

EFFECTIVENESS OF PROCUREMENT OF CONSTRUCTION MATERIALS AMONG ROAD WORKERS IN EKITI STATE

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Received: 11 November 2023, Revised and Accepted: 23 November 2023

ABSTRACT

This study investigated the effectiveness of procurement of construction materials among road workers in Ekiti State. The descriptive research design was used for this study. Sixty copies of structured instrument were developed to collect information from the road construction workers. The data were analyzed using Statistical Package for the Social Science. The research questions were answered using percentage and mean while the hypothesis was analyzed using analysis of variance and tested at 0.05 level of significance. The finding of the study revealed that there is upward increase in the cost of procuring construction materials by workers in Ekiti, several factors such as sequence of materials delivery, availability of material in the local market, material changes in type, and specification during construction among others affect the procurement of construction materials by road workers in Ekiti State. It was revealed that majority of the road construction workers are experienced. It was also revealed that the experience of road construction workers does not influence the factors affecting the procurement of construction materials by workers in Ekiti State. It was recommended among others that concerted efforts should be made by construction industries on ways of procuring construction materials at a cheaper rate to avoid increase in the cost of construction in the State. It was also recommended that there is need to appoint and register procurement experts to manage various procurement of construction materials so that the cost of procurement of materials will be reduced and better attitudes toward the procurement of construction materials should be encouraged among the construction workers.

Keywords: Procurement, Construction materials, Road workers and cost.

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INTRODUCTION

Procurement of infrastructure projects is facing a global challenge. The case of developing nations is of unique interest. Studies have confirmed a shortfall in the global supply of good shelter, potable water, schools, hospitals, electricity, roads, and telecommunication (Inderst and Stewart, 2014). The Sustainable Development Goals identified 17 critical areas of need that demands urgent attention if millions of people are to live above the poverty line and have enhanced quality of life (United Nations, 2015). Among the 17 areas identified 12 are directly related to infrastructure delivery. Studies have linked construction industry performance in delivering infrastructure projects to success of its procurement strategy (Chartered Institute of Building, 2010).

Procurement is the act of obtaining goods or services, typically for business purposes. Procurement is most commonly associated with businesses because companies need to solicit services or purchase goods, usually on a relatively large scale. Procurement generally refers to the final act of purchasing but it can also include the procurement process overall which can be critically important for companies leading up to their final purchasing decision. Procurement is a term describing the purchasing process for goods and services. In road construction, material procurement is the process by which the materials required to construct road are selected, ordered, invoiced, paid for, and delivered to the site.

A procurement team, or one or more construction buyers, may be responsible for procurement activities for products, materials, plant, and subcontractors. They typically work for the main contractor (although sub-contractors may also have buyers on large projects) to ensure that supplies are provided in accordance with the project specification and budget. Construction materials will typically be ordered from the supply chain, often from external suppliers with whom the team may have had past successful dealings, or who may be specified in the contract documents.

Procuring construction materials is a crucial aspect of the construction process as contractors will normally be inundated with requests from suppliers for the provision of goods and services. They must therefore order materials that align with both the client's and contractor's objectives. Developing the most suitable purchasing strategy will involve electing material suppliers according to a range of criteria that are likely to include speed of delivery, cost, quality, specific project constraints, risk, asset ownership, and financing.

Within a specification, buyers may have flexibility in purchasing, particularly where an architect or engineer has specified a product and added the clause or equal approved', upon which the buyers may for good reason substitute a different product that must, as a minimum, meet the same standards as the original. Where a specification stipulates only one type or brand of material/product available from one supplier, the procurement team may be bound to procure at product even though it may consider that there are better equivalent offers on the market. Unraveling such a title as the effects of procurement of construction materials by construction workers in Ekiti State has become pertinent at time that the major source of revenue for Nigeria has continued to dwindle and the resources for infrastructure development grossly limited.

