



THE IMPACT OF ENVIRONMENTAL FACTORS ON CONSTRUCTION MANAGEMENT IN NIGERIA

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Abstract

Construction sector is considered as one of the main sources of environmental pollution in the world. Over the past decade, the construction stage of a building is often criticized for overlooking or approximating the environmental impacts as compared to other life-cycle stages of a building. This is evident through strong research findings regarding other building life-cycle stages in building-emission-assessment studies. Despite the significant role of the real-estate industry to UAE's economy, the performance of contractors is a major concern for the stakeholders and clients. In many instances, contractors are blamed for poor performance and criticized for having limited knowledge in the application of requisite management techniques. The records showing that a large construction companies have won many residential projects in UAE but at the end they have a big loss due to improper handling of project schedule over a series of sub-contracts. The aim of this study is to examine the relationship between project risk management and the performance of construction companies in UAE. This study applies quantitative methods to examine the relationship between project risk management and project performance. The total number of population equal to 1270 individuals. Those individuals represent project managers and the staff in project management department in Aldar Company for construction and properties. The findings show that environmental factors have a significant effect on construction management. The paper therefore recommends that government with the support of stakeholders in the construction industry should come up with special legislations, codes or standards relating to sustainable construction practices specific to Ghana's construction environment to ensure its proper and effective implementation. Specifically, the national

building regulations should be reviewed to take account of environmental regulations. Besides, all forms of construction activities should be subjected to an environmental impact assessment to determine the potential impacts and also come up with some mitigation measures before they are executed.

Keywords: *construction; buildings; emissions; sustainability; environmental factors*

INTRODUCTION

Humanity has been continuously incrementing the Earth's pollution over the past centuries. The contamination of the air and water, climate change, soil erosion, biodiversity loss, and the reduction of natural bank account of non-renewable resources are some of the negative impacts that human activities have been generating on the environment during this period. In the long term, humans are damaging the regeneration capacity of the planet and the provision of clean air and water, tolerable climate, fertile soil and the maintenance of biological diversity (Harte, 2007). Overall, there is an increasing tension over the planet's resources that is being intensified by the increasing world population (IPCC, 2007, Ainger and Fenner 2014). Harte (2007) agrees with this and points out that the magnitude of this growth is dynamic and proactive. As a result, the adoption of approaches that permit a sustainable management of the planet's resources has become imperative. The Earth's natural resource base is not infinite (Rockström et al., 2013). The pressures on resources are increasing as natural resources underpin the functioning of the European and global economy (EC, 2011a). For instance, Europe has the world's highest net imports of resources per person and its economy relies heavily on imported raw materials and energy. Moreover, the possible negative social and environmental factors on third countries are an ongoing cause of concern. In the year 2007, the total amount of material directly used in the EU economy was more than eight billion tonnes (EC, 2011b). An equivalent of 16% of the EU Gross Domestic Product is spent each year by European public authorities on the procurement of goods such as building components, transport vehicles, services such as building maintenance and cleaning works. A major share of annual expenditure of the public authorities is represented by construction and renovation works (CEC, 2008). It must therefore be noted that one of the significant users of natural resources and energy is the construction sector. The Worldwatch Institute data shows that the construction sector consumes 40 percent of the total raw material flow into the global economy each year and more than a quarter of the world's annual appetite for wood (Roodman and Lenssen, 1995). A substantial amount of energy is also used during the manufacturing and transportation of building materials, installation and construction activities (Yan et al., 2010). In addition, studies show that the the construction sector accounts for the largest share of energy use and the environmental impacts during operation phase (cf: Adalberth 2000;

