Journal of Construction in Developing Countries, 17(1) 2012, 49–67, 2012

Influence of the Monitoring and Control Strategies of Indigenous and Expatriate Nigerian Contractors on Project Outcome

Godwin Iroroakpo Idoro

Abstract: Monitoring and control are very important management functions for ensuring that project objectives are fully achieved. This study compares the level and effectiveness of the efforts of indigenous and expatriate Nigerian contractors on project monitoring and control. The aim of this study is to establish whether the project monitoring and control efforts of the contractors contribute to an improved project outcome. The study's objectives are to compare the frequencies at which project monitoring and control strategies are used by Nigerian contractors and their influence on project outcome. A field survey was conducted using a sample of 86 contractors selected by stratified random sampling. The data were collected using structured questionnaires and analysed using the mean, t-test and Spearman correlation test. The results of the study reveal that indigenous contractors carry out project control strategies more frequently than expatriate contractors. Furthermore, three of the eight monitoring and control strategies influence the project outcome, while the remaining strategies do not; this result indicates that while some of the strategies are effective, others are not. Contractors should thus ensure that their project monitoring and control efforts are directed towards improving the entire outcomes of their projects.

Keywords: Contractors, Nigeria, Project control, Project monitoring, Project outcome

INTRODUCTION

Monitoring and control are two management functions that play a very important role in project success. Planning defines the strategies, tactics and methods for achieving project objectives, while monitoring and control provide the required checks and balances for ensuring that the plans and overall project objectives are achieved. Plans cannot bring about the required end by themselves; they must be complemented with monitoring and control to achieve their goals. Arditi (1985), Mauricio and Carlos (2002) confirmed that the performance of companies in project delivery depends largely on their control structures as well as their production planning. Kharbanda and Pinto (1996) maintained that most, if not all, major project failures could be traced to inadequate and inaccurate planning or blind adherence to the originally formulated plans regardless of how the environment changed in the interim.

In construction, contractors are one of the major parties concerned with the monitoring and control of projects. They are responsible for executing the works that form the contract. In Nigeria, research studies classify construction contractors into indigenous and expatriate contractors. In separate studies, Edmonds (1979), Ogunpola (1984), Olateju (1991), Samuel (1999), Mayaki (2003) and Idoro (2007) classified construction contractors operating in Nigeria into indigenous and expatriate contractors. The authors describe indigenous contractors as private firms that engage in the production or delivery of construction projects that are fully owned and managed by Nigerians, while expatriate contractors are

Department of Building, University of Lagos, Akoka, Yaba, Lagos, NIGERIA
*Corresponding author: iroroidoro@yahoo.com

described as private firms that also engage in the production or delivery of construction projects that are jointly owned by Nigerians and foreigners but the management of which is fully controlled by expatriates. Ogunpola (1984), Olateju (1991), Samuel (1999) and Idoro (2004) discovered that expatriate contractors are few in number, operate on a large scale and execute the majority of contracts in Nigeria; in contrast, indigenous contractors considerably outnumber their expatriate counterparts and operate on small and medium scales, but they are responsible for a very small proportion of the value of contracts executed in Nigeria. These two parties collaborate with consultants in the monitoring and control of projects to ensure that they are delivered within the scheduled time and cost and to the required quality standards.

The challenges of globalisation require that these two categories of contractors compete favourably with each other in performance. For indigenous contractors to survive in this modern, competitive global market, they must compare with their expatriate counterparts in all aspects of production. Idoro (2010) discovered that Nigerian clients give expatriate contractors preference over their indigenous counterparts in the award of contracts because they perceive the performance of the former as better than the latter in work quality standards. The challenge before indigenous contractors is to determine the way in which the confidence of clients can be gained and their impression of these contractors can be reversed. The effective monitoring and control of projects executed are two important strategies that the contractors cannot disregard when facing this challenge because these aspects are crucial to project performance.

This understanding prompts a comparison of the frequencies at which monitoring and control strategies are used by indigenous and expatriate contractors and their influence on project outcome in the Nigerian construction industry. The aim of this study is to compare the level and effectiveness of project monitoring and control efforts undertaken by indigenous and expatriate contractors. The study objectives are to determine the frequency at which selected monitoring and control strategies are used and their correlation with project outcome in projects executed by indigenous and expatriate contractors. The achievement of these objectives will assist both indigenous and expatriate contractors in utilising their project monitoring and control efforts to improve the outcomes of their projects.

Literature Review

The construction industry holds a very important position in the economy of Nigeria and can be regarded as the driver of economic development. Idoro (2004) considered construction as the leading industry in developing economies and a big player in economic development. The industry accounts for a substantial part of the gross domestic product (GDP) of each nation. Ogunlana (2002) estimated the contribution of the construction industry to GDP as 6%–10%. The Federal Ministry of Economic Development (1980) estimated the share of the construction industry to the GDP of Nigeria from 1967/1968–1972/1973 as 56%–66% and that from 1974/1975–1979/1980 as 71%–79%, while the Federal Government of Nigeria (1984; 1985; 1986) estimated the average share of construction to GDP as 60%–80%. The importance of the industry is also reflected in its capacity to create

employment and serve as a vocational training ground for employees to acquire skills in several areas. Ogunlana (2002) stated that the industry is responsible for approximately 10% of the workforce of most countries, with higher percentages for developing countries. Adeniyi (1984) found that between 1960 and 1970, the building sector of the construction industry alone accounted for an average of 30% of the total registered employment in Nigeria. When the percentage contribution of the civil engineering sector is included, it is clear that the industry should be the focal point for generating employment. The industry can be used to create millions of jobs and numerous training and development opportunities. The industry is also responsible for creating the desired environment for the growth and development of other sectors of every economy. The products of the industry, such as buildings, roads and other infrastructural facilities, are development stimulants that can hinder or accelerate the growth of other industries.

