

COMPARISON OF THE PERFORMANCE OF TRADITIONAL AND DIRECT LABOUR METHODS OF PROJECT PROCUREMENT: A CASE STUDY OF SOME SELECTED PROJECTS OF THE NIGERIAN ARMY

Adenuga, O. A.

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Abstract

The study examined the performance of the two project procurement methods often employed by the Nigerian Army. The objective was to find out if one has any advantage over the other. Project success determinants like cost, time and quality formed the basis for evaluation and comparison of the performance of the two methods. Thirty completed building projects made up of ten new buildings and twenty renovation works were examined. Comparison was done based on similarity of projects specifically, the magnitude of work, the type and specifications of work. Fifteen projects made up of ten renovation works and five new projects were thus considered for analysis for each of the two procurement methods compared. Results indicate that there is no significant difference in the quality of projects procured using either of the two procurement methods. Further results also indicate that in terms of cost overrun, there is no significant difference between the two. It was however discovered that overall cost and unit cost of projects were higher for those procured using the traditional contract system. It was also discovered that significant difference does exist between time overruns in the two methods. Projects procured using the direct labour method took more time. The study concludes that there is the need for continuous training and exposure of the in-house professionals to improve their proficiency and efficiency to further enhance the quality of their products and improve upon the time taken to execute them.

Keywords: Procurement, time, cost, quality, cost-overrun, and time overrun.

Introduction

Procurement method is that method that is employed in acquiring a project. According to Odusami (1987), a procurement method can be described as the process of the management of the design and construction of a building from inception to the completion stage. Omotosho (1999) in his work stated that it is more or less a concept rather than an absolute way of realizing projects. It is one of the several stages of project delivery chain, which must not be confused with tendering procedures or types of contract. From the mid 1960s to date, many procurement methods have emerged and are in use in the construction industry, the peculiar situation, need and resources available to the client informing each choice. The downturn in the economy experienced in Nigeria after the oil boom era, among other compelling reasons like project complexity and magnitude, has also led practitioners in the construction industry to embrace some methods of project procurement other than the popular traditional contract system.

Mojekwu (1998), El Rufai (1992), Ogunsanmi and Bamisile (1997) identified five methods of project procurement commonly used in Nigeria as: the traditional method; the direct labour method; labour only method; management contracting method and design and build method.

The traditional method of project procurement is a system whereby the client (owner) enters into separate contractual agreement with a team of consultants (Architects, Engineers, Quantity Surveyor, etc) and the contractor. Usually, the consultants are responsible for the design and supervision of the contractor at the site. They (consultants) in fact, represent the client's interest at the site. The contractor on the other hand is responsible for the actual construction work at the site.

The present traditional procurement method (for building projects) according to Goni-Anagu (1992) involved usually, the following: the Client; the Architect; the Quantity Surveyor; the Engineer and the Building Contractor. The Architect, Engineer, Quantity Surveyor were individual

consultants working in their separate firms but usually come together under an umbrella on the request of the client to offer their services for an agreed sum of money. It is possible under this system to fix the lump sum of a contract even before commencement and using any of the standard forms of contract with bills of quantities as basis for being able to do this.

Kettle (1976) listed the advantages inherent in this method of project procurement as follows:

1. The method is an accepted and historically supported system with legal and contract precedence well established.
2. The method allows for the determination of project cost before construction contracts are endorsed by parties involved in the construction.
3. The method provides good checks and balances between the client, the consultants and the contractor.

Griffith (1965) also found the following faults with the traditional method:

1. Contractors are usually not involved until the start of construction.
2. Design changes are often brought in after construction work has commenced at the site.
3. Contractors, having secured the job, probably on a lower tender may attempt to make more profits from variations.
4. Clients usually have no contractual relationship with subcontractors.
5. The appointment of subcontractors often takes place after construction has started.

Males and Stock (1985) found that over-emphasis on contractual arrangements rather than an effective organisational problem was the main setback of the traditional method of project procurement.