OECD, 2003). According to the Organization for Economic Co-operation and Development (OECD), the construction sector's energy use accounts for 25 to 40% of final energy consumption in OECD countries (OECD, 2003). As a result of vast consumption of resources and energy, the sector has been greatly responsible for environmental pollution and problems related to sustainability. The incidence of CO₂ emissions is evident during the different phases of a building life cycle such as the production of materials, setting the site, exploitation, construction of the building, and demolition (González and Navarro, 2006). As environmental and sustainability issues continue to become increasingly significant, the construction sector needs to act for three important reasons that Ofori (1992) has listed. Primarily, to contribute to the overall effort being made to address environmental issues and sustainability concerns. The second reason includes the sector's need to prepare for opportunities that can be anticipated regarding the changes that will be required in terms of design, construction and management, the new materials to use, and the processes to adopt. Moreover, the reason why the construction sector is required to act is also because it will have to take proactive measures for handling the array of environment-related statutes, regulations, policies and requirements. Such environmental requirements and "changing priorities in construction management" (Lam et al., 2010) have obliged the construction sector to respond to issues concerning sustainability. Sustainability in the construction business is concerned with achieving a win-win situation for contributing to the improved environment and the advanced society, and simultaneously gaining competitive advantages for construction companies (Shen et al., 2010). Therefore, the construction sector is in crucial need of improving its environmental performance (Tam et al., 2006). According to Rikhardsson (1998), the improvement of environmental performance implies that the sector must minimise the environmental impact of its activities, products or services. The construction sector is thereby compelled to ask itself many questions regarding the approaches to handling environmental problems within the overall design process, the suitable materials to be used, environmentally benign practices, and other such issues and aspects that influence its contribution to the improved environment (Ball, 2002). Moreover, the issues that should inform the social dimension are less acknowledged and addressed by stakeholders involved in the development process (Edum-Fotwe and Price, 2009). Such social issues focus on an adherence to ethical values during development, addressing topics such as ethical trading throughout the supply chain, the provision of adequate local services, including the provision of information to local community during construction activities. Also relevant is the conservation of local heritage, and access to green space, which tackles topics such as the accessibility of residents to green areas (van der Heijden and van Bueren, 2011). The construction sector is pushed by government authorities to adopt several policy instruments that guide "the better management of development in

harmony with the environment” (Glasson et al., 2007). Policy instruments can generally be classed as regulation (sticks), economic means (carrots) and information (sermons) (Vedung, 1998). Similarly, in the construction sector, policy instruments can be categorised into legislative and regulatory, economic, and information instruments (Vermande and van der Heijden, 2011). Legislative and regulatory instruments are tools derived from routinised legal forms establishing the archetype of state interventionism. They set out the values and interests protected by the state. Economic instruments are close to legislative and regulatory instruments as they follow the same route, drawing their force and legitimacy from having been developed on a legal basis. However, they use monetary techniques either to levy resources intended to be redistributed (eg: taxes) or to direct the behaviours of actors (eg: through subsidies, pollution fees) (Lascoumes and Le Gales, 2007). Thus the industries self-regulate their activities affecting the environment in their own economic in-terest. The state may pursue this course by playing the additional role of building the capacity among industries via the information instrument (Lenschow and Zito, 1998). Information instruments offer less interventionist forms of public regulation (Lascoumes and Le Gales, 2007), as they involve only the communication of claims and reasons but neither material resources nor obligatory directives (Vedung, 1998). The primary focus in this thesis will be on legislative and regulatory instruments. Four key policy instruments have been considered in this thesis, namely, green public procurement (GPP), sustainable public procurement (SPP), environmental impact assessment (EIA) and strategic environmental assessment (SEA). GPP is defined by the European Commission as “a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured”. According to the Commission, the priority sectors involve, among others, construction and energy from renewable sources (CEC, 2008). The adoption of GPP practices is facilitated when national public procurement legislation covers appropriate provisions (EEA and UNEP, 2007).

Problem statement:

Humanity has been continuously incrementing the Earth’s pollution over the past centuries. The contamination of the air and water, climate change, soil erosion, biodiversity loss, and the reduction of natural bank account of non-renewable resources are some of the negative impacts that human activities have been generating on the environment during this period. In the long term, humans are damaging the regeneration capacity of the planet and the provision of clean air and water, tolerable climate, fertile soil and the maintenance of biological diversity (Harte, 2007). Overall, there is an increasing tension over the planet’s resources that is being intensified by the increasing

world population (IPCC, 2007, Ainger and Fenner 2014). Harte (2007) agrees with this and points out that the magnitude of this growth is dynamic and proactive. As a result, the adoption of approaches that permit a sustainable management of the planet's resources has become imperative. The Earth's natural resource base is not infinite (Rockström et al., 2013). The pressures on resources are increasing as natural resources underpin the functioning of the European and global economy (EC, 2011a). For instance, Europe has the world's highest net imports of resources per person and its economy relies heavily on imported raw materials and energy. Moreover, the possible negative social and environmental factors on third countries are an ongoing cause of concern. In the year 2007, the total amount of material directly used in the EU economy was more than eight billion tonnes (EC, 2011b). An equivalent of 16% of the EU Gross Domestic Product is spent each year by European public authorities on the procurement of goods such as building components, transport vehicles, services such as building maintenance and cleaning works. A major share of annual expenditure of the public authorities is represented by construction and renovation works (CEC, 2008). It must therefore be noted that one of the significant users of natural resources and energy is the construction sector.