Procurement is a key factor in attaining client satisfaction and project success (Rwelamila, 2010). International Conference of Socio-economic Researchers ICSR (2016) in Cabibihan *et al.*, (2016) affirmed that procurement as "an organizational system that assigns specific responsibilities and authorities to people and organizations, and specifies how different elements of a construction project would relate". There are various construction procurement methods which hail from the need to develop strategies that will meet the clients need in different circumstances (Oyeranti *et al.*, 2011). These requirements vary from the level of client's involvement, management of risks, funding arrangements, payment regimes, type of contracts to be

used, the contractor's financial commitment, and who are the Clients (Rwelamila, 2010).

The procurement methods as revealed by the literature are: Traditional, Design and Build, Build Operate-Transfer, Management Contracting, Construction Management, Labor Only, Direct Labor, Partnering, Public Private Partnerships, Strategic Alliances, Private Finance Initiatives, Collaborative Agreements, Concessions etc. (Mathonsi and Thwala 2012).

Research has shown that Nigerian Construction Industry adopts all the various procurement methods in one form or another (Idoro, 2012). Even though the most prominent is the traditional method adopts separation of the design and construction functions in project procurement. In the last decades, several researchers within the multidimensional construct of project delivery have proposed different criteria or indicators based on empirical research, for example, Cheung *et al.*, (2004) agrees that project delivery can be measured and evaluated using a large number of performance indicators or criteria but time, cost and quality appear to be the three commonly preferred performance evaluation dimensions. Some contractors are focused on using these measures as strategic weapons; others emphasized the proper delineation of the measures and groupings into classes that will make tracking and management reasonable.

Contractors are builders who control the activities of building organizations. These contractors employ sub-contractors to coordinate the activities in their units. The group involves the indigenous people such as carpenters, bricklayers, electricians, plumbers, and welders. Inuwa *et al.* (2014) identified 22 factors plaguing the indigenous contractors in the Nigerian Construction Industry in their procurement efforts and ranked them. The categorization is after an intensive literature search, questionnaire administration, and interview sessions in the northern states. The factors that ranked 1st-5th are lateness in honoring payment certificates, variations, technical incompetence, design deficiencies, and material shortage. The issue of funding and prompt payment has continually been a challenge in the procurement of infrastructure in developing nations as opposed to developed nations where funding for infrastructure is available before the procurement process is initiated. Variation and design deficiencies introduce changes to projects which sometimes cause delays and cost increment. The impact may be mitigated by the procurement method adopted and the payment regime. Mohammad *et al.* (2015) acknowledge that the problems affecting construction procurement are kidnappings, vandalism, civil unrests, and other factors that have increased the risks associated with the construction process. The study further identified that lack of the knowledge and working processes of the Public Procurement Act, refusal to comply by some individuals, political influence, administrative bottlenecks, and knowledge gap in terms of the variety of procurement options available are common challenges.

The challenges of procurement of building materials are numerous. Musanzikwa (2013) identified the following as the challenges of public procurement; delays in project implementation, corruption, indigenization policy, incompetence, inadequate market enquiry, and political influence and proposed that these challenges can be mitigated by adoption of professional procurement practice, training of procurement officers and staff, transparency, and the decentralization of the process.

Statement of the problem

Construction materials are purchased by main contractors and in some cases; they could delegate the authority to sub-contractors to purchase the construction materials in their units. The main contractors would give the sub-contractors the amount of money to purchase the required materials for the construction of buildings. The sub-contractors would use the money to buy inferior materials and inflating the price because they are not the main contractors who control the activities of the buildings. If any problem occurs during the design and construction of the

building, the main contractors would be held responsible. There would be a time the buildings would collapse, leading to the death of occupants due to the several factors affecting the procurement of materials for road construction among workers. They include a sequence of materials delivery, availability of material in the local market, material changes in type, and specification during construction among others. Some market women are builders who employ the sub-contractors without consideration on quality of materials. If these situations continue, this would lead to differential settlement of buildings.

Research questions

1. How are construction materials procured in Ekiti State?
2. What are the factors affecting the procurement of construction materials by road workers in Ekiti State?
3. What is the experience of the road construction workers?

Research hypothesis

1. Experience of the road construction workers has no significant influence on the factors affecting the procurement of construction materials by road workers in Ekiti State

METHODS

The descriptive research design was used for this study. A total of 60 structured instrument was developed to collect information from road construction workers on the effects of procurement of construction materials among road workers in Ekiti State. The copies of the instrument were delivered by hand to the contractors on site to ease the distribution of the instrument to the workers.