The direct labour approach is where the client uses his or her in-house human resources to carry out a construction project. Opadiran (1987) defined it as a process by which a project is executed by the workers of an organisation instead of the project being contracted out. It can simply be described as a 'do it yourself' approach to project procurement.

Iyagba and Idoro (1995) stated the following as some of the advantages of the direct labour method:

1. In-house professionals gain practical experience and exposure thereby becoming

more proficient and confident in their various fields.

2. There is no wasting of precious time in writing tenders or negotiating with contractors.
3. The procedure for initiating the execution of work is highly simplified.
4. In-house operatives better handle projects with high security risks.
5. The team leader enjoys the loyalty of those directly hired by him/her and the staff of the organisation.

Ogunsanmi *et al.* (1995), however, came to the conclusion that:

1. Directly employed labour eases the problem of communication and enhances better working relations and the control of quality.
2. It is suitable for the execution of emergency repairs, as the in house labour will be familiar with the location of all operational services.

The disadvantages of the direct labour as enumerated are also as follows:

1. Since there is usually no contractual obligation, projects are sometimes abandoned due to a lack of funds.
2. There is usually no standard labour, as would have been the case with established construction firms.
3. There may be inadequate incentives for workers involved in direct labour procurement.

Fagbenle (1999) noted that there may be a shoddy attitude to work at times on the part of the operatives. In order that a better understanding of this study is achieved, the paper therefore compares the performance of direct labour and the traditional method of project procurement in terms of cost, quality and time for some selected projects of the Nigerian Army. In achieving this, the study subjected variables that make up these three determinants (cost, quality and time) of the end value of a project to statistical analysis, and in the process, make useful inferences about how these determinants have performed.

Four hypotheses were tested to establish the performance of the two procurement methods:

Methodology

A questionnaire focused on contractors and clients around five major Nigerian cities of Lagos, Ibadan, Abuja, Makurdi and Benin was designed

to obtain the data required to test the hypotheses postulated for the study. The group of respondents was mainly officers and contractors who have played key roles in this procurement. The projects selected for comparison were similar in cost and executed within the same period of time. The magnitude of work done was also noted.

For analysis, the descriptive statistical method was used. T-test was used for comparison. Pearson chi-square was used to establish the significance or otherwise of variations in the grouped variables of cost, time and quality which provided the platform for making inferences from the propounded hypotheses.

Results and Discussion

Educational Background

Figure 1 shows that 60% of the respondents have qualification above first degree i.e. M.Sc. and PhD. This is an indication that members involved are more knowledgeable and better performance is expected.

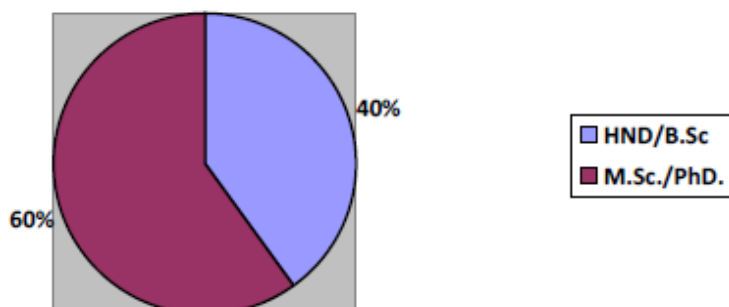


Figure 1 Respondents' Academic Qualification

Professional Discipline

From table 1, majority of the respondents are Engineers with highest percentage of 56.70% followed by the Architects. The result could be attributed to the fact that the Architects and the Engineers have been in the construction practice before other professionals in the built environment.

Table 1 Professional disciplines.

Professionals	Frequency	Percentage (%)
Architecture	3	10.00
Engineering	17	56.70
Building	7	23.30
Surveying	2	6.70
Town Planning	1	3.30
Total	30	100.00

Category of Projects

Table 2 indicated the category of projects considered for the study but only fifteen (15) of these projects consisting of five new projects and ten renovation works were thus selected for each of the two procurement methods for comparison.