Contractors are one of the major players in the construction industry. They are responsible for executing most of the construction programmes for the three tiers of government in Nigeria, their parastatals and the organised private sector. Therefore, the success or failure of construction projects and the supply and quality of construction products are largely determined by their performance. In separate studies, Edmonds (1979), Ogunpola (1984), Olateju (1991), Samuel (1999), Mayaki (2003) and Idoro (2007) classify construction contractors operating in Nigeria into indigenous and expatriate contractors. The authors describe indigenous contractors as private firms that engage in the production or delivery of construction projects that are fully owned and managed by Nigerians, while expatriate contractors are described as private firms that also engage in the production or delivery of construction projects that are jointly owned by Nigerians and foreigners but the management of which is fully controlled by expatriates. Ogunpola (1984), Olateju (1991), Samuel (1999) and Idoro (2004) discovered that expatriate contractors are few in number, operate on a large scale and execute the majority of contracts in Nigeria; in contrast, indigenous contractors considerably outnumber their expatriate counterparts and operate on small and medium scales, but they are responsible for a very small proportion of the value of contracts executed in Nigeria. These two parties collaborate with consultants in the monitoring and control of projects to ensure that they are delivered within the scheduled time and cost and to the required quality standards.

Monitoring and control are regarded as management functions and are processes in the delivery of a project. Enshassi (1996) describes project monitoring as the process of collecting, recording and reporting information concerning any or all aspects of the performance of a project. Otieno (2000) describes it as a continuous assessment of a programme or project in relation to the agreed implementation schedule or plan. Mawdesley, Askew and O'Reilly (1997) identify 16 sources of records for project monitoring describing the documents produced through a number of activities, or strategies, that constitute project monitoring. Four of these activities, site visit, site meeting, interim valuation and financial statement, were selected to represent project monitoring in this study. Interim valuations refer to the report of valuations carried out periodically, such as monthly or bi-monthly, to determine the value of the work completed by the contractor in a satisfactory manner. Financial statements refer to the statement of the account of a project inclusive of payments received from certificates and expenditures. The level of project monitoring can be considered from the perspective of the

regularity or time interval of these activities. Enshassi (1996) emphasises the importance of monitoring projects at frequent intervals and on a timely basis. Monitoring and control are often regarded as a single activity because they are both project management functions, sequential and closely related. Anthony (1965) acknowledges their relationship but regards them as separate activities because monitoring leads to control. Ritz (1994) describes control as the work of constraining, coordinating and regulating actions in accordance with plans to meet specific objectives. Control is, as a process, distinguishable from monitoring by a number of activities through which schedule slippage in project performance is corrected. Odiorne (1965) identifies three of these activities as rescheduling activities, reallocating resources and altering project objectives. Kursave (2003) reflects that monitoring and control ensure that all of the changes are incorporated into the original plan. Programme updating, plan review, objective review and scope review were selected as the activities to represent project control. Programme updating describes the activities concerned with incorporating changes into the original plans. Project plan review describes the adjustment of project plans, potentially translating into new plans. Project objective review refers to the adjustment of project objectives to align with the project status, while project scope review refers to the adjustment of the scope of work in the project. The level of project control can also be considered from the perspective of the regularity of these activities.

As Faniran, Oluwoye and Lenard (1998) stated, the purpose of carrying out these project monitoring and control strategies is to complete a project within a scheduled time and cost and to a specified quality standards. This understanding shows that monitoring and control cannot be separated from project performance. Naoum (1991), Ling and Chan (2002) and Thomas et al. (2002) use project performance as the basis for evaluating the effectiveness of project delivery processes. Nahapiet and Nahapiet (1985), Naoum (1991), Thomas et al. (2002), Ling and Chan (2002) and Ling et al. (2004) describe project performance as the assessment of project success and use objective factors, including time, cost and quality objectives, and subjective factors, which are concerned with the assessment of stakeholders' satisfaction. This study used four objective variables: time and cost overruns, percentage of time overrun to the initial contract period and percentage of cost overrun to the initial contract sum. Naoum (1991) describes time overrun as the difference between the planned and actual contract periods and cost overrun as the difference between the initial and final contract sums.

Conceptual Framework for the Study

The variables selected to achieve the objectives above were categorised into construction contractors, project monitoring, project control and project outcome. According to Edmonds (1979), Ogunpola (1984), Olateju (1991), Samuel (1999), Mayaki (2003) and Idoro (2007), Nigerian contractors are typically classified into two indigenous and expatriate contractors. Site visit, site meeting, interim valuation and financial statement were selected as the variables of project monitoring. For project control, Odiorne (1965) identified rescheduling activities, reallocating resources and altering project objectives. These activities involve reviewing the project plan, scope and objectives. The fourth project control

process involves updating the programme of work of a project. Thus, programme updating, project plan review, project objective review and project scope review were selected as the project control variables. For project outcome, Hatush and Skitmore (1997) and Michell et al. (2007) maintained that cost, time and quality are the most important parameters of project outcome. For this reason, percentages of time overrun to the initial contract period and cost overrun to the initial contract sum, which were discovered in previous studies (Michell et al., 2007; Idoro, 2008) to be the principal factors for measuring project outcome, were used in this study as the project outcome variables.