The data were analyzed using Statistical Package for the Social Science. The research questions were answered using percentage and mean. The hypothesis was analyzed using analysis of variance and tested at 0.05 level of significance. The Likert scale on five points was used for the study. The responses of the items on the questionnaire were obtained on a 5-point scale ranging from 1 to 5. "Very High" were scored 5, "High" were scored 4, "Average" were scored 3, "Low" were scored 2 and "Very Low" were scored 1. The hypothesis was tested at 0.05 level of significance.

RESULTS

Research questions 1

What is the cost of procuring of construction materials by road workers in Ekiti State?

Table 1 shows the cost of procuring construction materials by road workers in Ekiti state from the information in the table, it can be deduced that between 2021 and 2023, there are increase in the price of construction materials procured by road workers in Ekiti state. From 2021 to 2022, cement increase by 12%, sharp sand (40%), granite (53), gravel (32%) sand (40%), laterite (22), 6 inches block (15%), 9 inches block (14%), 1 inch nail (12%), 2 inches nail (13%), 3 inches nail (13%), 4 inches nail (13%), 8 mm rod (3%), 10 mm rod (13%), 12 mm rod (13%), 16 mm rod (3%), 1 roll of stiff binding wire (23%), and 1 of flexible binding wire (23%). While from 2022 to January 2023 cement increase by 2%, sharp sand (29%), granite (25), gravel (36%) sand (29%), laterite (27%), 6 inches block (39%), 9 inches block (19%), 1 inch nail (20%), 2 inches nail (11%), 3 inches nail (11%), 4 inches nail (11%), 8 mm rod (20%), 10 mm rod (9%), 12 mm rod (8%), 16 mm rod (7%), 1 roll of stiff binding wire (11%), and 1 of flexible binding wire (11%). The average increase in the cost of procurement in 2022 is 20% while that of 2023 is 18%. That is the rate of increase in the price of procurement from January to December 2022 is 1.67% while for January, 2023 is 18%. This implies that there is an increase in the cost of procuring construction materials by workers in Ekiti State.

Research question 2

What are the factors affecting the procurement of construction materials by road workers in Ekiti State?

Table 2 shows the factors affecting the procurement of construction material by road construction workers in Ekiti State. Taking the cutoff at 3.5, it shows that sequence of materials delivery (4.1), availability of material in the local market (4.0), material changes in type and specification during construction (3.5), poor planning and coordination (3.6), poor communication between sites (3.6), transportation for large quantities (3.7), improper handling on site/manual materials handling (3.7), workers' mistakes/misuse of specification (3.7), management of surplus materials (3.5), dispute resolution strategies (3.5), and lack of skilled negotiating procedures (3.5) are all above 3.5, while damage of material in storage (3.0), delay in the especial manufacture of building materials (3.2), unreliable supply from material suppliers (3.3), inadequate waste management plan (3.3), inadequate knowledge of IT solution on materials management (3.4), and excessive paperwork (3.2) are below 3.5. This implies that not all the factors affect the procurement of construction materials by road workers in Ekiti State. Items 1, 2, 3, 7, 8, 10, 12, 13, 15, 16, and 17 affect the procurement of construction materials by road workers in Ekiti state, while items 4, 5,

6, 9, 11, and 14 did not affect the procurement of construction materials by road workers.

Research question 3

What is the experience of the road construction workers?

Table 3 showed the respondents involvement in the construction industry. It indicated that 92.1% (49) of the respondents' company has been in the construction industry for more than ten years; and 7.9 (11)% for <10 years. The results revealed that majority of the respondents are key players in the construction industry. The mean number of respondents working experience in the construction industry is 23.09 years.

Testing of hypothesis

Research hypothesis 1

Experience of the road construction workers has no significant influence on the factors affecting the procurement of construction materials by road workers in Ekiti State.