Table 2 Category of projects

Professionals	Frequency	Percentage (%)
New	10	33.30
Renovation	20	66.70
Total	30	100.00

Traditional Method

Table 3 shows the cost and time overruns of renovation and new construction works procured by traditional contract method reflecting their unit costs. The analyses are explained using the bar chart indicated in figures 2 and 3.

Table 3 Projects Procured by Traditional Contract Method

Project	Initial Cost =N= (M)	Final Cost =N= (M)	Cost		Gross Floor Area (M ²)	Unit Cost N M/M ²	Initial Time (Wks)	Final Time (Wks)	Time Overrun (Wks)
			Overrun =N= (M)						
TR1	1.80	2.10	0.30		120	0.018	2	3	1
TR2	1.80	1.90	0.10		120	0.016	2	4	2
TR3	1.80	1.90	0.10		120	0.005	2	4	2
TR4	2.10	2.40	0.30		480	0.004	3	5	2
TR5	2.10	2.10	0.00		480	0.004	3	3	0
TR6	2.10	2.10	0.00		480	0.010	3	4	1
TR7	4.50	4.90	0.40		480	0.005	10	12	2
TR8	2.10	2.50	0.40		480	0.005	3	4	1
TR9	2.10	2.40	0.30		480	0.005	3	4	1
TR10	3.20	3.80	0.60		720	0.005	4	5	1
TR11	3.20	3.60	0.40		720	0.005	4	6	2
TN12	6.80	7.50	0.70		720	0.010	12	14	2
TN13	30.00	36.50	6.50		1200	0.030	22	24	2
TN14	30.00	36.50	6.50		1200	0.030	22	24	2
TN15	30.00	36.50	6.50		1200	0.030	22	25	3

TR = Renovation work procured using the traditional method.

TN = New construction work procured using the traditional method.

Direct Labour Method

Table 4 shows the cost and time overruns of renovation and new construction works procured by direct labour method, reflecting their unit costs. The analyses are also explained using the bar chart indicated in figures 2 and 3.

Table 4 Projects Procured by Direct Labour Method

Project	Initial Cost =N= (M)	Final Cost =N= (M)	Cost		Gross Floor Area (M ²)	Unit Cost N M/M ²	Initial Time (Wks)	Final Time (Wks)	Time Overrun (Wks)
			Overrun =N= (M)						
DR1	1.10	1.10	0.0		120	0.10	2	3	1
DR2	1.10	1.30	0.2		120	0.011	2	4	2
DR3	1.10	1.10	0.0		120	0.010	2	3	1
DR4	1.50	1.50	0.0		480	0.003	3	4	1
DR5	1.50	1.70	0.2		480	0.003	3	3	0
DR6	1.50	1.80	0.3		480	0.003	3	3	0
DR7	3.20	3.50	0.3		480	0.007	12	14	2
DR8	1.50	1.50	0.0		480	0.003	3	4	1
DR9	1.50	1.50	0.0		480	0.003	3	4	1
DR10	2.10	2.20	0.1		720	0.003	6	8	2
DR11	2.10	2.40	0.3		720	0.003	6	8	2
DN12	4.50	5.10	0.6		720	0.007	12	15	3
DN13	20.00	25.00	5.0		1200	0.021	24	27	3
DN14	20.00	25.00	5.0		1200	0.021	24	26	2
DN15	20.00	25.00	5.0		1200	0.021	24	26	2

DR = Renovation works procured using the direct labour method.

DN = New construction work procured using the direct labour method.

