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Labour Productivity in Plastering Works Under Direct Labour and Traditional Procurement Delivery Systems

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Abstract
Construction project performance has deep correlation with construction labour productivity but in most cases some stake holders has less considerations to the fact that procurement method may have influence over some factors that could affect workers' performance. The study aimed at establishing the level of labour productivity in Direct labour (DL) and Traditional procurement (TP) systems in plastering by comparing the level of labour productivity in DL and TP in plastering work. Work study manual was used to assess the level of labour out put and the productive time of artisans in the study area using direct observation method. The data collected was analysed using t-test and the result indicated that an average productivity of 2.71m2/hrs was recorded in direct labour while 2.83m2/hrs Was recorded in traditional procurement in the selected trade. The study indicated that there is more productivity in plastering under TP than what is achieved in DL. But from the test it was indicated that there is no significant difference between artisans' productivity in the direct labour and traditional procurement system in plastering work. This result implies that, though there is observable difference in the output of artisans at the site, the difference in the overall performance of the project is not significant.

Keywords: Plasteringwork, Direct Labour, Procurement Strategies, Productivity; Traditional Methods

Introduction

As seen in developed countries, construction projects are actually very crucial in the progress and development of the nation especially where projects are taken as great priority since it is part of the level of development of any country, it advances through the stages of conception, design and actual construction (Ogunsanmi,2013). The owner initiates the conception making clear his needs and requirement in the form of a brief to the professional who then transform the concept into a form that will satisfy the owner's requirements in an optimum an economic manner. Generally, different projects execution methods had been used to execute construction projects and mostly amongst these methods are traditional method and direct labour procurement methods (Adenuga, 2013).
Traditional procurement involves the practice of selecting the Architect and other consultants by the client for the project and later a building contractor with a contractual relationship is also selected. In direct labour procurement, it is the bargain where client otherwise referred to as the building owner organizes the various operations involves in the construction and uses both the materials and manpower at his disposal towards the actualization of a successful project. And undoubtedly, the productivity of labour in the various procurement systems is always paramount while making a choice for the method of contractual arrangement for a certain project. This is reflected in the fact that labour productivity in the construction industry is one of the most frequently discussed issues in general construction management. Therefore, the productivity of existing workers in the industry needs to be measured across the various procurement methods in the study area notably, in direct labour (DL) and traditional procurement (TP) so as to offer measures for its maximization especially in plastering which seems to be one of the most predominantly trades in the study area. As currently observed in the construction industry, low productivity is associated with its attendants problem in the project delivery system because a successful construction project is one that is completed within the time as well as the estimated budget, meets specified standard of quality and conforms to safety policies as well as precautions. This is realistic only if the intended levels of productivity can be achieved (Kunkendall, 2007).

Aim and Objectives of the Study

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The study aimed at establishing the level of artisans' productivity in plastering under direct labour and traditional procurement delivery systems. The Objective were to:

1. evaluates the productivity of labour in plastering work under Direct Labour and Traditional procurement and,
2. make comparison of the level of artisan productivity in plastering under direct labour and traditional procurement.

Hypothesis

- There is no significant difference in the level of artisans' productivity in direct labour (DL) and traditional procurement (TP) in plastering.

Methods and Materials

The research covered both government and private construction sites in Akwa Ibom State. The population used were skilled and unskilled labour in masonry work carrying out their operations in construction sites procured by either direct labour or traditional procurement. Work study manual was used as the instrument for direct observation techniques. This method was used to collect data for 30 working days, the benchmark for small and large sample size (Lucey, 2002), to ensure that the number of observation is adequate for generalization. The research assistance observed and recorded the non-working time and quantity of work done by a gang comprising of an artisan and a helper noted to be the major gang composition for plastering activity in the study area (Odesola,, 2012), this gang composition was very much appropriate to both procurement methods used in this study. t-test was used to analysed the hypothesis which was to test if there exist any difference in artisan's productivity in plastering under direct labour and traditional procurement delivery system. The interpretation is that when the significant 2-tailed is greater than the p-value (0.05), the null hypothesis is accepted (or retained, this implies that there is no significant difference between the two independent groups) but when the significant 2-tailed is less than the p-value (0.05) the null hypothesis is rejected (meaning that there is significant difference between the independent group).

Results

Evaluation of productivity of artisans in plastering work in direct labour procurement system. To arrive at the labour productivity as presented in Table 1, the values were gathered and calculated as explained earlier.

Table 1: Productivity of labour in plastering under direct labour

Days	Output (m^2/day)	No of hours	Productivity m^2/hr
1	20.8	8	2.6
2	22.4	8	2.8
3	26.4	8	3.3
4	17.4	8	2.18
5	19.2	8	2.4
6	25.0	8	3.13
7	28.1	8	3.51
8	18.8	8	2.35
9	23.2	8	2.90
10	20.0	8	2.5
11	24.5	8	3.06
12	21.2	8	2.65
13	22.0	8	2.75
14	24.0	8	3.0
15	23.0	8	2.88
16	27	8	3.38
17	16	8	2.0
18	18.9	8	2.36
19	23	8	2.88
20	23.6	8	2.95
21	17.6	8	2.2
22	21	8	2.63
23	20.8	8	2.60
24	18.7	8	2.34
25	16.28	8	2.04
26	25.6	8	3.20
27	19.30	8	2.41
28	24.8	8	3.10
29	20.6	8	2.58
30	19.8	8	2.48

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Average	**21.63**	**2.71**

Source: Researcher's Field study, (2025).