Objective of the study:

The general objective of the study is to determine the impact of environmental factors on construction management in Nigeria

Specific Objectives

i. To investigate the environmental factors that affects construction management in Nigeria

Research Question

1. Does environmental factors affects construction management in Nigeria?

Research Hypothesis

H₀₁ Environmental factors has no significant impact on construction management in Nigeria

Justification of the study

The research reduces the gap in the current body of knowledge by offering a new approach to identifying common external environmental conditions that influence construction project failures. Revealing these common external environmental conditions contributes to the body of knowledge by developing the reader's ability to utilize enhanced risk management practices. The second subsection offered the

implications for biblical integration. The lessons gleaned from Biblical integration are several throughout the passages. For instance, determining project objectives, defining roles and responsibilities, being diligent, and the importance of communication. All of these lessons assist with managing project risks. The third subsection provided the relationship to the field of construction project management. Research suggests that the better a construction project manager is at identifying, planning for, and reacting to negative risk assisted to improve project outcomes. Examining the relationship between external environmental conditions and construction project failures revealed new insights that influence project success and improve the project manager's skill at managing risks.

LITERATURE REVIEW

Concept of Construction Industry

Most human activities that impact on the environment have backwards or forward linkages to the construction industry and their impact can be mitigated through changes in the practices of the construction industry. Therefore as Du Plessis (2002) explains the construction industry is central to how we shape our future, and to the sustainability of this future. The industry impacts on almost every aspect of the realisation of human settlements and the creation of infrastructure that supports development. The construction industry is the largest industrial employer in the world with 111 million employees worldwide, according to data presented in Du Plessis (2002). Of these total, 74% are in the developing countries with a low income. Hence these countries produce only 23% of the global construction output, it is clear that the "employment intensity" of construction activities is much higher for developing countries in comparison with developed countries. Nevertheless Gomes and Gomes da Silva (2005) points out that more construction is needed to provide prosperity, social equalisation and minimum standards of living. The continuing urban population growth and rapid urbanisation puts an increasing pressure on the by now insufficient and limited infrastructure of urbanised areas. In the Gulf countries, governments are taking significant steps to reconfigure their business models and measures are being adopted to move away from oil-based economies, create economic sustainability and continue infrastructure investment, a key 16 element of the business environment and a generator of employment (Deloitte, 2016). However, the low oil prices will constrain the amount of funding available to regional governments that will have to innovate and find alternative funding sources to bridge the funding gap. The GCC Member States share a strong interest in increasing building performance to achieve environmental benefits, with energy efficiency and water conservation being key focal areas for the hot, arid climate zone. Therefore, the UAE Government has taken measures to promote a more sustainably built environment, there also are indications of interest in aligning certain initiatives across the region to

facilitate commerce and ensure that the world's leading technologies can be used in regional construction projects. The United Arab Emirates (UAE) construction sector is an important industry and contributes approximately 11% of the GDP. It has been the most significant economic activity outside the oil sector. However, recession, uncertainty, complexity, sustainability, and climate change are among the most important features of the current construction business environment in the UAE. Although many construction firms throughout the world have successfully embedded sustainability, there is little information on how UAE construction organisations are embedding sustainability strategies for competitive advantage.

Theoretical Framework

Positivistic Paradigm

Basically the positivistic approach is theory based and it depends on explanations and description. Based on the deductions and discussions, the theories give a very strong framework. On the basis of logical, reasonable and rational approach this research is performed which is very systematic. In this approach the persuasions such as emotions, beliefs and feelings are not accepted because they are not tangible or objective and due to the reality that they are not constant across time. The aim of the approach is at the critical evaluation of all descriptions from the facts which can be guaranteed or validated with certain probabilities. The true knowledge and objectives are lead by falsifying and verifying theories and hypothesis.