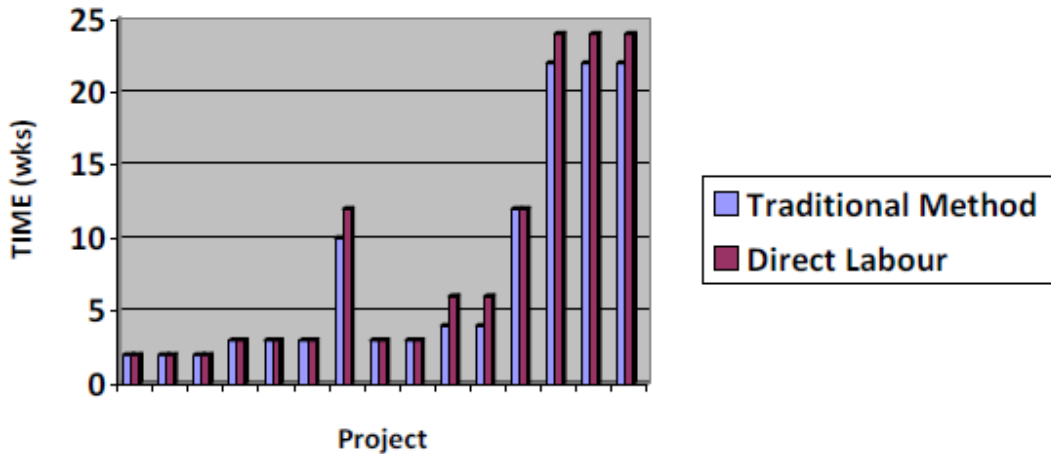


Figure 2 Bar Chart showing a comparison of the timings of the projects procured using the two procurement methods

The results in figure 2 revealed that direct labour experiences time overrun more than traditional contract method of procurement. The fact may be attributed to traditional contract method introducing innovations and technology to work done, using special skills for the delivery of their projects.

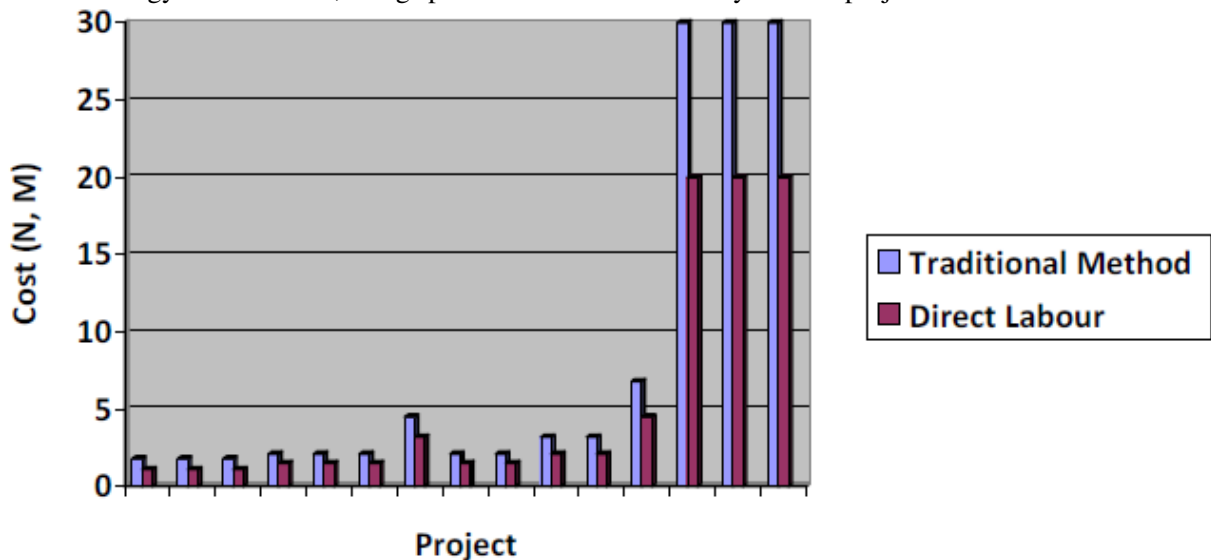
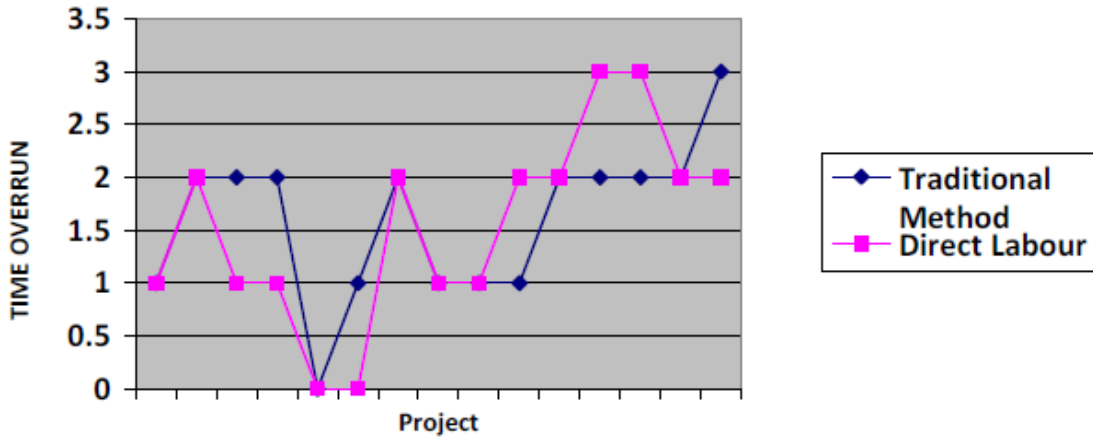