Table 1: Cost of procuring construction materials by road workers in Ekiti State

S/ No	Material	Unit	2021	2022	%	2023	%
			Price (#)	Price(#)	Increase	Price(#)	Increase
1	Cement	1Bag	4,100	4,600	12	4,700	2
2	Sharp sand	l tipper	25,000	35,000	40	45,000	29
3	Granite	1 tone	4,700	7,200	53	9,000	25
4	Gravel	l tipper	25,000	33,000	32	45,000	36
5	Sand	l tipper	25,000	35,000	40	45,000	29
6	Laterite	l tipper	18,000	22,000	22	28,000	27
7	6 inches block	1 block	200	230	15	320	39
8	9 inches block	1 block	280	320	14	380	19
9	Nails						
	1 inch	1 bag	12,500	14,000	12	16,800	20
	2 inch	1 bag	12,000	13,500	13	15,000	11
	3 inch	1 bag	12,000	13,500	13	15,000	11
	4 inch	1 bag	12,000	13,500	13	15,000	11
10	Steel rod						
	8 mm	1 rod	1950	2000	3	2,400	20
	10 mm	1 rod	3,100	3,500	13	3,800	9
	12 mm	1 rod	4000	4500	13	4,850	8
	16 mm	1 rod	7,900	8,100	3	8,700	7
11	Binding wire						
	1 roll of stiff binding wire	1 bundle	11,000	13,500	23	15,000	11
	1 roll of flexible Binding wire	1 bundle	11,000	13,500	23	15,000	11
	Average % Increase in Prices				20%		18%

Table 2: Factors affecting the procurement of construction materials by road workers in Ekiti State

S/N	Item	Very high	High	Average	Low	Very low	T.S	Mean
1	Sequence of materials delivery	29	22	1	3	5	247	4.1
2	Availability of material in the local market	24	23	5	5	3	240	4.0
3	Material changes in type and specification during construction	11	28	10	2	9	210	3.5
4	Damage of material in storage	6	19	13	12	10	179	3.0
5	Delay in the especial manufacture of building materials	9	22	9	11	9	191	3.2
6	Unreliable supply from material suppliers	12	21	10	9	8	200	3.3
7	Poor planning and coordination	26	12	4	9	9	217	3.6
8	Poor communication between sites	22	14	7	9	8	213	3.6
9	Inadequate waste management plan	8	23	13	10	6	197	3.3
10	Transportation for large quantities	17	28	1	8	6	222	3.7
11	Inadequate knowledge of IT solution on materials management	13	22	11	6	8	206	3.4
12	Improper handling on site/manual materials handling	20	18	10	7	5	221	3.7
13	Workers' mistakes/misuse of specification	21	17	10	5	7	220	3.7
14	Excessive paperwork	10	20	14	5	11	193	3.2
15	Management of surplus materials	14	23	8	6	9	207	3.5
16	Dispute resolution strategies	13	24	10	5	8	209	3.5
17	Lack of skilled negotiating procedures	16	19	13	2	10	209	3.5

Table 4 revealed that the computed F-value (0.300) at degree of freedom 8 and 51 obtained for the group with $p > 0.05$ was not significant at 0.05 level. The null hypothesis was not rejected. This implied that experience of the road construction workers has no significant influence on the factors affecting the procurement of construction materials by road workers in Ekiti State.

DISCUSSION

The finding of the study revealed that there is increase in the cost of procuring construction materials by road workers in Ekiti State. This finding corroborated Olanrewaju (2015) who stated that the importance of procurement of material is highlighted by the fact that materials account for substantial portions of project cost and time. Safa et al. (2014) stated that materials wastage is any extra cost over and above the material used, plus their handling as contained in the estimated price for the job. It was also opined by them that, materials management can be defined as a process of planning, executing, and controlling the right source of materials with the exact quality, at the right time and place suitable for minimum cost construction process. From the above, it was also deduced that from the Olanrewaju (2015) that construction materials constitute a major portion of the total cost in a construction project. It has been pointed out that the construction materials can constitute 50–60% of the project cost. Due to its role and major portion in construction projects, procurement has become a critical component and an essential function that improves productivity in construction projects.