Deductive Approach

For every deductive method, the base point is the theory behind it. The goal then will be to find some data based on the theory which supports the predetermined predictions made. The theory then concludes, what information should be collected? How it should be interpreted? And how the results can be related to the existing theory?

Environmental Impacts and Embodied Energies

The external environment is defined as the group of external factors that exist around the organization which are formed by economic, political, legal, social and technological factors. In many cases, the organization cannot control these factors, thus, they pose either opportunities or challenges to the organization (Hunger et al., 2012). These factors include all the dynamic and developed dimensions as well as the uncontrolled dimensions that affect the organization on the long or short run. This approach investigates all changing external factors such as the technological, political, legal, social and economic.

1. Technological Factors. Technological factors refer to the group of factors that affect the production pattern in the organization and affect the demand for its products.

Likewise, technological changes affect the opportunities and challenges facing the organization. One of these effects is the change on demand due to technological progress. Therefore, it may lead to the emergence of new opportunities for the organization, such as the use of the Internet and the subsequent modern means of communication in marketing and sales (AlSiddiq, 2018). The organization cannot survive unless there is an effective production and management technology (Grubich & Shrolik, 2015). Technological factors contribute to supporting the organization's capability to apply and exploit new sciences and ideas that are emerging in various fields of knowledge. Technology is an important element in the areas of enhancing the competitive position of the organization as it works to improve the organization's services or products continuously, hence achieving business sustainability and prosperity. Technological factors include spending on research and development, focusing on technological development in the industry, innovation, technology transfer, life cycle, and speed of technology changes. One of the most important ways to ensure stable performance is to invest in new technologies, redesign products and processes or spending on research and development (Epstein & Roy, 2001).

2. Legal Factors. These encompass legislation and laws regulating the work of institutions and organizations in its various sectors. They may overlap with political factors. Legal factors are **concerned** with issues related to regulations and laws in the region in which the company operates. In return, companies need to take care of their commercial operations within legal limits which includes the labour law, distribution law, and health law. Legal factors affect the costs and demand of companies. Thus, it is necessary that companies realize their legal environment before they start business (Liu, 2017). Legal environment has also an impact on the activities of organizations in terms of having laws regulating work sector in any country such as business regulations, competition laws, environmental laws, education laws, laws related to monopoly, discrimination law, intellectual property and copyright law, consumer protection and e-commerce law, employment law, data protection law, health and safety law (Pulaj & Kume, 2013). Therefore, these factors are gaining importance due to their impact on attracting capital and encouraging investors in terms of establishing new companies. In addition, laws and legislations influence the technology sector. By contrast, environmental preservation contributes positively to production mechanisms and the level of quality provided, whether as products or services. Because of the sudden change in the external environment, its fluctuation, and rapid change, having legislation and laws that achieve security stability would help organizations to improve their performance and reduce the risks they are exposed to.

3. Economic Factors. The economic situation in a country refers to a set of economic factors that have a major impact on the operations in an organization. Such operations are related to the nature and direction of the economy in which the organization

operates. Fahey and Narayanan (1986) stated that economy factors include gross domestic product (GDP), goods and services, foreign exchange reserves, size and nature of foreign trade, availability of capital, and the strength of stocks markets. Rastogi & Trivedi (2016) pointed out the determinants of economic performance that directly affect the organization and have long-term effects on it. For instance, high inflation in any economy would affect the way of the product and services price. In addition, it will affect the purchasing power of the consumer and change the demand / supply patterns of such an economy. Economic factors are considered the cornerstone of the overall performance of the organization, as it is the primary source of its resources and the basis of its products. The economic factors in an organization are classified according to their comprehensiveness: First, the general economic factors are concerned with foreign trade policies and rate of inflation. Second, economic factors are concerned with competition, high and low interest rates. In addition, it have a major impact on the company's strategy as they affect the capital cost and the purchasing power of the institution. Likewise, they affect the purchasing power of consumers who will buy or use the goods and services of the organization (Kume et al., 2010). The sustainability and success of any organization depends on its economic environment, given that economic factors play an important role in determining the company's activity in terms of energy

The Impact of External Environment Factors on Business Continuity Management to Promoting the Higher Education Excellence in Oman 330 prices, transportation costs, telecommunications cost, services, quality standards, and the influence of the financial sector (Živanović, 2014). The country's economic situation has a reflection on the patterns of consumer spending: the increase in interest rates has a clear impact on the amount of credit granted; high levels of unemployment will reduce the consumption of unnecessary goods and services; and if people face financial difficulty, they will spend less on luxury and recreational goods and services such as vacation travel, new cars, and luxury goods (Semolic, 2007).

