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Analysis of Consequences of Unmanaged Wastes on Building Procurement Activities in Southwest, Nigeria

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Abstract

This paper examines the consequences of unmanaged wastes on building procurement activities across southwest Nigeria. To achieve this, two hundred and six-one (461) questionnaires were randomly administered across the six (6) that makes of the southwest states Nigeria. The result of the findings established that 75.9

Index terms— analysis, building procurement, consequences, unmanaged wastes, procurement activities, southwest.

1 Introduction

he global burden of building material waste is enormous in terms of material wastage, percentage of project cost, time and cost overrun, and it is still growing specifically in Nigeria and many other developing countries in the light of housing and infrastructure development component of the sustainable development goals. Edoka et al. (2013); Wahab and Lawal (2011) in their studies corroborated the earlier submission that the activities of building and infrastructure development have been on the increase as a result of the strong demand from increasing population and urbanisation. This, in turn, has translated to a corresponding generation of an enormous amount of waste at the different stages of procuring building projects in the construction industry (that is from the inception stage, through the design stage to the implementation stage) and amounting to between 30% -35% of the industrial waste globally per annum translating to several billion tonnes (Solis- ??uzman et al., 2009).

This includes those wastes produced from the activities of maintenance and/or renovation of the buildings and demolition at the end of life. Olusanjo, Panos and Ezekiel (2014) reported that close to 30% of all construction works are made up of works that are being re-worked and they include all the unnecessary efforts of re-doing the processes/activities that were incorrectly implemented the first time. Similarly, findings from the literature showed that rework has become a major issue in construction procurement process leading to considerable time and cost overrun in projects. Some other studies ??Burati et al., 1992; ??IDA, 1994; ??yewole et al., 2011) opined that the direct cost of rework range between 5% and 15% of the total contract value and this figure could be higher considering the indirect costs and disruptions caused by schedule delays, litigation and other intangible aspects of poor quality finishes that come with it.

Gardiner (1994) in a similar study, estimated that the costs related to the rework of design consultants could be as high as 20% of their fee for a given project and that the primary sources of rework in construction, naturally, are the documentation upon which construction activities are based and they include design changes, errors and omissions (O' ??onnor and Tucker, 1986; ??urati et al., 1992; ??ove et al., 1999). Abdul-Rahman (2013) reported that projects in their study area overshoot their original budget with about 14% of the final project cost (cost overrun) while Standish Group (2015) Chaos Report submitted that about 70% of all projects overshoot their projected delivery date (time overrun) and the projected cost with about 30% of the total cost of materials. The study by Olusanjo et al., 2014 reported that about 50% of labour is lost to inefficiencies and that only about 90% of the building materials purchased for a project are effectively used, the remaining 10% wasted. The waste generated from building and construction projects is therefore seen to be huge and accounts for a sizeable proportion of the overall amount produced in many countries, making it the single largest waste stream (Bates, 2006).

Studies from developing country like Nigeria shows that it is a popular practice for a large portion of building wastes to be illegally dumped by roadsides, river banks and stockpiled in many other open spaces where some of them are either burnt or buried on the same site (Mahayuddin et al., 2008). It is noted that if these illegal dumping of building and construction debris are not checked, it has the propensity to affect the well-being of people, the value of properties and the cost of cleaning up the mess. Likewise, incineration of wastes leads to the generation of a large volume of nitrogen oxide gases that can potentially contribute to the existing environmental issues such as acidification and eco-toxicity with the volume of residual ashes attaining very high level with toxic substances (Qian, Cao, Chui and Tay, 2006), while Tan and Khoo (2006) claimed that the energy gained from the process outweighed the environmental damage associated with it.

Tongo, Oluwatayo, & Adeboye, (2020a), examined procurement waste management on building construction industry in southwestern, Nigeria, the study found that professional satisfactory index fell between ”disagree” and ”not sure” this translate that management support, staff knowledge, financial incentives/motivation, estimating/ordering practice, design issues, material Supply issues, material storage practice may not reduce the scourge of procurement waste in Building construction. In another study, **??**ongo, et, al, (2020), examined the Professional’s Perception of Materials Management Practices on Construction Sites in selected states in Nigeria through the use of structured questionnaires, administered to senior construction professional personnel of construction firms, the study established that delay in the completion time of project such as storage of materials on-site with mean value (4.9), incompetence of estimators (4.8), issuing of materials for use (4.7) and procurement for materials **??**4.6).