Research studies found that construction contractors in Nigeria are either indigenous or expatriates and that these two contractor categories differ in patronage and performance. This assertion suggests that the project monitoring and control efforts of these two types of contractors are likely to differ. Furthermore, Faniran, Oluwoye and Lenard (1998) assert that the objective of monitoring and control is the same as that of planning: to complete a prescribed amount of work within a fixed time, at a previously estimated cost and to specify quality standards. This understanding suggests that the basis of establishing the effectiveness of contractors' project planning, monitoring and control efforts is project outcome. The relationship between planning monitoring and control and project outcome implies that a relationship exists between the four categories of variables used in the study. This relationship is expressed in a conceptual framework adopted for the study, presented in Figure 1.

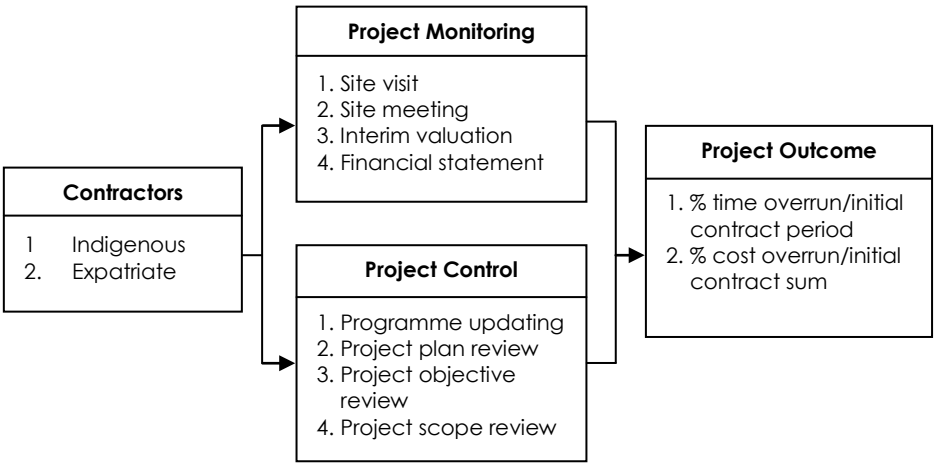

Figure 1. Framework for Comparing Indigenous and Expatriate Contractors' Project Monitoring and Control Efforts

The framework shows that project outcome and the frequencies at which project monitoring and control efforts are used may differ based on whether a contractor is an indigenous or expatriate firm, and project outcome may differ based on these frequencies.

Hypotheses of the Study

To achieve the objectives of the study, three hypotheses were postulated. The first hypothesis states that the frequencies at which selected monitoring and control strategies are used among indigenous and expatriate contractors do not differ significantly. The results of this hypothesis will assist indigenous contractors in benchmarking their monitoring and control efforts with those of their expatriate counterparts. The second hypothesis states that the frequencies at which indigenous contractors use project monitoring and control strategies are not significantly correlated with the outcomes of their projects. The third hypothesis states that the frequencies at which expatriate contractors use project monitoring and control strategies are not significantly correlated with the outcomes of their projects. The results of the second and third hypotheses will assist the two categories of contractors in assessing the effectiveness of their efforts

RESEARCH METHODS

A questionnaire research design approach involving a field survey was adopted to achieve this study's objectives. In the survey, comprehensive data on contractors operating in Nigeria could not be obtained; therefore, a pilot study was conducted in late 2009 in which 161 contractors were identified and adopted as the study population. The population frame was stratified into two categories consisting of 121 indigenous contractors and 40 expatriate contractors. From the list of projects executed by each contractor category that were completed in 2009, the project having the highest value was selected for the investigation.

Data were collected on the frequencies at which site visits and meetings are carried out, interim valuations and financial statements are prepared, programmes of work are updated and project plans, objectives and scopes are reviewed. Data were also collected on the initial and final contract periods and sums of the projects. Frequencies of site visits and meetings were measured using four ranks: weekly, two weeks, three weeks and four weeks. The two remaining project monitoring variables, frequencies at which interim valuations and financial statements are prepared, were measured using four ranks: four weeks, eight weeks, 12 weeks and 16 weeks, representing one month, two months, three months and four months, respectively. The four project control variables were measured using six ranks: one month, two months, three months, four months, five months and six months, representing four weeks, eight weeks, 12 weeks, 16 weeks and 20 weeks, respectively. All of the project monitoring and control variables were recorded in weeks for analysis purposes. The initial and actual contract periods were obtained in weeks, while the initial and final contract sums were obtained in Nigerian currency, which is Naira (N). Time overrun was derived as the difference between the actual and initial contract periods, while cost overrun was derived as the difference between the final and initial contract sums. These two overruns were used to calculate the percentages of time overrun to initial contract period and cost overrun to initial contract sum, which are the project outcome variables.

The data were collected with the aid of structured questionnaires that were administered by hand in early 2010 to the contract managers of the contractors constituting the study population. The respondents were asked to indicate the rank that represented their assessment of the frequencies at which the project monitoring and control strategies were carried out. They were also asked to state the initial and final contract periods and project sums. From the questionnaires returned, a sample of 85 contractors (questionnaires) consisting of 64 indigenous contractors and 21 expatriate contractors was selected by stratified random sampling. The ranking and test of difference in the frequencies at which indigenous and expatriate contractors use the project monitoring and control variables were analysed using the mean and t-test, respectively, while the relationship between the frequencies at which project monitoring and control strategies are used and the project outcome was tested using the Spearman correlation test.

RESULTS OF THE DATA ANALYSIS

The analysis of data collected and the results obtained are presented below.

Characteristics of Projects Used for the Study

The characteristics of the projects sampled were analysed to provide an understanding of the projects to which the results of the study apply. For the purpose of investigating the characteristics of the projects sampled, four characteristics namely: project type, client, contractor and procurement method, were analysed. The percentages at which the projects used a given project type, client type, contractor type and procurement method are presented in Table 1.