4. Social Factors. Social factors are the set of external factors that directly or indirectly affect the behaviour of customers in their relationships with different groups of society, and the extent to which the practices of those factors affect the activities of the organization (Berrgeron, 1993). They are the set of intellectual and ethical ways used in a society in which the organization exists. The social factors that have a great impact on the organization include consumer habits, community awareness, educational level, social habits, traditions and legacies. These all contribute in one way or another to directing consumers' consumption patterns. Besides, demographic factors such as population, average age, and birth rate, distribution of population in the country, rates of unemployment, and migration from the countryside to cities, the nature of the composition of the population, ethnic ethnicities, the level of income and purchasing habits all constitute either opportunities or challenges to the organization. Accordingly, the organization needs to understand these factors and work to exploit what opportunities they offer. The organization has also to work hard to avoid the challenges

that these factors may pose to its future activity in terms of achieving customer satisfaction, understanding their needs, and meeting their needs (Sholla & Nazari, 2018). Social conditions are essential parameters for any analysis of the business environment because they constitute the context in which all personal and business activities take place (Nandonde, 2019).

In the Figure 3-5 different materials are compared to each other to see which has less or which has more embodied energy per unit weight. Comparative lists shows that steel embodied energy per unit weight is highest than the other materials.

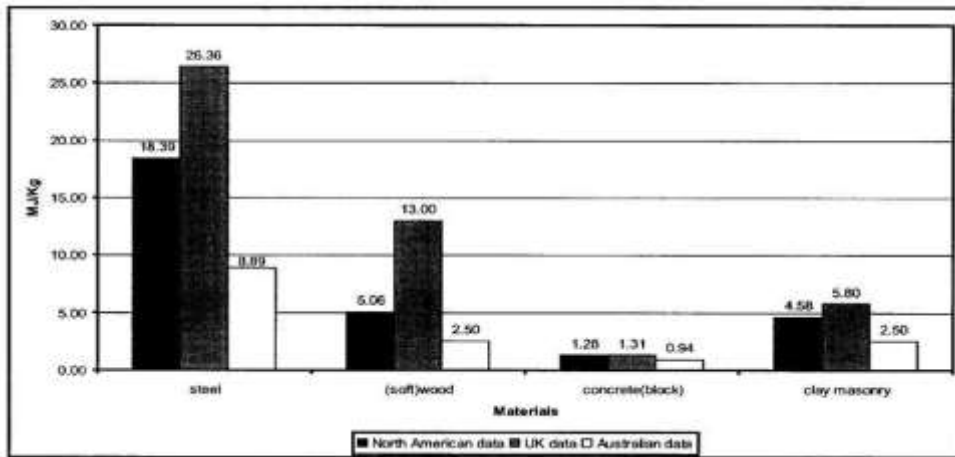


Figure 3-5 Embodied energy of materials per unit weight

The environmental impact of steel is worst when compared to other structural construction materials as per the Inventory analysis of Athena SMI reports. Steel is the worst when compared to concrete in terms of emission per unit weight. The environmental impact of steel and other structural construction materials in emission per unit weight are shown in Figure 3-6

