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STANDARD COSTING AND EFFICIENCY OF CEMENT BLOCK MANUFACTURING BUSINESS IN NIGERIA

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ABSTRACT
The study examined literature and contextual review of Standard Costing (SC) as a tool that can impact positively on manufacturing efficiency of cement block making enterprise in Nigeria given the fact that block is a key material in a building construction project. The aim of the study is to assess whether the standards laid down by the regulatory authority/agency – Standard Organisation of Nigeria (SON) for producers of this material have been adhered to and also to state the benefits of setting a pre-determined Standard cost (SC) for the required standard expected of a quality block (material) used in building construction. The findings from various studies suggest that there is wide non-adherence to the standards set for production of quality cement blocks for users. It was also discovered that poor quality blocks (material) is one of the key factors responsible for building cracks and rampant cases of their collapse in the entire country. The study recommended among others that registration of all cement block producers in Nigeria with SON should be made compulsory with a view to monitoring the quality of this important building material and any producer found wanting should be blacklisted.
Keywords: *Standard Costing – Efficiency – Cement blocks – Producers – Standards – Adherence.*

INTRODUCTION
It is no longer debatable that entrepreneurship has been playing a crucial role in economic growth and development in all nations of the world in terms of job creation and poverty reduction. Economic empowerment, poverty reduction, self-reliance and improved standard of living of individuals in any society are closely related to entrepreneurship. The socioeconomic advantages of entrepreneurship cannot be over-emphasized as it is the main source of economic dynamism, innovation and provision of opportunity to train young managers of personal businesses (Diyoke, 2015). In Nigeria, block making business is one of the major endeavors into which many entrepreneurship ventures. The rapid growth of Nigerian population requires additional physical infrastructures to accommodate the ever-growing population (Ogunsanmi et al, 2011). The physical infrastructure need for the populace include residential and commercial buildings, agricultural and health facilities and provision of drainage facilities for the safety of the buildings and the environment. In many developing nations of Africa particularly in Nigeria, over 80 percent of the physical infrastructure is constructed with the use of cement blocks as a key material (Bolanle, 2011). For durability of the infrastructure particularly residential building, standards are set by Standard Organization of Nigeria (SON) through Nigeria Industrial Standard reference

document. The document, (NIS87-2004) prescribes the comprehensive strength, water absorption and treatment for blocks produced and delivered to users. The standards are to be followed in costing all the items used in cement block production for quality and durability. The strength and durability of any building constructed using cement blocks largely depends on the quality of such blocks hence the need for adherence by block manufacturers/producers to the Standards developed by the regulatory authority.

STATEMENT OF THE PROBLEM

All over the country, cases of frequent building collapse, loss of lives and properties are bound. These ugly situations are largely attributable to poor quality materials particularly the cement blocks used in building construction. Poor quality production and poor quality delivery to consumers are as a result of non-adherence to requirement of quality as specified by the regulators in the building industry (Kabir, 2017). In conformity with the best practice, the Standard Organization of Nigeria (SON) came up with standard reference document for production and delivery of building blocks contained in NIS87-2004 series. The essence of the document is that all cement blocks manufactured/produced in Nigeria should meet the minimum specified standard for quality, variation control and efficiency (Kadala, 2013). The overall objective of the standards and adherence by cement block producers is to promote efficiency and reduce to the barest minimum rampant cases of building collapse and associated problems such as loss of lives and properties. Unfortunately however, many years after the introduction of the standards, cases of building collapse is still a big issue in Nigeria.

For instance, between 2010 and 2017, about seventy (70) cases of building collapse were reported in major towns and cities in Nigeria (Kabir, 2017). This ugly situation according to Ogbada (2016) is due to the fact that through the standards for building materials production particularly cement blocks have been set, there still exits a high rate of non-conformity to the standards by block producers in Nigeria. Non-adherence to the set standards by cement block manufacturers is key issue paving way for ever rising cases of building collapse in Nigeria. The attendant problems of wastage and inefficiency in the manufacturing process due to poor quality, loss of lives and properties to the people and government of Nigeria are better imagined that experienced.

OBJECTIVES OF THE STUDY

The general objective of the study is to examine the importance of standard setting for material production particularly cements block production in construction industry (Standard Costing) and adherence to standards prescribed by SON for cement block producers in Nigeria. The specific objective however,

is to ascertain whether the standard set for cement block production in Nigeria has been complied with by manufacturers/producers relying on existing literatures and theoretical review on the subject matter.