Table 1. Descriptive Result of the Characteristics of the Projects Used in the Study

Characteristic	**N**	**%**	**Characteristic**	**N**	**%**
Project type			**Project client**		
Buildings	72	83.7	Public	16	18.6
Roads	14	16.3	Private	70	81.4
Total	86	100	Total	86	100
Project procurement method			**Project contractor**		
Direct labour	29	33.7	Indigenous	64	74.4
Design-bid-build	48	55.8	Expatriate	22	25.6
Design-build	9	10.5			
Total	86	100	Total	86	100

N = Number of respondents

Table 1 shows that 38% of the sampled projects are building projects and 16.3% are road projects. Regarding procurement methods, 33.7% are direct labour projects, 55.8% are design-bid-build projects and 10.5% are design-build projects. Governments and their parastatals develop 18.6% of the projects, while private

clients develop 81.4%. Indigenous contractors execute 74.4% of the projects in the sample, while projects expatriate contractors execute 25.6%.

Ranking of the Frequencies at which Indigenous and Expatriate Contractors use Project Monitoring and Control Strategies

The data collected on the frequencies at which project monitoring and control strategies are used were analysed to determine the ranking of the efforts of the two contractor categories using the mean. The results are presented in Table 2.

Table 2. Ranks of the Frequencies at Which Indigenous and Expatriate Contractors Use Project Monitoring and Control Strategies

Strategy	N	$\bar{X}$	Std. Dev.	Rank
Site visits				
Indigenous	64	1.38	0.604	1
Expatriate	21	1.24	0.700	2
Site meetings				
Expatriate	20	1.70	0.733	1
Indigenous	62	1.63	0.723	2
Interim valuations				
Expatriate	20	8.00	4.104	1
Indigenous	60	6.45	3.788	2
Financial statement				
Indigenous	62	7.42	4.276	1
Expatriate	20	7.20	4.021	2
Updating programme of work				
Expatriate	20	8.00	4.104	1
Indigenous	60	5.94	3.377	2
Review of project plans				
Expatriate	20	8.80	4.021	1
Indigenous	60	6.19	3.524	2
Review of project objectives				
Expatriate	20	11.20	3.578	1
Indigenous	60	6.45	3.642	2
Review of project scope				
Expatriate	20	10.40	4.570	1
Indigenous	60	6.97	3.392	2

N = Number of respondents, Std. dev. = Standard deviation

Table 2 shows that the frequencies at which indigenous contractors conduct site visits ($\bar{X}$ = 1.38 weeks) and prepare financial statements ($\bar{X}$ = 7.42 weeks) rank first, while the frequencies at which expatriate contactors conduct site meetings ($\bar{X}$ = 1.24 weeks) and prepare financial statements (7.20 weeks) rank second. These

results indicate that expatriate contractors tend to carry out site meetings and prepare financial statements more frequently than indigenous contractors. However, Table 2 shows that the frequencies at which expatriate contractors conduct site meetings ($\bar{x}$ = 1.70 weeks) and prepare interim valuations ($\bar{x}$ = 8.00 weeks) rank first, while the frequencies at which indigenous contractors conduct site meetings ($\bar{x}$ = 1.63 weeks) and prepare interim valuations ($\bar{x}$ = 6.45 weeks) rank second. These results indicate that indigenous contractors tend to monitor projects by carrying out site meetings and interim valuations more frequently than expatriate contractors. The results imply that the levels of the project monitoring efforts of indigenous contractors by conducting site meetings and preparing interim valuations are higher than those of expatriate contractors.

Table 2 reveals that the frequencies at which expatriate contractors update programmes of work ($\bar{x}$ = 8.0 weeks) and review project plans ($\bar{x}$ = 8.8 weeks), objectives ($\bar{x}$ = 11.2 weeks) and scope ($\bar{x}$ = 10.4 weeks) rank first, while the frequencies at which indigenous contractors updating programmes of work ($\bar{x}$ = 5.94 weeks) and review project plans ($\bar{x}$ = 6.19 weeks), objectives ($\bar{x}$ = 6.45 weeks) and scope ($\bar{x}$ = 6.97 weeks) rank second. These results indicate that indigenous contractors tend to control projects by updating programmes of work and reviewing project plans, objectives and scope more frequently than expatriate contractors. The results imply that the levels of the project control efforts of indigenous contractors by updating programmes of work and reviewing project plans, objectives and scope are higher than those of expatriate contractors.

Differences in the Frequencies at which Indigenous and Expatriate Contractors use Project Monitoring and Control Strategies

The results in Table 2 have shown that the frequencies at which the four project monitoring strategies and three project control strategies are used by the two categories of contractors rank differently. Further analysis is therefore completed to determine whether these differences are significant or not. This involves the test of the first hypothesis, which states that the frequencies at which project monitoring and control strategies are used in projects executed by indigenous and expatriate contractors do not differ significantly. The hypothesis was tested using a t-test with a p-value ≤ 0.05. The rule for accepting or rejecting the hypothesis is that the hypothesis is accepted when the p-value > 0.05, but the hypothesis is rejected when the p-value ≤ 0.05. The eight project monitoring and control strategies were used for the test. The results are presented in Table 3.