Figure 3 Bar Chart showing a comparison of cost of the projects procured using the two methods of procurement.

The results in figure 3 also indicated that projects procured by traditional contract method experience cost overrun more than direct labour procurement system. This may be attributed to the fact that under direct labour method, there is better control of services, better adjustment to workload fluctuation and security to work done.



From Figure 4, it is obvious that the problem of time overrun is not peculiar to any of the two procurement methods but it is more pronounced in direct labour projects.

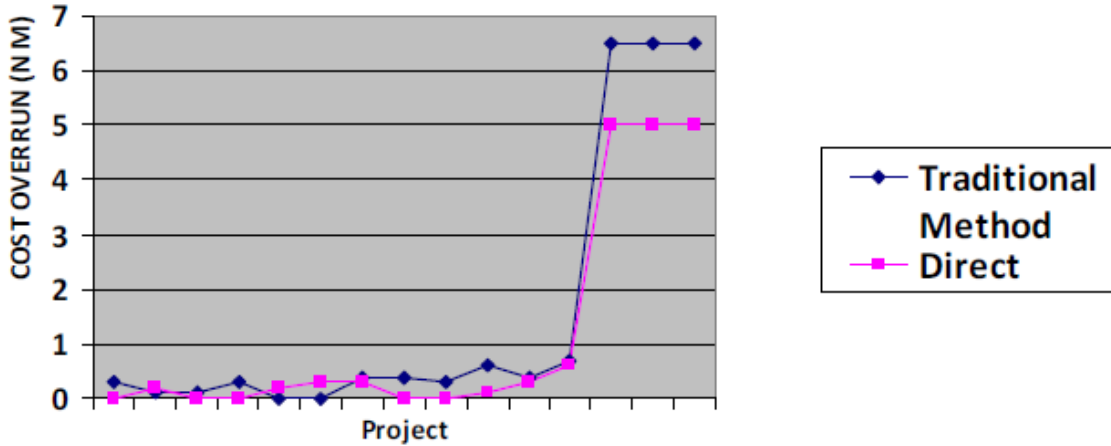


Figure 5 Graph showing cost overruns for traditional and direct labour procurement methods

The graph in figure 5 indicated that traditional method of procurement has a cost overrun when compared with the direct labour method of project execution especially in Nigerian Army project.