The inappropriately managed waste has the potential to cause traffic obstruction, block storm water drains and other waterways thereby leading to flooding, unpleasant visual perception and general environmental degradation which impact on the health and safety of the workers as well as the socio-economic aspects of the society. Ordinarily, stockpiling of rubbles from construction works is considered useful as it could be used in earth filling/land reclamation projects on a later day **??**Poon, Yu and Ng, 2001). This was thought to be an efficient way of reusing inert materials but there are not enough of such projects to absorb the stockpiled wastes. It has, therefore, become increasingly difficult and uneconomic to sort inert materials for use by other projects as filling materials (Einstein . Also, a large portion of these wastes is buried or end up in landfills mostly in the industrialised nations due to their non-combustible nature. In the UK for example, about 89.6 million tonnes of waste was generated from construction-related activities in 2005 and out of which about 31% (that is, 28 million tonnes) went to the landfill. In Australia (between 2006 and 2007), about 7 million tonnes of waste was sent to the landfill (Olusanjo, et al., 2014).

Like in many other studies, Yu, Poon, Wong, Yip and Jaillon (2013) reported that the existing landfills in Hong Kong can no longer cope with the volume of waste disposed of in them daily while Hostovsky (2004) observed that in recent times, landfills could no longer provide the desired long term and sustainable solution to manage waste; hence they have become a headache to many cities. Finding new sites suitable for landfill activities has always been a tough task because they require large pieces of land, which have to fit well with the geological and engineering criteria (Hostovsky, 2004). Depountis, Koukis and Sabatakakis (2009) noted that more waste is presently being generated per capita and this has contributed to shortening the lifespan of many landfills significantly.

The absence of which has given rise to increased environmental problems like noise pollutions, emissions of dust and gases to the atmosphere and contaminated water and watercourses. Also, extending the existing sites is extremely costly **??**Yu, 2010). This land-use conflict was brought about by the ’Not-In-My-Backyard’ syndrome and the more demanding administrative procedure imposed by the environmental impact assessment policies make the siting of new waste facilities a time-consuming and herculean task in many countries (Hostovsky, 2004).Material waste significantly attracts additional cost to the estimated cost of building projects as a result of the new purchases that have to be made to replace the wasted ones. The cost of demolition and executing previous unsatisfactory works, time losses due to delays and the cost of disposing of the waste are all included as waste and all add-up to the financial losses by the contractor (Ekanayake and Ofori, 2000). Hence, construction waste reduction is currently being accorded the highest priority amongst waste management options today which includes reduction, recycling and reuse.

2 II.

3 Methodology

In this study, primary and secondary data were used. The primary data was attained through field survey, while secondary data were derived from published texts. To collect data and to meet the set objectives of this study two hundred and sixty-one (261) questionnaires were randomly administered among the built environment professionals (Architects, Builders, Engineers, Quantity Surveyor, Town Planners, and Project Manager etc.) across the six (6) To assess the consequences associated with unmanaged wastes generated by the operations of building construction, the responses were given by the survey respondents to the research instrument’s question on the effect of unmanaged building construction wastes on the environment; socioeconomic well-being and quality of life; project cost was examined. However, only the professional in the senior cadre level was picked as a sample and administered the questionnaire to collect information about their knowledge, attitudes and current practices regarding the management of wastes from building construction processes, and the motivation to adopt any particular strategy was obtained. Data were analyzed using SPSS.