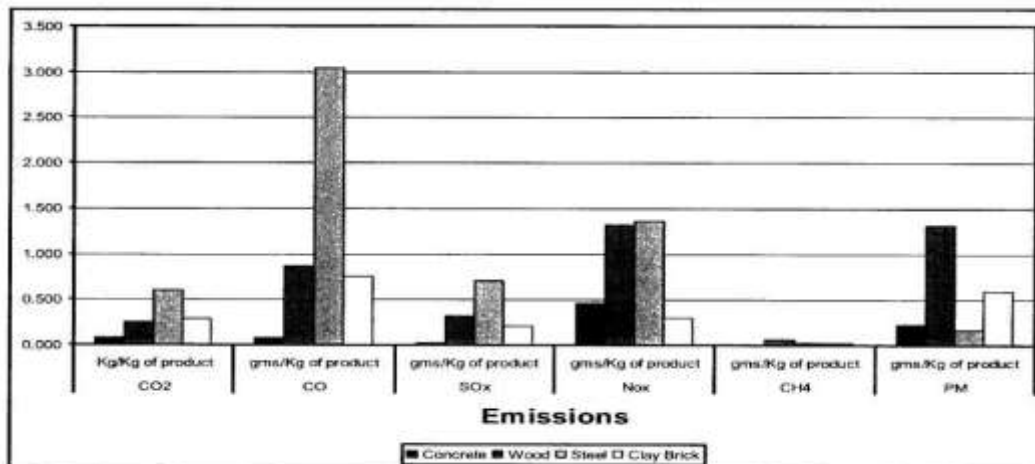


Figure 3-6 Emission per unit weight of different structural construction materials

Due to the uncontrollable use of structural construction materials it is clear that with this current trend of consumption will lead to serious environmental hazards in the world. Steel has the worst environmental impact with highest emission per unit weight and has very high embodied energy. Comparatively performance of concrete is much better than steel per unit weight. Although consumption of cement and its global emission are extremely high when compare to the consumption of steel. To mitigate these environmental hazards new materials which has less environmental impact and which are

The amount of steel recycled in the construction industries.

Steel is also called “The EnviroMetal” as it is the most recycled metal on earth. Steel can be recycled over and over again without any losses of properties. Moreover recycling has grown in parallel with the increase in the consumption of steel. Steel is one of the highly recycled materials with 85% of the recovery rate from consumed construction industries. It is very difficult to separate steel from other construction materials and to estimate the end life of the steel.

Recycling trends are different in each industry. In construction industries it is always manageable to identify the sources of steel production but at the same time it is very difficult to calculate what happened to the steel at end of life. In construction, steel is mixed with other construction materials like for example concrete which is very difficult to separate but it is managed with different performances. Even after some performances some steel is simply land-filled like a worthless material. These land filled material is a mixture of steel and concrete and it is very difficult to calculate how much steel got recycled and how much was land-filled. From Steel Recycling Institute it is estimated that 95% of the construction steel is been recycled (Steel Recycling Institute, 2006)



Figure 2.1 Construction Structural, Recycling Rates (in Percent)
(Courtesy: <http://www.recycle-steel.org/>)

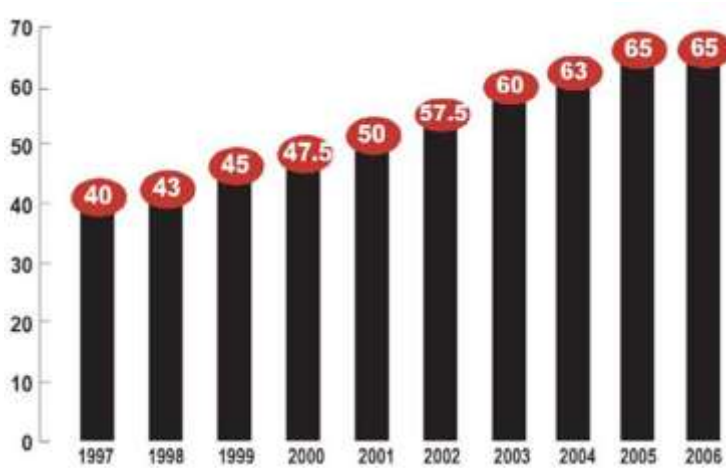


Figure 4.2 Construction Reinforcement, Recycling Rates (In Percent)
(Courtesy: <http://www.recycle-steel.org/>)