CONCEPTUAL CLARIFICATION

Standard Costing: Mula et al (2016) view standard costing (SC) as a tool that places responsibility for identifying variance with line-managers thereby integrating product or process efficiency intervention as a routine line activity. SC is a managerial tool that contributes to process efficiency as it a means where various inefficiencies and defects are brought to light (Odulami and Balogun, 2016). Joy (2014) stated that the emphasis on SC is on variation from standards thereby drawing management attention as a result of variations between standards and actual in the usage of material and production of product(s). Batt (2011) viewed standard costing as a system of accounting designed to show in detail how much each product should cost to produce and sell when a business is operating at a stated level of efficiency and for a given level of output. It is a costing system meant to identify in detail how much each standard material should cost to produce standard output (Mula et.al, 2016).

Efficiency is a concept that has to do with minimizing waste and maximizing resource capabilities of an enterprise in order to deliver quality products to consumers (Enemah, 2012). Babaye (2014) viewed efficiency of a manufacturing process as a concept measured as a ratio of useful output to total input expressed with a mathematical formula r=p/c where P is the amount of useful output per the amount of Cost (C) of resources consumed during an operation. Resource maximization for quality according to standard is the domain of efficiency (Bell et al 2004).

Theoretical framework

The study is anchored on production theory propounded by Ohno in 1978 (Alvaro (2005). The production function as contained in the production theory shows the relationship between input changes and output changes. It further shows the maximum output that can be obtained by an entity from fixed quantity of resources (Hiller and Lieberman, 2007). Production function is expressed as Q=f(k+L+etcetera) where 'Q' is the output and 'K' and 'L' are capital and labour respectively (input resources) plus other factors such as adherence to presented standards as defined by regulators of the standards. Out quality (dependent variable) is a function of capital and labour applied by entrepreneurs in production process plus adherence to standards (independent variables). Improved quality in any production process depends on the rate of application of the independent variables (Cinquini and Tenuci, 2010). The relevance of this theory to the study stems from the facts that improved quality of cement blocks

produced in Nigeria depends largely on the quality of the application by the entrepreneurs, the required Capital and Labour plus Standard Costing of items required for making a cement block and adherence to standards required to produce a quality/durable cement block given the fact that cement block is a key material in a building project. The theory has two main assumptions – (i) that resources of an enterprise are limited and (ii) that the limited resources can be efficiently applied to deliver a standard output.

Empirical Review

Anosike and Oyebande (2012) conducted a study on sandcrete blocks and quality management in building industry in Nigeria. The aim of the study was to assess the rate of adherence to prescribed standards for sandcrete blocks in Nigeria. Using a survey design research approach data were obtained from sandcrete block manufacturers in Abuja, Port-Harcort, and Umahia. The obtained data were analysed using simple percentage of descriptive statistics. It was found that manufacturers of these blocks do not comply with the set standards. The study recommended mandatory registration of all block manufacturers in Nigeria with a view to monitoring their output.

Adewale et'al (2016) did a study on building collapse in Nigeria: Issues and challenges. The aim of the study was to examine the causes and effects of building collapse on the nation's economy. The study is a theoretical review that made use of relevant literature and previous studies on the issue. It was found that the use of poor quality material is the major factor responsible for building collapse in the country. The study recommended constant monitoring of operators in building construction industry by relevant government agencies with a view to making sure that quality material are used for building construction.

Ogbada (2016) conducted a study on the factors responsible for rampant building cracks and eventual collapse in Gombe metropolis. With the use of primary source, data were obtained from five (5) block manufacturers using questionnaire, oral interview and personal observation of block production and treatment by the manufacturers. Findings from the analysis of data obtained using simple percentage of descriptive statistics indicated that poor mixing of cement/water ratio and poor treatment of block before sale were largely responsible for the menace of building collapse in the metropolis.

Kamal (2017) did a study on the issues surrounding building collapse in Kano and its environs. The aim of the study was to ascertain the effect of quality of material on building durability in Kano state. Data were primarily sourced from eight (8) sandcrete block factories in Kano using a simple percentage of descriptive statistics. It was found that poor quality block and sale of same to

users is the major factor responsible for collapse buildings in the state. The study recommended adherence to standards laid down by regulatory authorities for production of building blocks.

Kabir (2017) conducted a study on the comparative analysis of machine vs hand/manual molded cement blocks in Yola metropolis. The aim of the study was to compare the quality and consumers' preference for the two types of blocks. Data for the study were primarily obtained through questionnaire administered on 63 staff of ten block manufacturing enterprises and 26 randomly selected consumers. In analysis using simple percentage of descriptive statistics, evidence was obtained that machine molded type is of quality than manual molded type. The study recommended that block molders should use machine.