The finding of the study revealed that several factors such as sequence of materials delivery, availability of material in the local market, material changes in type and specification during construction, poor planning and coordination, poor communication between sites, transportation for large quantities, improper handling on-site/manual materials handling, workers’ mistakes/misuse of specification, management of surplus materials, dispute resolution strategies, and lack of skilled negotiating procedures are affecting the procurement of construction materials by road workers in Ekiti State. This finding corroborated Inuwa et al. (2014) who identified 22 factors plaguing the indigenous contractors in the Nigerian Construction Industry in their procurement efforts and ranked them. The categorization is after an intensive literature search, questionnaire administration, and interview sessions in the northern states. The factors that ranked 1st–5th are lateness in honoring payment certificates, variations, technical incompetence, design deficiencies, and material shortage. The issue of funding and prompt payment has continually been a challenge in the procurement of infrastructure in developing nations

as opposed to developed nations where funding for infrastructure is available before the procurement process is initiated. Variation and design deficiencies introduce changes to projects which sometimes cause delays and cost increment. Musanzikwa (2013) identified delays in project implementation, corruption, indigenization policy, incompetence, inadequate market enquiry, and political influence and proposed that these challenges can be mitigated by the adoption of professional procurement practice, training of procurement officers and staff, transparency, and the decentralization of the process. From the findings above, it was found that the procurement of materials in building construction industry has always been faced with the problem of procurement of building materials that could hinder the swift completion of construction of work.

The finding of the study revealed that majority of the respondents is key players in the construction industry. This does not support the position of Rwelamila (2010) who stated that lack of knowledge by professionals in a broad sense of the available procurement options is one of the challenges of project success. This is indicative of the knowledge level of professional who are in the position to influence the clients in choosing the most appropriate procurement route for the unique circumstance of their project.

The finding of the study revealed that experience of the road construction workers has no significant influence on the factors affecting the procurement of construction materials by road workers in Ekiti State. This finding does not corroborate Terakawa (2011), who stated that clients are most of the time certain about what they want in terms of infrastructure delivery but often times lack the experience of how best this can be delivered. It is not uncommon in private projects that the Client has started relating with potential contractors and sub-contractors before the project brief and initial designs are produced. This can be due to experience on previous projects and preferences. This idea is sometimes transmitted into public projects where a chief executive may want to specify the preferred contractor without any selection process. The feedback from the respondents suggests that the more informed the clients/client organizations are about various procurement options available, the better for the procurement process in general.

CONCLUSION

Construction industry in Ekiti State provides the infrastructure which is fundamental to the development of the state and since majority of the state’s investments involve construction, the efficiency of investment programs and the pace of economic growth depend on the efficiency and productivity of the state’s construction industry. Despite its significant position within the state economy, its performance within the economy has been and continues to be affected by the how the construction materials are procured.

Following the findings from this study, it is concluded that:

1. There is upward increase in the cost of procuring construction materials by workers in Ekiti State. Hence, this made the cost of road construction high and expensive in Ekiti State.
2. Several factors such as sequence of materials delivery, availability of material in the local market, material changes in type and specification during construction, poor planning and coordination, poor communication between sites, transportation for large quantities, improper handling on-site/manual materials handling, workers’ mistakes/misuse of specification, management of surplus materials, dispute resolution strategies, and lack of skilled negotiating procedures are factors identified to be affecting the procurement of construction materials by road workers in Ekiti State.
3. It was revealed that majority of the road construction workers are experienced.
4. The experience of road construction workers does not influence the factors affecting the procurement of construction materials by workers in Ekiti State.

Table 3: Experience of road construction workers in Ekiti State

Duration	Midpoint (X)	Frequency (F)	FX	Percent	Mean year
<10	10	11	110	7.9	23.09
11–20	15.5	20	310	22.4	
21–30	25.5	10	255	18.4	
31–40	35.5	11	390.5	28.2	
Above 40	40	8	320	23.1	
Total		60	1385.5	100	

Table 4: Analysis of variance of experience of road construction workers and factors affecting the procurement of construction materials by road workers

Source	Sum of square	DF	Mean of square	F	p
Between groups	198.103	8	24.763	300	0.963
Within groups	4209.497	51	82.539		
Total	4407.600	59			

$p < 0.05$

RECOMMENDATIONS

From the conclusion of this study, the following recommendations are:

1. Concerted efforts should be made by construction industries on ways of procuring construction materials at a cheaper rate to avoid an increase in the cost of construction in the State. This should be done through the procurement of local materials instead of laying emphasis on the use of foreign materials which will be very expensive.
2. There is a need to appoint and register more procurement experts to manage construction materials so that the cost of procurement of materials will be reduced. The appointment of experts will give room for better negotiation that will help in reducing the cost of construction materials. They will be able to find out how to procure construction materials.
3. Better attitudes towards the procurement of construction materials should be encouraged among the construction workers. Developing better attitude will foster good commitment among the construction workers instead of inflating the price. The right attitude will also help in making the construction workers use the materials procured according to specifications and not stealing the materials or selling them illegally.

REFERENCES

- Cabibihan, J. J., Abu Basha, M. K., & Sadasivuni, K. (2016). Recovery behavior of artificial skin materials after object contact. In *Social robotics: 8th international conference, ICSR 2016, Kansas City, MO, USA, November 1-3, 2016 proceedings 8(449-457)*. Berlin: Springer International Publishing.
- Chartered Institute of Building. (2010). *Procurement in the construction industry 2010: A report exploring procurement in the construction industry* (pp. 1-29). Bracknell: Chartered Institute of Building.
- Cheung, S. O., Suen, H. C. H., & Cheung, K. K. W. (2004). PPMS: A web-based construction project performance monitoring system. *Automation in Construction*, 13(3), 361-376.
- Idoro, G. I. (2012). Influence of project plans on the outcome of construction projects procured by design-build (DB) in Nigeria. *Journal of Construction in Developing Countries*, 17(2), 77-99.
- Inderst, G., & Stewart, F. (2014). *Institutional investment in infrastructure in emerging markets and developing economies*. Washington DC: Public Private Infrastructure Advisory Facility. Retrieved from <https://www.ppiaf.org/sites/ppiaf.org/files/publication/ppiaf-institutional-investors-final/web.pdf>.accessed [Last accessed on 23 November 2023].
- Inuwa, I. I., Wanyona, G., & Diang'a, S. (2014). Construction project procurement: project planning challenges of Nigeria indigenous contractors. In *Proceedings of the CIB W107 2014 international conference, Lagos, Nigeria held 28-30 January, 2014*.
- Mathonsi, M. D., & Thwala, W. D. (2012). Factors influencing the selection of procurement systems in the South African construction industry. *African Journal of Business Management*, 6(10), 3583-3594.
- Mohammad, B. A., Adamu, T., & Ladi, B. D. (2015). Appraisal of project procurement policies in Nigeria. *American Journal of Engineering Research*, 4(3), 19-24.
- Musanzikwa, M. (2013). Public procurement system challenges in developing countries: The case of Zimbabwe. *International Journal of Economics, Finance and Management Science*, 1(2), 119-127.
- Olanrewaju, S. B. O. (2015). *Appraisal of material management strategies of construction firms in Ekiti state, Nigeria*. Unpublished M. Tech Thesis. Bauchi, Nigeria: Department of Building Technology, Abubakar Tafawa Balewa University.
- Oyeranti, G. A., Babatunde, M. A., & Ogunkola, E. O. (2011). An analysis of China-Nigeria investment relations. *Journal of Chinese Economic and Foreign Trade Studies*, 4(3), 183-199.
- Rwelamila, P. D. (2010). Impact of procurement on stakeholder management. In E. Chinyio, & P. Olomolaiye (Eds.), *Construction stakeholder management* (pp. 195-215). West Sussex: Wiley Blackwell Publishing.
- Safa, M., Shahi, A., Haas, C. T., & Hipel, K. W. (2014). Supplier selection process in an integrated construction materials management model. *Automation in Construction*, 48, 64-73.
- Terakawa, A. (2011). *Challenges facing public procurement and perspectives of land management, national institute for land and infrastructure management*. Retrieved from <https://www.nilim.go.jp/english/annual/annual2011/2-1.pdf> [Last accessed on 23 November 2023].
- United Nations. (2015). *Sustainable development goals*. Retrieved from <https://www.un.org/sustainabledevelopment/sustainable-development-goals> [Last accessed on 23 November 2023].