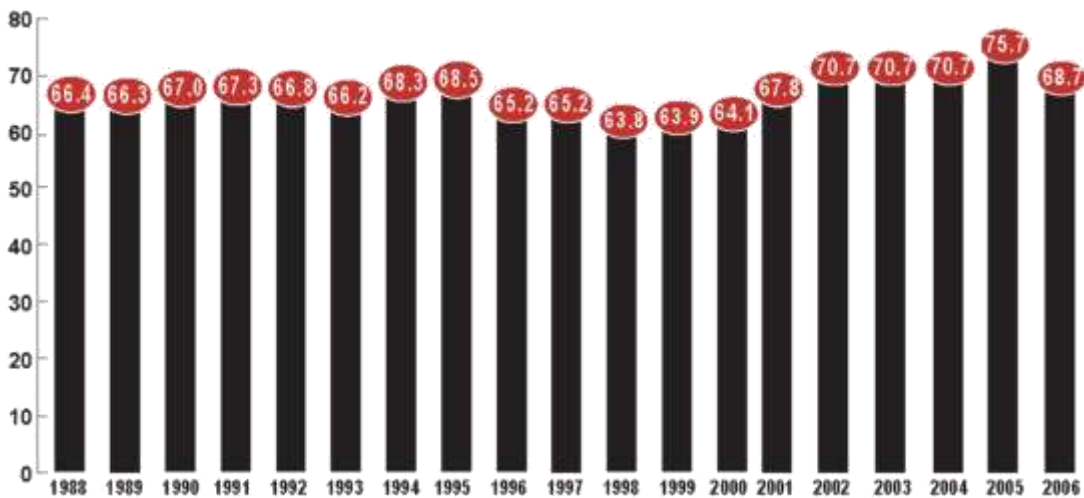


Figure 2.3 Overall Steel Recycling Rates (in Percent)

(Courtesy: <http://www.recycle-steel.org/>)

A targeted policy needs to be developed in recycling products to ensure which product is been recycled and which is not recycled. Form Steel Recycling Institute, 2006 it is estimated that (95%) of the bulky products like steel beams are highly recycled and only (50%) of the products like reinforcing bars are recycled with very low recycling rate this is because of the difficulties in separation of concrete from steel while recycling. From the figures 4.1and 4.2, 4% of the reinforce bars and 10% of the sections are produced out of the total crude steel produced in the world. But it is always important that reinforce bars and sections should be properly recycled. Reinforce bars are decreasing all around the world according to the latest trends. Where in the world, reinforce bars doesn't form as larger percentage of the total construction steel.

In brief, construction steel is highly recycled. Products like beams are awfully recycled whereas products like reinforce bars are not highly recycled and new policies should be introduced and designs to advance recycling of reinforce bars.

Composition of steel used in construction industry

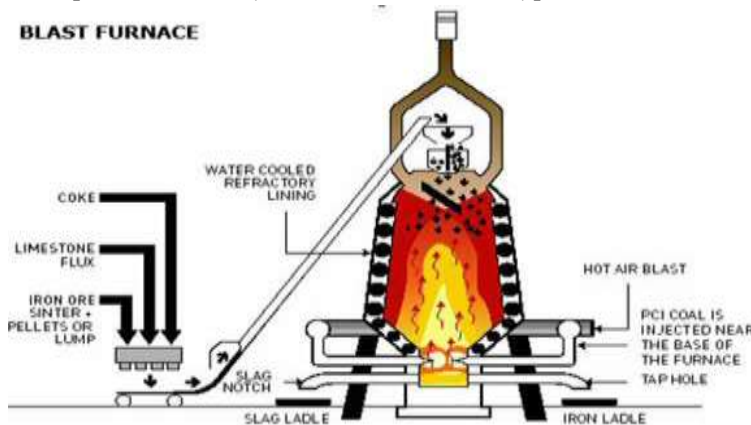
To operate steel mills huge amount of fossil fuels are burnt resulting large amount of embodied energy. Steel has very high embodied energy and it is clear that due to high embodied energy steel is one of the most environmentally harmful construction materials when measured by weight. Concrete has low embodied energy because of low fossil fuel consumption with low emission when compared with steel.

In steel production construction steel is one of the lower grades steel and is 100% recyclable. Steel can recycled infinitely without any loss of quality. To create construction steel it is always possible to collect recycled steel from all other industries reducing the usage of energy and other raw materials.:

Basic Oxygen Furnace (BOF):

To produce new steel, basic oxygen furnace (BOF) uses 25% to 35% old steel. Where this furnace produces products like encases of refrigerators, automotive cover etc whose major characteristic is drawability.