STANDARDS PRESCRIBED BY THE REGULATORY AUTHORITY (SON) FOR BLOCK MANUFACTURERS /PRODUCERS

The Standard Organization of Nigeria (SON) in a reference document (NIS87:2004) developed the following as Standards for production of block cement in Nigeria.

(1) **Mix ratio:** The mix ratio of 1:8 cement to sand shall be observed by all cement block manufactures.

(2) **Method of Molding:** The NIS specified use of vibrating machine in molding blocks as against hand/manual molding.

(3) **Addition of Water**: The specified ratio is 0.45mm water to a bag of cement. Addition of water beyond the specified ration reduces the strength of the block.

(4) **Curing method and duration**: the standard specified a curing period of seven (7) days by watering three times a day in a covered area/place for strength.

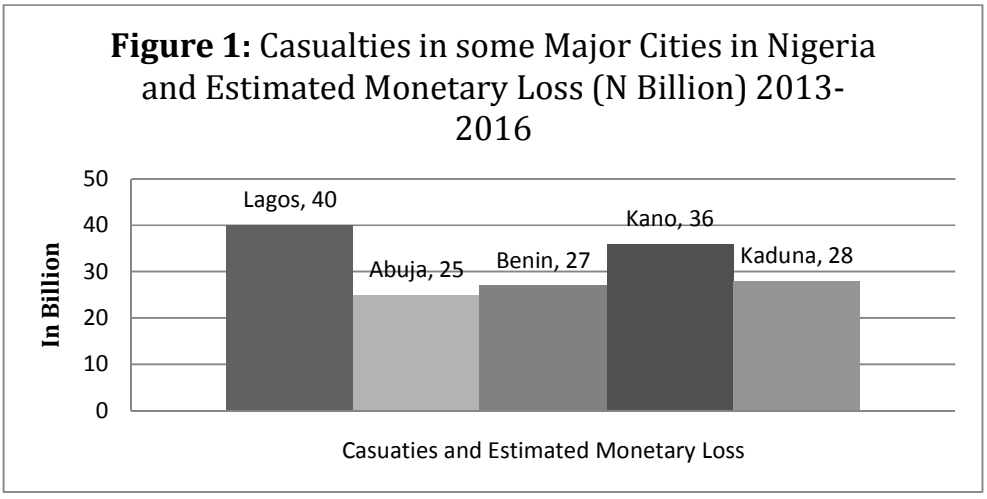
(5) **Quality Assurance Test**: The standard required that all blocks manufactured must undergo a comprehensive strength and water absorption tests for quality assurance before the intended use.

(6) **Mandatory Conformity Assessment Program Certification (MANCAP):** The standard specified that all block manufacturers/producers in the country should have MANCAP Certificate issued by SON.

The essence of these standards is to ensure efficiency in block manufacturing process for quality and durability. Unfortunately, most block manufacturers in Nigeria do not comply with the laid down standards as revealed in various researches.

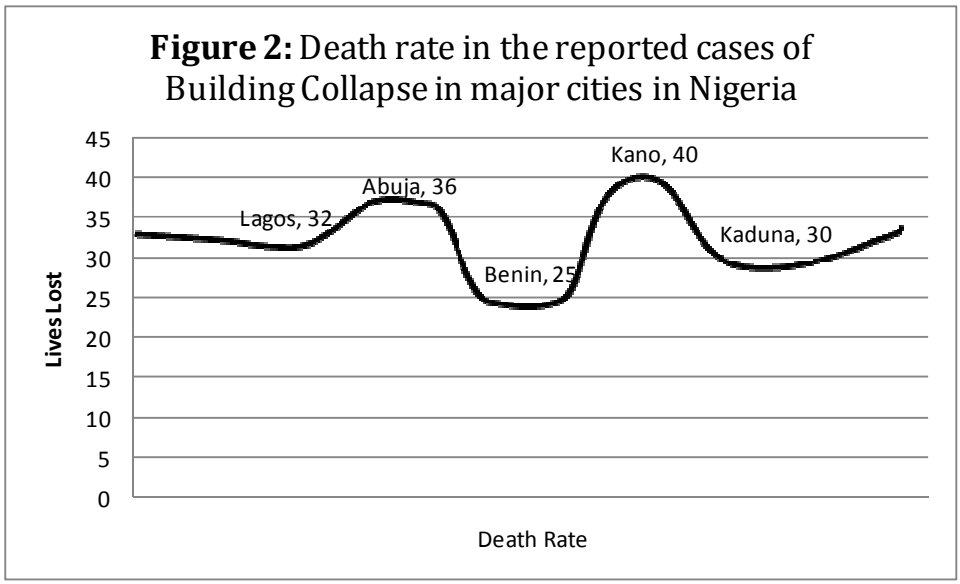
For instance, Ogbada (2016), Kamal (2017), Kabir (2017) in their separate studies in Gombe, Kano and Yola respectively discovered that few cement block producers in these states were able to meet just one of the requirements of the standards that is, making their blocks using vibrating machine. These findings corroborate with that of Anosike and Oyebade (2012) in a study carried out among block manufacturers in Federal Capital Territory Abuja, Umuahia and Ota in Ogun State.