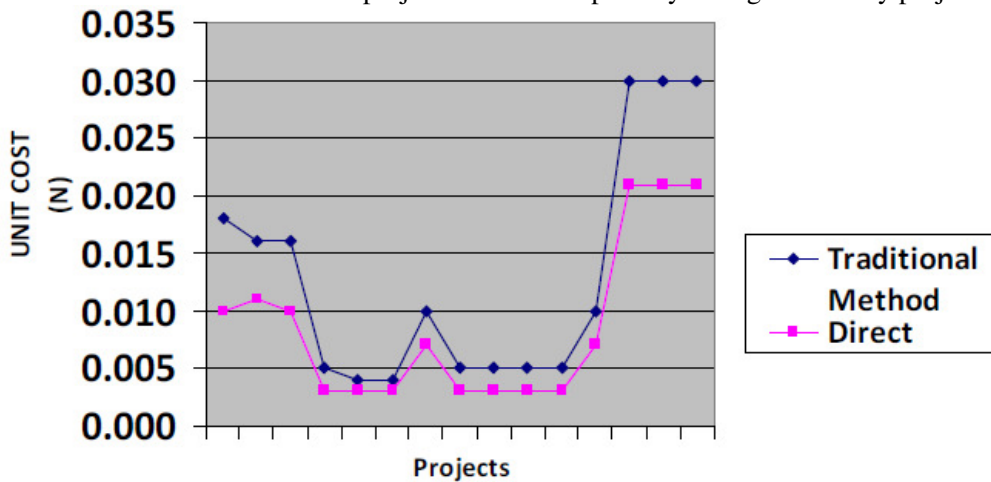


Figure 6 Graph showing the unit costs of projects for the two procurement methods

From Figure 6 it is easily deduced that the unit cost of projects procured under the traditional contract method are higher than those procured using the direct labour method.

Likely Causes of Cost Overrun in Traditional and Direct Labour Methods of Procurement

Table 5 Ranking of likely causes of cost overrun

Likely causes of cost overrun	Most likely	Likely	Undecided	Not likely	Most unlikely	Mean item Score (MIS)	Overall Ranking
Lack of proper coordination	5	4	3	2	1	0.55	1
Lack of adequate control	3	6	3	16	2	0.52	2
Changes in scope and quality of work	2	9	0	13	6	0.43	3
Lack of adequate planning	3	4	1	9	13	0.41	4
	4	2	0	10	14		

Table 5 revealed the causes of cost overrun in traditional and direct labour methods of procurement. From the analysis, the predominant factors are; lack of proper coordination and adequate control. Other factors are the changes in scope and quality of work most especially by the clients and lack of adequate planning.

Likely Causes of Time Overrun in Traditional and Direct Labour Methods of Procurement

Table 6 Ranking of likely causes of time overrun

likely causes of cost overrun	Most likely	Likely	Undecided	Not likely	Most unlikely	Mean item Score (MIS)	Overall Ranking
Failure to order/purchase materials as scheduled	5	4	3	2	1	0.83	1
Delay due to subcontractor/supplier's work	20	3	1	3	3	0.71	2
Lack of requisite equipment to cope with project demand	11	10	0	3	6	0.51	3
Negative attitude of construction workers	3	9	0	8	10	0.42	4
Inadequate labour force	1	2	2	19	6	0.39	5
Poor motivation of workforce	1	2	0	19	8	0.38	6
Delay due to inadequate design information	2	3	0	10	15		
	3	1	0	7	19	0.35	7

Table 6 revealed the likely factors causing time overrun in traditional and direct labour methods of procurement. From the analysis, the most prominent factors are; failure to order materials as scheduled, delay due to subcontractor and suppliers assignments and lack of requisite equipment to cope with project demand. Other reasons are negative attitude of construction workers, inadequate labour force, poor motivation of workforce and delay due to inadequate design information.

Test of Hypotheses

In order to achieve the objectives of this study, the following hypotheses are tested:

1. Ho: There is no significant difference in the contributions of identified factors to cost overrun in traditional and direct labour procurement methods.

Variable	By Variable	X^2_{cal}	DF	X^2_{tab}	Significance	Decision
Lack of adequate planning	Lack of adequate control	17.663	9	19.023	NS	Accept Ho
Lack of adequate planning	Lack of proper coordination	20.821	12	23.337	NS	Accept Ho
Lack of	Changes in the	20.824	12	23.337	NS	Accept Ho

adequate planning	scope and quality of work					
Lack of adequate control	Lack of proper coordination	30.064	12	23.337	S	Reject Ho
lack of adequate control	Changes in the scope and quality of work	26.443	12	23.337	S	Reject Ho.

X_{cal}^2 is lower than X_{tab}^2 and so there is no significance in the contributions of identified factors to cost overrun.