Table 3. Results of the t-Test for the Difference in the Frequencies at which Indigenous and Expatriate Contractors Use Project Monitoring and Control Strategies

Strategy	N	t-Value	Df	p-Value
Site visits				
Indigenous	64	0.866	83	0.389
Expatriate	21			
Site meetings				
Expatriate	20	–0.361	80	0.719
Indigenous	62			
Interim valuations				
Expatriate	20	–1.558	80	0.123
Indigenous	60			
Financial statement				
Indigenous	62	0.202	80	0.840
Expatriate	20			
Updating programme of work				
Expatriate	20	2.253	80	0.027
Indigenous	60			
Review of project plans				
Expatriate	20	2.778	80	0.007
Indigenous	60			
Review of project objectives				
Expatriate	20	5.086	80	0.001
Indigenous	60			
Review of project scope				
Expatriate	20	–3.601	80	0.001
Indigenous	60			

N = Number of respondents, Df = Degrees of freedom

Table 3 shows that the p-values for the tests of the difference in the frequencies at which indigenous and expatriate contractors conduct site visits (0.389) and site meetings (0.719) and prepare interim valuations (0.123) and financial statements (0.840) are greater than the critical p-value (0.05); therefore, the hypothesis is accepted for these variables. These results imply that indigenous and expatriate contractors conduct site visits and meetings and prepare interim valuations and financial statements at the same frequency.

Table 3 reveals that the p-values for the tests of the difference in the frequencies at which indigenous and expatriate contractors update programmes of work (0.027) and review project plans (0.007), objectives (0.001) and scope (0.001) are greater than the critical p-value (0.05); therefore, the hypothesis is accepted. These results imply that all of the project control efforts by indigenous and expatriate contractors are significantly the same.

Influence of the Levels at which Indigenous Contractors use Selected Project Monitoring and Control Strategies on Project Outcome

Because the purpose of this study is to assist indigenous and expatriate contractors in evaluating the effectiveness of their monitoring and control efforts, an attempt was made to determine the relationship between the frequencies at which these contractors use project monitoring and control and the outcomes of their projects. This involves the test of the study's second hypothesis, which states that the frequencies at which indigenous contractors use project monitoring and control strategies have no significant relationship with the outcomes of their projects. The hypothesis was tested using the Spearman correlation test with a p-value ≤ 0.05. The rule for accepting or rejecting the hypothesis is that the hypothesis is accepted when the p-value > 0.05, but the hypothesis is rejected when the p-value ≤ 0.05. The eight project monitoring and control parameters and the two project outcome parameters stated in the research methods were used for the test. The results are presented in Table 4.

Table 4. Results of the Spearman Test for the Correlation between the Frequencies at which Indigenous Contractors Use the Project Monitoring and Control Strategies and Project Outcome

Variables Paired	N	R	p-Value
% cost overrun/initial contract period			
Frequency of site visits	54	0.436	0.001
Frequency of site meetings	52	0.456	0.001
Frequency of interim valuations	52	–0.082	0.563
Frequency of financial statements	52	0.159	0.260
Frequency of programme of work	52	0.314	0.023
Frequency of project plans	52	0.080	0.574
Frequency of reviewing project objectives	52	0.001	0.996
Frequency of reviewing project scope	52	0.041	0.772
% time overrun/initial contract sum			
Frequency of site visits	56	–0.140	0.302
Frequency of site meetings	54	–0.228	0.097
Frequency of interim valuations	54	0.186	0.178
Frequency of financial statements	54	–0.209	0.130
Frequency of programme of work	54	0.057	0.684
Frequency of project plans	54	–0.012	0.930
Frequency of reviewing project objectives	54	0.079	0.570
Frequency of reviewing project scope	54	–0.186	0.177

N = Number of respondents, R = Correlation coefficient value

Table 4 shows that the p-values for the test of correlation between the percentage of cost overrun to the initial contract sum and the frequencies at which interim valuations (0.563) and financial statements (0.260) are prepared and project plans (0.574), objectives (0.996) and scope (0.772) are reviewed are greater than the critical p-value (0.05); therefore, the hypothesis is accepted for these variables.

These results indicate that the frequencies at which indigenous contractors prepare interim valuations and financial statements and review project plans, objectives and scope have no significant correlation with the percentage of cost overrun to the initial contract sum of their projects. However, the p-values for the test of correlation between the percentage of cost overrun to the initial contract sum of their projects and the frequencies at which site visits (0.001) and site meetings (0.001) are conducted and programmes of work (0.023) are updated are less than the critical p-value (0.05); therefore, the hypothesis is rejected for these variables. These results indicate that the frequencies at which indigenous contractors conduct site visits and meetings and update programmes of work are significantly correlated with the percentage of cost overrun to the initial contract sum of their projects.

Table 4 shows that the p-values for the test of correlation between the percentage of time overrun to the initial contract period of the projects and the frequencies at which site visits (0.302) and meetings (0.097) are conducted, interim valuations (0.178) and financial statements (0.130) are prepared, programmes of work (0.684) are updated and project plans (0.930), objectives (0.570) and scope (0.177) are reviewed are greater than the critical p-value (0.05); therefore, the hypothesis is accepted for these variables. These results indicate that the frequencies at which indigenous contractors use the eight project monitoring and control strategies have no significant correlation with the percentage of time overrun to the initial contract period of their projects. In other words, all of the project monitoring and control efforts of indigenous contractors have no influence on the ratio of overrun to scheduled delivery time of their projects.

Influence of the Levels at which Expatriate Contractors Use Selected Project Monitoring and Control Strategies on Project Outcome

The relationship between the frequencies at which expatriate contractors use project monitoring and control strategies and the outcomes of their projects was also evaluated. This involves the test of the study's third hypothesis, which states that the frequencies at which expatriate contractors use project monitoring and control strategies have no significant relationship with the outcomes of their projects. The hypothesis was tested using the Spearman correlation test with a p-value $\leq$ 0.05. The rule for accepting or rejecting the hypothesis is that the hypothesis is accepted when the p-value > 0.05, but the hypothesis is rejected when the p-value $\leq$ 0.05. The eight project monitoring and control parameters stated above and the two project outcome parameters stated in the research methods were used for the test. The results are presented in Table 5.