4 Findings and Discussions

To assess the consequences associated with unmanaged wastes generated by the operations of building construction, the responses were given by the survey respondents to the research instrument's question on the effect of unmanaged building procurement wastes on the environment; socioeconomic well-being and quality of life; project cost was examined. The results (Table **??**.1.), showed that majority (75.9%) of the respondents were in agreement that unmanaged building material wastes have a direct impact on project cost, it is also seen that 69.3% of the respondents are agreed that unmanaged wastes have a direct impact on the environment. While, many (65.1%), of the respondents, are agreed that unmanaged wastes have a direct impact on the socio-economic well-being of the general population and the quality of life respectively. Similarly, the study established that the effect of unmanaged waste on project cost is ranked highest with a mean score of 3.91, this is followed by the effect on the environment and finally the effect on the socio-economic well-being of the general population and the overall quality of life with mean scores of 3.66 and 3.59 respectively. The results of the further analysis of the data to assess the danger of unmanaged building material waste are as shown in table **??**.2, revealed that as many 78.5% of the respondents were agreed that unmanaged building material wastes have a direct impact on the loss of significant revenue while 73.6% indicated that unmanaged wastes have a direct impact on the lengthening of contract execution time. In the same manner, 72%, 62.5%, 61.7%, 60.9%, 58.5% and 51.3% of the respondents are agreed that unmanaged wastes have a direct impact on a cleaner environment, less productivity, others (such as land and air pollution, and public health), increased project cost, increased patronage and longer lifespan of materials respectively. However, it is seen that the extent to which unmanaged building material waste affects the loss of significant revenue is perceived to be most affected with a mean score value of 3.91 followed by the impact on lengthening of contract execution time with a mean score of 3.88 and the impact on the cleaner environment with a mean score of 3.80.

IV.

5 Conclusion

This study presents findings on the consequences of unmanaged wastes on building procurement activities in southwest states Nigeria. The finding is most significant to the current lag in building procurement activities in developing countries, where a substantial shortage was recorded due to poor waste management. The findings of this study indicate that wastes management interventions should place dual emphasis on building procurement activities and professionals (e.g. architects, builders, engineers, project manager etc.) to effectively train on the ways of handling materials, and waste reduction. There are needs for a further study assessing the effect of building procurement on project cost and construction projects applying international recognized building procurement indicators to examines and design a desired and better inform building procurement intervention strategies and regulatory decisions within the study area. [1] [2]

Figure 1:

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S/N	Professionally Registered Firms	Sample Population	Calculated Sample Size
1	Architects	281	103
2	Civil Engineers	53	37
3	Quantity Surveyor	83	53
4	Contractors	27	20
5	Client agencies	17	10
	Total	461	223

III.

Figure 2: Table 2 . 1 :

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	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree	Mean Score	Rank
Building material Waste impact on Project Cost	79(30.3)	119(45.6)	33(12.6)	21(8.0)	9(3.4)	3.91	1
Building material Waste impact on the Environment	70(26.8)	111(42.5)	20(7.7)	42(16.1)	18(6.9)	3.66	2
Building material Waste impact on the Socio-economic Well-Being and Quality of Life	59(22.6)	111(42.5)	36(13.8)	36(13.8)	19(7.3)	3.59	3
Source: Author Field Survey, 2020							

Figure 3: Table 3 . 1 :

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	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree	Mean Score	Rank
Direct impact on loss of significant revenue	76(29.1)	129(49.4)	22(8.4)	24(9.2)	10(3.8)	3.91	1
Direct impact on the lengthening of contract execution time	78(29.9)	114(43.7)	37(14.2)	24(9.2)	8(3.1)	3.88	2
Direct impact on cleaner environment	65(24.9)	123(47.1)	40(15.3)	21(8.0)	12(4.6)	3.80	3
Direct impact on less productivity	44(16.9)	119(45.6)	33(12.6)	50(19.2)	15(5.7)	3.49	4
Direct impact on others (such as availability of land; land, air and water qualities, and risk to security)	60(23.0)	101(38.7)	34(13.0)	36(13.8)	30(11.5)	3.48	5
Direct impact on increased project cost	48(18.4)	111(42.5)	29(11.1)	47(18.0)	26(10.0)	3.41	6
Direct impact on increased patronage	45(17.4)	106(41.1)	35(13.6)	44(17.1)	28(10.9)	3.37	7
Direct impact on longer lifespan of materials	40(15.3)	94(36.0)	53(20.3)	51(19.5)	23(8.8)	3.30	8
Source: Author Field Survey, 2020							

Figure 4: Table 3 . 2 :

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[2]Analysis of Consequences of Unmanaged Wastes on Building Procurement Activities in Southwest, Nigeria

[Sustainable Development in the Built Environment] , *Sustainable Development in the Built Environment* 35 p. .

[Edoka et al. ()] 'An Assessment of Environmental Impacts of Building Construction Projects'. A I Edoka , A J Richard , O A Bamidele , B A Abdul-Quadri . *Civil and Environmental Research* 2013. (1) p. 3.