2. Ho: There is no significant difference in the contributions of identified factors to time overrun in traditional and direct labour procurement methods.

Variable	By Variable	X_{cal}^2	DF	X_{tab}^2	Significance	Decision
Poor motivation of the work-force	Lack of requisite equipment to cope with project demand	28.192	9	19.023	S	Reject Ho
Poor motivation of the work-force	Negative attitude of construction workers	29.991	12	23.337	S	Reject Ho
Poor motivation of the work-force	Failure to order materials as scheduled	8.117	12	23.337	NS	Accept Ho
Poor motivation of the work-force	Delay due to in adequate design information	19.970	9	19.023	S	Reject Ho
Poor motivation of the work-force	Inadequate labour force	41.467	9	19.023	S	Reject Ho.
Poor motivation of the work-force	Delay due to subcontractor/supplier's work	11.479	9	19.023	NS	Accept Ho
Lack of requisite equipment to cope with project demand	Negative attitude of construction workers	20.527	12	23.337	NS	Accept Ho
Lack of requisite equipment to cope with project demand	Delay due to in adequate design information	21.537	9	19.023	S	Reject Ho
Lack of requisite equipment to cope with project demand	Inadequate labour force	24.585	9	19.023	S	Reject Ho
Lack of requisite equipment to cope with project demand	Delay due to subcontractor/ supplier's work	12.973	9	19.023	NS	Accept Ho
Negative attitude of construction workers	Failure to order materials as scheduled	25.846	16	28.845	NS	Accept Ho
Negative attitude of construction workers	Delay due to subcontractor/ supplier's work	16.726	12	23.337	NS	Accept Ho
Negative attitude of construction workers	Inadequate labour force	36.768	12	23.337	S	Reject Ho
Negative attitude of construction workers	Delay due to subcontractor/ supplier's work	10.670	12	23.337	NS	Accept Ho
Failure to order materials as scheduled	Delay due to inadequate design information	18.872	12	23.337	NS	Accept Ho
Inadequate labour force	Delay due to subcontractor/ supplier's work	7.437	9	19.023	NS	Accept Ho

Here there exist situations where X_{cal} is higher than X_{tab} which makes the difference significant even though there are non-significant situations.

3. There exists no significant difference between the performance of traditional and direct labour methods in terms of project quality.

Procurement option	N	Variable	SD	t_{cal}	Df	t_{tab}	Significance	Decision
Traditional	15	Conformity with specification	0.56	0.303	28	2.048	NS	Accept Ho
Direct Labour	15		0.64					
Traditional	15	Standard of workmanship	0.70	-0.887	28	2.048	NS	Accept Ho
Direct Labour	15		0.52					
Traditional	15	Satisfaction with the quality of materials	0.68	-0.487	28	2.048	NS	Accept Ho
Direct Labour	15		0.82					

From the table, t_{cal} is lower than t_{tab} and so the result is not significant. There is no significant difference between the performance of traditional and direct labour methods.

4. There is no significant difference between the performance of traditional and direct labour procurement methods in terms of time and cost overruns.

Procurement option	N	Variable	SD	t_{cal}	Df	t_{tab}	Significance	Decision
Traditional	15	Cost	1.0499	-	28	2.048	NS	Accept Ho
Direct Labour	15	Overrun	3.1062	1.071				
Traditional	15	Time	1.3202	-	28	2.048	NS	Accept Ho
Direct Labour		Overrun	1.6847	1.689				

Here t_{cal} is lower than t_{tab} which means that there is no significant difference between performances.

The result of the analysis of time overrun in direct labour was similar to the result of a survey conducted by Odusami and Olusanya (2000) which discovered the average time overrun on projects to be 51%. However, the result is higher than the result of another study by Idoro (2007) which discovered that average delay was 25%. This finding indicates that time overrun is a common feature of projects procured by the two systems. However, projects procured by direct labour system are prone to higher time overrun than those procured by traditional method.