Table 5. Results of the Spearman Test for the Correlation between the Frequencies at which Expatriate Contractors Use the Project Monitoring and Control Strategies and Project Outcome

Variables Paired	N	R	p-Value
% cost overrun/initial contract period			
Frequencies of site visits	17	–0.402	0.110
Frequencies of site meetings	16	0.084	0.757
Frequencies of interim valuations	16	–0.218	0.417
Frequencies of financial statements	16	–0.546	0.029
Frequency of programme of work	16	–0.327	0.216
Frequency of project plans	16	–0.056	0.836
Frequency of reviewing project objectives	16	0.153	0.571
Frequency of reviewing project scope	16	0.412	0.112
% time overrun/initial contract sum			
Frequencies of site visits	19	0.044	0.859
Frequencies of site meetings	18	0.275	0.269
Frequencies of interim valuations	18	–0.346	0.159
Frequencies of financial statements	18	–0.087	0.733
Frequency of programme of work	18	0.087	0.733
Frequency of project plans	18	0.182	0.469
Frequency of reviewing project objectives	18	0.105	0.677
Frequency of reviewing project scope	18	0.258	0.301

N = Number of respondents, R = Correlation coefficient value

Table 5 shows that the p-values for the test of correlation between the percentage of cost overrun to the initial contract sum and the frequencies at which expatriate contractors conduct site visits (0.110) and meetings (0.757), prepare interim valuations (0.417), update programmes of work (0.216) and review project plans (0.836), objectives (0.571) and scope (0.112) are greater than the critical p-value (0.05); therefore, the hypothesis is accepted for these variables. These results indicate that the frequencies at which expatriate contractors use the three project monitoring strategies, site visits, site meetings, interim valuations, and the four project control strategies have no significant correlation with the percentage of cost overrun to the initial contract sum recorded in their projects. However, the p-value for the test of correlation between the percentage of cost overrun to the initial contract sum and the frequency at which financial statements (0.029) are prepared is less than the critical p-value (0.05); therefore, the hypothesis is rejected for this variable. The result indicates that the frequency at which expatriate contractors prepare financial statements is significantly correlated with the overrun in the contract sum of their projects.

Table 5 shows that the p-values for the test of correlation between the percentage of time overrun to the initial contract period and the frequencies at which expatriate contractors conduct site visits (0.859) and meetings (0.269), prepare interim valuations (0.159) and financial statements (0.733), update programmes of work (0.733) and review project plans (0.469), objectives (0.677) and scope (0.301) are greater than the critical p-value (0.05); therefore, the

hypothesis is accepted for these variables. These results indicate that the frequencies at which expatriate contractors use the eight project monitoring and control strategies have no significant correlation with the percentage of time overrun to the initial contract period recorded in their projects. In other words, the project monitoring and control efforts of expatriate contractors have no influence on the percentage of time overrun to the initial contract period recorded in their projects.

DISCUSSIONS

The results of the study have revealed that the frequencies at which the two categories of contractors conduct site visits and meetings and prepare interim valuations and financial statements are insignificant. These results imply that the frequencies at which indigenous and expatriate contractors monitor projects are the same. However, the study reveals that the frequencies at which the two categories of contractors update programmes of work and review project plans, objectives and scope are significantly different. These results indicate that indigenous contractors carry out the four project control strategies more frequently than expatriate contractors. The implication is that contractor type affects the frequency at which projects are controlled, but it does not affect the frequency at which they are monitored. While indigenous contractors update the work programme of their projects and review their plans, objectives and scope more frequently than expatriate contractors, they conduct site visits and meetings and prepare interim valuations and financial statements at the same frequency as their expatriate counterparts. It is important to note that while monitoring activities could be done by the contractors' team alone, control activities require the involvement and approval of other project stakeholders, especially project consultants. In other words, the higher frequencies (in the case of the indigenous contractors' projects) and lower frequencies (in the case of the expatriate contractors' projects) of control are in conjunction with other project stakeholders. Because the indigenous contractors' projects are small and those of the expatriate contractors are large, the results therefore imply that small projects require more frequent control than large projects. This is an indication that small projects are not as adequately planned as large projects. The question that arises from these results is "what is the relevance of these efforts?"

The analysis of the relationship between the project monitoring and control strategies and the outcomes of the projects executed by the two categories of contractors provides an answer to this question. The results of the study show that the frequency at which site visits are conducted significantly influences the percentage cost overrun to the initial contract sum; however, it has no influence on the percentage of time overrun to the initial contract period of projects executed by indigenous contractors. Similarly, it has no significant influence on the percentages of time overrun to the initial contract period and cost overrun to the initial contract sum of projects executed by expatriate contractors. These results indicate that the number of times that the contractors conduct site visits can reduce the cost overrun of projects executed by indigenous contractors but cannot reduce the time overrun of their projects and the cost and time overruns of projects executed by expatriate contractors.

The results of the relationship between the frequency at which site meetings are conducted and the two project outcome parameters indicate that the frequency of site meetings significantly influences the percentage of cost overrun to the initial contract sum of projects executed by indigenous contractors but has no influence on the percentage of time overrun to the initial contract period of their projects. The results of the study also indicate that the frequency at which site meetings are conducted has no significant influence on the time and cost overruns of projects executed by expatriate contractors. These results imply that the number of site meetings held can reduce the cost overrun of projects executed by indigenous firms. This result supports the assertions by Arditi (1985) and Mauricio and Carlos (2002) that the performances of firms depend on their monitoring and control structures.

The results of the relationship between the frequency at which interim valuations are prepared and the two project outcome parameters indicate that the frequency of interim valuation preparations has no significant influence on the percentages of time overrun to the initial contract period and cost overrun to the initial contract sum of the projects executed by both indigenous and expatriate firms. These results imply that the number of interim valuation reports prepared does not contribute to the outcomes of projects executed by the two categories of contractors.