Table 1 indicated that the highest labour output was 27m^2/day indicating the productivity per hour to be 3.38m^2/hour. The least average productivity was seen to be 16m^2/day (a productivity of 2.0m^2/hour)

Evaluation of productivity of artisans in plastering work under traditional procurement system,
To arrive at the labour productivity as presented in table 2, the values were gathered and calculated as explain previously.

Table 2 : Productivity of labour in plasteringwork in traditional procurement

Days	Output(m^2)	No of hours	Productivity (m^2/hrs)
1	33.9m2/day	8	4.24
2	28.1	8	3.51
3	20.9	8	2.61
4	17.3	8	2.16
5	24.2	8	3.03
6	16	8	2.0
7	19.6	8	2.45
8	18.7	8	2.34
9	22.4	8	2.8
10	21.3	8	2.66
11	30.8	8	3.85
12	26.4	8	3.3
13	20.1	8	2.5
14	17	8	2.13
15	16.2	8	2.03
16	23	8	2.88
17	22	8	2.75
18	27	8	3.38
19	25	8	3.13
20	19.2	8	2.4
21	16.8	8	2.1
22	28	8	3.5
23	18	8	2.25
24	24	8	3
25	24.5	8	3.06
26	26	8	3.25
27	32	8	4
28	17.9	8	2.24
29	23	8	2.88
30	20.8	8	2.60
Average	**22.67**		**2.83**

Source: Researcher's Field study, (2025).

Table 2 shows the highest labour productivity output to be 33.9m^2/day (a productivity of 4.24m^2/hr) and the least labour output was shown to be 16m^2/day (a productivity of 2.0m^2/hr). the average labour output was seen to be 22.67m2/day and the average labour productivity was 2.83m^2/hr

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Test of Hypothesis (H_O1) – there is no significant difference in the level of artisans' productivity in direct labour and traditional procurement in plastering work.

Table 3: Test of Hypothesis H_{O1}

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% CI LBr	UB
Procurement Methods	Equal variances assumed	4.611	0.036	-0.981	58	0.330	-0.129	0.131	-0.39	0.135
	Equal variances not assumed			-0.981	50.3	0.331	-0.129	0.131	-0.39	0.135

Source: Researcher's Field study, (2025).

From Table 3, the means of the respective variables for the two groups are: DL = 2.7053 and TP = 2.8347. Interpreting the t-test for equality of means, the sig (2-tailed) for equal variances is 0.331(which is more than 0.05). The null hypothesis is accepted and it is inferred that there is no significant difference between the level of artisans' productivity in plastering under direct labour and traditional procurement.

Discussion

This study examined labour productivity in plastering works under two procurement delivery systems—Direct Labour (DL) and Traditional Procurement (TP)—with a view to determining whether the choice of procurement method significantly influences artisans' productivity. The discussion of findings is presented in line with the study objectives and hypothesis.

The findings revealed that the average labour productivity under the Direct Labour system was 2.71 m²/hr, while that of the Traditional Procurement system was slightly higher at 2.83 m²/hr. This indicates that artisans engaged under the traditional procurement method achieved marginally higher output in plastering works compared to those under direct labour. The higher productivity observed in TP could be attributed to better site supervision, clearer role definitions, improved motivation mechanisms, and stricter time and performance controls typically associated with contractor-managed projects. Under traditional procurement, artisans often work within structured contractual arrangements where performance expectations, deadlines, and quality standards are more clearly enforced, which may enhance work pace and efficiency.

In contrast, the relatively lower productivity recorded under the Direct Labour system may be linked to challenges commonly associated with this procurement method, such as less stringent supervision, delays in material supply, weaker incentive structures, and occasional administrative inefficiencies on the part of the client. Since the client directly manages labour and resources in DL projects, any lapses in coordination or logistics can directly affect artisans' effective working time and output.

Despite the observable difference in mean productivity values, the t-test analysis showed that the difference was not statistically significant at the 0.05 level (Sig. 2-tailed = 0.331). This implies that, statistically, the productivity of artisans in plastering works under Direct Labour and Traditional Procurement systems does not differ significantly. The acceptance of the null hypothesis suggests that although traditional procurement recorded a higher average output, the variation between the two systems is not strong enough to conclude that procurement method alone determines labour productivity in plastering works.

This finding aligns with the view that labour productivity in construction is influenced by a combination of factors beyond procurement strategy, including artisans' skill level, gang composition, site conditions, availability of

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materials, weather conditions, and the nature and complexity of the work. Since the same gang composition (an artisan and a helper) and similar site conditions were used across both procurement methods in the study area, these controlling factors may have minimized productivity differences attributable solely to procurement approach.Furthermore, the wide range of daily productivity values recorded in both DL and TP systems—ranging from as low as 2.0 m²/hr to as high as 4.24 m²/hr—suggests that short-term site-specific factors and daily operational conditions may exert a stronger influence on plastering productivity than the procurement method itself. This supports earlier assertions in construction management literature that productivity is multifactorial and cannot be fully explained by contractual or procurement arrangements alone.

The findings imply that while Traditional Procurement may offer slight practical advantages in managing and coordinating plastering works, both procurement systems are capable of delivering comparable levels of labour productivity when similar site conditions and workforce characteristics are maintained. This reinforces the conclusion that observable differences in artisans' output do not necessarily translate into statistically significant differences in overall project performance.

Conclusion

The study set-out to establish the level of labour productivity in direct labour DL and traditional procurement TP in plastering work, with the objectives of evaluating artisans' productivity in the two procurement methods and to make comparison of the labour productivity in the two methods. The result showed that artisans' labour output under TP was higher than that of DL but the scientific analysis revealed that the difference is not significant considering the result from the t-test.

Recommendation

The study recommends that traditional procurement should be adopted in plastering work.

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