[Lu et al. ()] 'An Empirical Investigation of Construction and Demolition Waste Generation Rate in Shenzhen, South China'. W S Lu , H P Yuan , J Li , R Hao , J L Mi , X M Ding , ZK . *Waste Management* 2011. 31 (4) p. .

[Wahab and Lawal ()] 'An Evaluation of Waste Control Measures in Construction in Nigeria'. A B Wahab , A F Lawal . *African Journal of Environmental Science and Technology* 2011. 5 (3) .

[Love and Smith ()] 'Benchmarking, Benchaction, and Benchlearning: Rework Mitigation in Projects'. P Love , J Smith . *Journal of Management in Engineering* 2003. 19 (4) p. .

[Bates ()] 'Compact' Concept Comes of Age: How Specialist Manufacturers Have Helped Create a New Market in Materials Recycling'. M Bates . *Waste Management World* 2006. 7 (6) .

[Love ()] 'Constructing a Coherent Cross-Disciplinary Body of Theory about Designing and Designs: Some Philosophical Issues'. T Love . *Design Studies* 2002. 23 (3) p. .

[Network ()] *Construction 849: Session Guide -Recycling Construction Waste for a movie Recycling Construction Waste*, Einstein Network . 2002. London: Einstein Network.

[Ekanayake and Ofori ()] 'Construction Material Waste Source Evaluation'. L L Ekanayake , G Ofori . *Proceedings of the Second Southern African Conference on*, (the Second Southern African Conference on) 2000.

[Hostovsky ()] *Course Taught at the University of Toronto with the Course Code and Course Name: GGR 332Y1 Environmental Waste Management*, C Hostovsky . 2004.

[Yu et al. ()] 'Impact of Construction Waste Disposal Charging Scheme on Work Practices at Construction Sites in Hong Kong'. A T W Yu , C S Poon , A Wong , R Yip , L Jaillon . *Waste Management* 2012. (1) p. .

[Yu et al. ()] 'Impact of construction waste disposal charging scheme on work practices at the construction site in Hong Kong'. A T W Yu , C S Poon , Wong , A Yip , R Jaillon , L . *Waste Management* 2013. (1) p. .

[Ofori et al. ()] 'Impact of ISO 14000 on construction companies in Singapore'. G Ofori , C Briffet , G Gang , M Ranasinghe . *Construction Management and Economics* 2000. 18 p. .

[Mahayuddin et al. ()] S A Mahayuddin , J J Pereira , W H W Badaruzzaman , M B Mokhtar . *WIT Transactions onEcology and the Environment*, 2008. 109 p. .

[Tongo et al. ()] 'Professional perspicacity of building procurement on waste management in construction industry'. S Tongo , A Oluwatayo , B Adeboye . 10.21474/IJAR01/10873. *International Journal of Advance Research* 2020a. 8 (04) p. .

[Tongo et al. ()] 'Professionals' perception of main causes on materials wastes in Nigeria building construction industry'. S Tongo , A Oluwatayo , B Adeboye . 10.21474/IJAR01/10848. *International Journal of Advance Research* 2020b. 8 (04) p. .

[Love and Li ()] 'Quantifying the Causes and Costs of Rework in Construction'. P Love , H Li . *Construction Management and Economics* 2000. 17 (4) p. .

[Olusanjo et al. ()] 'Quantitative Analysis of the Sources of Construction Waste'. O F Olusanjo , G Panos , C Ezekiel . 10.1155/2014/...(Accessed. ID 651060. `http://dx.doi.org/10.1155/2014/...(Accessed` *Journal of Construction Engineering* 2014. 2018. March 18. 2014 (9) . School of Technology, University of Wolverhampton

[Network ()] 'Recycling Construction Waste [videorecording'. Einstein Network . *London: Einstein Network, Hong Kong: MediaMatters (distributor)*, 2002b. 2002.

[Poon et al. ()] 'Reducing Building Waste at Construction Sites in Hong Kong'. C S Poon , T W Ann , L Jaillon . *Journal of Construction Management and Economics* 2004. 22 (5) p. .

[Abdul-Rahman et al. ()] 'Significant Factors Causing Cost Overruns in Large Construction Projects in Malaysia'. I Abdul-Rahman , A H Memon , Abd , A T Karim . *Journal of Applied Sciences* 2013. 13 (2) p. .