The results of the relationship between the frequency at which financial statements are prepared and project outcome indicate that the frequency of financial statement preparations significantly influences the percentage of cost overrun to the initial contract sum of projects executed by expatriate contractors. However, it does not influence the percentages of time overrun to the initial contract period and cost overrun to the initial contract sum of projects executed by indigenous contractors or the percentage of time overrun to the initial contract period of projects executed by expatriate contractors. This result indicates that the efforts of indigenous contractors in preparing financial statements do not contribute to the outcomes of their projects, and that of the expatriate contractors only contributes to the cost overrun of their projects.

The results of the relationship between the frequency at which work programmes are updated and project outcome indicate that the frequency of work programme updates significantly influences the percentage of cost overrun to the initial contract sum of projects executed by indigenous contractors. However, it has no influence on the percentage of time overrun to the initial contract period of projects executed by indigenous contractors or the time and cost overruns of projects executed by expatriate contractors. These results imply that the number of times that a work programme is updated contributes to the cost overrun of projects executed by indigenous contractors but does not contribute to the time overrun of their projects or the time and cost overruns of projects executed by expatriate contractors.

The results of the relationship between the frequency at which project plans and objectives are reviewed and project outcome indicate that the frequencies of project plan and objective reviews have no significant influence on the time and cost overruns of projects executed by both indigenous and expatriate contractors. These results imply that the number of times that indigenous and expatriate contractors review project plans and objectives does not influence the outcomes of their projects. Similarly, the results of the relationship between the

frequency at which the project scope is reviewed and project outcome indicate that the frequency of project scope reviews has no significant influence on the percentages of cost overrun to the initial contract sum or time overrun to the initial contract period of projects executed by indigenous and expatriate contractors. This result indicates that the efforts of the two categories of contractors in project scope reviews do not contribute to the outcomes of their projects, as asserted by Arditi (1998) and Mauricio and Carlos (2002).

CONCLUSION

The results of the test of the study's first hypothesis have established that the two categories of contractors carry out the four project monitoring strategies at the same frequency, but indigenous contractors carry out the four project control strategies more frequently than their expatriate counterparts. Because control measures are applied when the project status is behind schedule, the results of the study therefore suggest that the projects executed by indigenous contractors are more frequently delayed and demand more control measures than those executed by expatriate contractors. Previous studies conducted by Elinwa and Buba (1993), Elinwa and Uba (2001), Elinwa and Joshua (2001) and Aibinu and Jagboro (2002) also found that a delay in the delivery of projects is a major problem in Nigeria.

The results of the test of the second hypothesis revealed that the frequencies at which site visits and site meetings are conducted and programmes of work are updated can reduce the cost overrun of projects executed by indigenous contractors, while the test of the third hypothesis shows that the frequencies at which financial statements are prepared can reduce the cost overrun of projects executed by expatriate contractors. The conclusion from these findings is that indigenous contractors can reduce the cost overrun of their projects by conducting more site visits and meetings and updating their programmes of work more often; expatriate contractors can achieve the same result in their projects by preparing financial statements more often.

Furthermore, the results of the study have revealed that the use of many of project monitoring and control strategies by indigenous and expatriate contractors does not contribute to the outcomes of their projects. This result suggests that the two categories of contractors do not utilise some of the strategies to improve the delivery time and cost of their projects. While these contractors carry out these strategies, they do not utilise them for monitoring and controlling their projects. The challenge before the contractors now is how to utilise the strategies to improve the outcomes of their project. Though not established in this study, the firms may lack the knowledge of how to use the reports or statements produced from these activities to monitor and control projects. There is a need for these firms to ensure that their project monitoring and control efforts are utilised to improve the outcomes of their projects. Thus, they should ensure that site visits, site meetings, interim valuations and financial statements are carried out more frequently than before. They should also explore the possibility of utilising the monitoring and control strategies to improve the outcomes of their projects. In this regard, project objectives, scope and plans and programmes of work should be properly defined and prepared before projects are executed, and site visits, site

meetings, interim valuations and financial statements should be carried out frequently and at a high standard during the execution of the projects. The firms should also ensure that their management staffs possess adequate knowledge of how to utilise the reports and statements prepared from the activities to monitor and control their projects effectively.

SUGGESTIONS FOR FURTHER RESEARCH

This study only adopted the frequencies at which monitoring and control activities are carried out for investigating the contributions of monitoring and control to project outcome. However, the quality of monitoring and control activities will equally contribute to project outcome. For this reason, further research on the contribution of the quality of project monitoring and control strategies to project outcome is suggested to complement the results of this study.

REFERENCES

Adeniyi, E. O. (1984). Housing and the Construction Industry in Nigeria. *Proceedings of the Annual Conference of Nigeria Economic Society*. Ibadan, Nigeria: University of Ibadan, 91–101.

Aibinu, A.A. and Jagboro, G.O. (2002). The effects of construction delays on project delivery in Nigerian construction industry. *International Journal of Project Management,* 20(8): 593–599.

Anthony, R.N. (1965). *Planning and Control System: A Framework for Analysis.* Massachusetts: Division of Research, Graduate School of Business Administration, Harvard University.

Arditi, J.D. (1985). Construction productivity improvement. *Journal of the Construction Division (ASCE)*, 111(1): 1–4.

Edmonds, G.A. (1979). Macro firms: Construction firms for the computer age. *Journal of Construction Engineering and Management* 109(1): 13–24.

Elinwa, A.U. and Buba, S.A. (1993). Construction cost factors in Nigeria. *Journal of Construction Engineering and Management (ASCE)*, 119(4): 698–713.