The ugly effect of this rampant non-adherence to standards is various cases of building collapse witnessed all over the country with loss of lives and properties. The figures below depicts, the quantum amount of financial loss suffered and lives lost in casualties of building collapse in some major cities in Nigeria.



Source: Kabir (2017)

Evaluation of financial loss suffered as depicted in the graph above indicated that the estimated financial loss suffered by victims of building in Lagos State between 2013-2016 stood at about N40 Billion which is the highest while the least estimated loss figure of N25 billion is the amount suffered by victims in Abuja. In all these incidents, lives were lost as depicted in the figure below:



Source: Kabir (2017)

The death rate in the reported cases of building collapse between 2013 and 2017 in these five major cities: Lagos, Abuja, Benin, Kano and Kaduna stood at 162 with Kano recording the highest figure of 40lives lost in the unfortunate casualties.
The sad incident occurring in these cities of Nigeria is likely a reflection of what is happening in the entire country where there is fragment disobedience to the set out standards by operators in the building industry without adequate punitive measures. Thus, Olamide (2016) observed that though natural forces such as earth quakes, landslide, etc. can also be responsible for building collapse, over seventy (70) percent of the cases of building collapse in sub-Saharan Africa is due of faulty materials in building construction whereby adequate punitive measures for offenders is lacking. Failure to meet standards required of a material for construction is an indication of inefficiency on the part of the entrepreneurs. Inefficiency in a manufacturing enterprise such as that of cement block production is as a result of inability to set predetermined standards for each of the cost elements necessary to make and sell quality product (Olamide, 2016). Setting a predetermined standard for each cost element to incur in order to produce quality (standard) product is a key feature of standard costing (McNair and Polutnik, 2010). The Burning desire of an enterprise to produce quality product, pre-determine standard costs for each material to produce that quality (standard) products and remain competitive are key ingredients that propels adherence to prescribed Standards of any regulator in a manufacturing setting.

BENEFITS OF STANDARD COSTING IN A BLOCK MAKING BUSINESS

The operation of standard costing system in a block manufacturing enterprise is meant to identify in detail how much it costs to produce each standard unit of standard block without compromising quality. It is the setting of predetermined standards for each cost element to be incurred in producing and treating each block certified for use by customers. Adherence to standards of regulators for production of each material block is therefore a function of setting pre-determined cost (standard costing) of each item of block produced. Standard costing of each cost elements triggers adherence to set standards relating to material (block) production. Thus, standard costing of each item of block and adherence to standards of regulatory authority in block making enterprise will be beneficial to entrepreneurs themselves, the people and government of Nigeria in the following ways: (i) increased efficiency due to reduction in block damages and scraps (ii) increased patronage by customers due to quality (iii) increased profit as a result of (i) and (ii) above (iv) business growth and expansion as a result of (i), (ii) and (ii) above (v) more employment opportunities as a result of (i), (ii), (iii) and (iv) above (vi) less cases of building collapse, loss of lives and properties in the society and (vii) increase/improved standard of living in the society as a result of (i) to (vi) above.

CONCLUSION

The rate of building collapse and attendant consequences of the unfortunate situation has assumed a heightened dimension. Poor quality cement blocks as one of the major material used in building construction accounted significantly for the rampant cases of building collapse in Nigeria as revealed in the study. Non-adherence by entrepreneurs in block making industry coupled with lack of punitive measures for producers of substandard blocks paves ways for mass production of substandard blocks in Nigeria. This sad situation can be remedied if further regulations and punitive measures are taken by government.

RECOMMENDATIONS

i. All block manufacturers must be duly registered and certified by SON
ii. All blocks produced must undergo quality test to determine the strength of such blocks before sale to consumers.
iii. Constant monitoring of cement block manufacturers/producers in the country with a view to blacklisting any producer found wanting (Non-adherence to Standard Costing of material items required and production of cement blocks).
iv. To carry out (iii) effectively SON should have offices located in all the local government areas in Nigeria. This is certainly a way of creating more jobs in the society.

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