Another major findings confirmed in this study is that cost overrun is a feature of the two procurement systems especially for large projects. The implication of this finding is that contingency sum is set aside for the purpose of additional cost. It costs more to execute a project using the traditional method than employing the direct labour option for the same project. This result agrees with the result of a study conducted by Odusami (2001).

The results also indicate that there is no significant difference between the two methods in their conformity with specifications standard of workmanship and satisfaction with the quality of materials. The unit cost of projects procured using the traditional method is higher than the unit cost of similar projects procured using the direct labour method. This finding agrees with the position of the Federal Government of Nigeria on the adoption of direct labour system (Federal Military Government, 1986).

Security implication was one of the main reasons proffered by respondents for choosing the direct labour method. Time overrun as experienced is not due to a lack of adequate planning but due largely to a lack of adequate equipment and likely delay due to subcontractor/supplier's work.

Conclusions

This research work has provided a good appreciation of the roles that direct labour and traditional procurement systems have played in the developmental programmes of Nigeria. The results

enable prospective developers to appreciate the strengths and weaknesses of direct labour and traditional procurement systems.

It has been observed that most clients in Nigeria use the two procurement systems and the task they often face is how to select the appropriate system for a project. Based on this understanding, the study has developed basic facts of procurement choice for prospective developers.

The findings also provide bases for proper management of project delivery process when both procurement systems are used. Further exposure and training of the in-house staff of the Nigerian Army would lead to a reduction of time for the execution of direct labour projects, and indeed enhance quality and save cost.

References

E1-Rufai, E.N. (1992), An overview of the Generic types of Contractual Arrangement, Paper presented at the Conference on Management Contracting in Nigeria.

Fagbenle, O. (1999), "Direct labour system in a depressed economy", NIOB seminar paper. Obafemi Awolowo University, Nigeria.

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

Griffith, A. (1985), 'An unpublished lecture note on "Construction Management"', Department of Building, Heriot Watt University, Edinburgh, Scotland.

Idoro, G.I. (2007) A Comparative study of direct labour and design-tender-Construct Procurement Systems in Nigeria. P.hD. Thesis Department of Building, University of Lagos, Akoka, Yaba, Lagos, Nigeria.

Iyagba, R and Idoro G. I. (1995), "An Overview of Direct Labour Construction in the Declining Economy of Nigeria", *Construction in Nigeria*, 4, 2-13.

Kettle, K.A (1976), "Project delivery system for construction projects", *Journal of the Construction Division of ASCE*, 576.

Males, S.P and Stock, A. (1985), *An Investigation into Chart Perception of Contractual Forms and Procedures*, Department Of Building, Heriot Watt University, Edinburgh, Scotland.

Mojekwu, C.K.S. (1998) Procurement Methods in Construction Projects. A seminar paper presented at the Department of Building, University of Lagos, Akoka, Yaba, Lagos, Nigeria.

Odusami K.T. (1999) Comparative study of Nigerian and Ghanaian Construction Industry, *Construction in Nigeria* 14(2)15-28.

Odusami, K.T and Olusanya (2000) client's contribution to Delays on Building Projects. The Quantity Surveyor, October – December, Vol 26.

Odusami, K.T. (2001) Project Team leadership and Construction Project Performance in some selected States in Nigeria. P.hD Thesis. Department of Building, University of Lagos, Akoka, Yaba, Lagos, Nigeria.

Ogunsanmi, O.E. and Bamisile, A. (1997), 'Factors affecting the selection of project procurement methods', *Builders Magazine*, 7(2),

Ogunsanmi, O.E, Iyagba, R.O.A and Omirin, M.M. (2001), "Modeling procurement performance in housing projects in Nigeria", *The Lagos Journal of Environmental Studies*. 3(1), 16-35.

Omotosho, S.T. (1999) Management of labour only contract for Building Construction Projects in Lagos Metropolis. M.Sc Thesis, Department of Building, University of Lagos, Akoka, Yaba, Lagos, Nigeria

Opadiran, J. K. (1987), "Use of direct labour in programme execution", seminar paper, Economic and Financial Studies Department ASCON, Topo, Badagry.