Elinwa, A.U. and Joshua, A. (2001). Time-overrun factors in Nigerian construction industry. *Journal of Construction Engineering and Management,* 127(5): 409–425.

Elinwa, U. and Uba, A.S. (2001). Failure factors in the Nigerian construction industry. *Nigerian Journal of Engineering and Management,* 2(1): 16–21.

Enshassi, A. (1996). A managing and controlling system in managing infrastructure projects. *Building Research and Information,* 24(3):163–189.

Faniran, O.D., Oluwoye, J.O. and Lenard, D. (1998). Interactions between construction planning and influence factors. *Journal of Construction Engineering and Management*, 124(4) (July/August): 245–258

Federal Government of Nigeria. (1984). *Budget of the Federal Republic of Nigeria.* Lagos, Nigeria: Federal Government Press.

———. (1985). *Budget of the Federal Republic of Nigeria.* Lagos, Nigeria: Federal Government Press.

———. (1986). *Budget of the Federal Republic of Nigeria.* Lagos, Nigeria: Federal Government Press.

Federal Ministry of Economic Development. (1980). *Second National Development Plan.* Lagos, Nigeria: Federal Government Press.

Hatush, Z. and Skitmore, M. (1997). Evaluating contractor prequalification data: Selection criteria and project success factors. *Construction Management and Economics,* 15(2): 129–147

Idoro, G.I. (2004). The effect of globalisation on safety in the construction industry in Nigeria. *Proceedings: The International Symposium on Globalisation and Construction*. School of Civil Engineering, Asian Institute of Technology, Bangkok, Thailand, November.

———. (2007). Contractors' characteristics and health and safety performance in the Nigerian construction industry. *Proceedings: The CIB World Building Conference on Construction for Development.* Cape Town, South Africa, 14–18 May.

———. (2008). Effect of mechanisation on project performance in the Nigerian construction industry. *Proceedings: RICS Construction and Building Research Conference (COBRA 2008)*. Dublin Institute of Technology, Dublin, UK, 4–5 September 2008.

———. (2010). Influence of quality performance on clients' patronage of indigenous and expatriate construction contractors in Nigeria. *Journal of Civil Engineering and Management,* 16(1): 65–73.

Kharbanda, O.P. and Pinto, J.K. (1996). *What Made Gertie Gallop? Learning from Project Failures.* 1st Edition. New York: Von Nostrand Reinhold.

Kursave, J.D. (2003). The necessity of project schedule updating, monitoring, statusing. *Journal of Cost Engineering*, 45(7): 8–14.

Ling, F.Y.Y. and Chan, S.L. (2002). Performance evaluation of alternative project procurement methods. Research brief. National University of Singapore.

Ling, F.Y.Y., Chan, S.L., Chong, E. and El, P. (2004). Predicting performance of design-build and design-bid-build projects. *Journal of Construction Engineering and Management (ASCE),* 130(1) (Jan/Feb): 10–20.

Mauricio, M.S.B. and Carlos, T.F. (2002). Contribution to the evaluation of production planning and control system in building companies. *Proceedings: IGL Conference*. Granado, Brazil, 12 August.

Mawdesley, M., Askew, W. and O'Reilly, M.P. (1997). *Planning and Controlling Construction Projects: The Best Laid Plans.* 1st Edition. London: Longman Publishers.

Mayaki, S.S. (2003). The place of Nigeria's building industry in a globalised world. Paper presented at the *International Conference on Globalisation and Capacity Building in the Construction Sector*. Department of Building, University of Lagos, Lagos, Nigeria, 1–5 December.

Michell, K., Bowen, P., Cattell, K., Edward, P. and Pearl, R. (2007). Stakeholder perceptions of contractor time, cost and quality management on building project. *Proceedings: The CIB World Building Conference on Construction for Development*. Cape Town, South Africa, 14–18 May. Rotterdam: International Council of Building Research (CIB), 231–240.

Nahapiet, H. and Nahapiet, J. (1985). A comparison of contractual arrangements for building projects. *Construction Management and Economics,* 3(3): 217–231.

Naoum, S.G. (1991). *Procurement and Project Performance Occasional Paper 45.* London: Chartered Institute of Building.

Odiorne, G.S. (1965). *Management by Objectives*. 1st Edition. New York: Pitman.

Ogunlana, S.O. (2002). Training for construction industry development best practice. In S.O. Ogunlana (ed.). *Training For Construction Industry Development*. CIB Publication No. 282. Rotterdam: International Council of Building Research (CIB), 1–6.

Ogunpola, A. (1984). The structure of building costs and implication for economic development. *Proceedings: The Annual Conference of Nigerian Economic Society*. Ibadan, Nigeria: Nigerian Economic Society, University of Ibadan.

Olateju, B. (1991). Enhancing the contract management capabilities of the indigenous contractor. *Effective Contract Management in the Construction Industry.* Lagos, Nigeria: Nigerian Institute of Building, 132–142.

Otieno, F.A.O. (2000). The roles of monitoring and evaluation in projects. *Proceedings: 2nd CIB W107 Construction in Developing Countries International Conference on Challenges Facing the Construction Industry in Developing Countries*. Gaborone, Botswana, 15–17 November.

Ritz, J.G. (1994). *Total Construction Project Management*. 1st Edition. New York: McGraw Hill Book Company.

Samuel, M.O. (1999). The causes of foreign dominance of the Nigerian construction industry and the prospects for the indigenous firms. MSc. thesis. University of Lagos, Nigeria, 21–22.

Thomas, S.R., Macken, C.L., Chung, T.H. and Kim, I. (2002). *Measuring the Impact of the Delivery System on Project Performance: Design-Build and Design-Bid-Build.* NIST GCR 02-840. Austin: Construction Industry Institute.