In 2006 by Steel Recycling Institute, to produce 46,802,100 tons of raw steel the basic oxygen furnace (BOF) consumed a total of 13,509,000 tons of ferrous scrap where 1,000,000 tons of these ferrous scrap tons had been produced as non-salable steel products. In steel industry, these tons of scraps are classified as "home scrap" which is a mixture of pre-consumer scrap and runaround scrap. By the Steel Recycling Institute it is estimated that 80% of the home scrap as pre-consumer scrap which is equating to 800,000 tons. For these kinds of operations during certain time frame 122,400 tons of superseded scrap is consumed. This kind of volume is known as post-consumer scrap. Therefore from the above results the outside purchases of scrap is equal to 12,386,600 tons [13,509,000 - (1,000,000 + 122,400)].



Analysis and Results

Descriptive Analysis

This section provides a detailed presentation of the results of the answers of the study sample individuals on the different study tool paragraphs. It also presents a description of the factors of the study model, through the use of descriptive statistics methods represented by *Mean*, Standard Deviation (SD), Rank, and Relative Importance as shown in Table 3:

Table 3: Analysis of the external environment factors

No.	Factors	Mean	SD	Rank	Relative Importance
1	Economic	3.923	0.640	4	High
2	Social	4.076	0.602	1	High
3	Legal	4.059	0.544	3	High
4	Technological	4.066	0.500	2	High
5	Political	3.911	0.689	5	High
External environment factors		4.007	0.428		High

Many reasons for these high importance such as the relation of these factors to society and its members directly, the intellectual and moral beliefs, customs, traditions and social legacies, in addition to the level of education and income. Other reasons for these high levels of importance are referred to the stability of the political situation in Nigeria, the efficiency and effectiveness of government policies, policies and decisions taken by the government.

Hypotheses Results

To test the main hypotheses, A Multiple Linear Regression was used, which is one of the methods of inferential statistics. The results of the first main hypothesis is presented in Table 5.

Table 5: ANOVA Multiple Linear Regression of H01

Dependent variable	Model Summary				ANOVA	
	R	R ²	Adjusted R ²	Standard Error	F Value	Sig (F)
BCM	0.643	0.413	0.381	0.481	13.084	0.000

Table 5 shows the significance of the model, as F value was (13.084) which is significant ($\alpha = 0.000$) as it is less than 0.05, the value of correlation coefficient (R) has reached (0.643), and it indicates a positive correlation between the study factors (Independent: external environment factors, and dependent: Construction management). The value of the (R^2) has reached (0.413). This indicates that the change in external environmental factors leads to a change in Construction management with a percentage of (41%).

Table 6: Regression coefficients of first major hypothesis H01

Regression Coefficients				
Independent Variables	(B)	Standard Error	t-value	Sig (t-value)
Regression	0.354	0.486	0.728	0.469
Economic Factors	0.125	0.085	1.469	0.145
Legal Factors	0.349	0.100	3.497	0.001
Technological Factors	0.216	0.109	1.990	0.049

Regarding the environment factors that show a significant effect, the results indicated that the t-value of the legal factors has reached (3.497). This value is significant at (Sig = 0.001), which is less than 0.05. The (B) value was (0.349) that indicates the rise in the level of legal factors as the first factor leads the BCM.

H01: "There is significant relationship at level ($\alpha \leq 0.05$) of the environment factors (economic, social, legal, technological) on construction management in Nigeria

To determine the most influential factor of the external environment factors on construction management, Linear Regression analysis was use as shows below.:

Table 7: Results of regression analysis of H01

Model	BCM	B	t-value	Sign (t)	R ²	F value	Sig.
1 st	Legal factors	0.559	5.575	0.000	0.243	31.083	0.000
2 nd	Legal factors	0.426	4.364	0.000	0.364	27.450	0.000
	Social factors	0.335	4.275	0.000			
3 rd	Legal factors	0.374	3.797	0.000	0.395	20.637	0.000
	Economic factors	0.266	3.196	0.002			

	Technological factors	0.238	2.197	0.030			
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Table 4 reports the order of external environment factors that are the most influential in Nigeria. Legal factors were found as the most influential, as it ranked first (24.3 %) of the change in construction. The table makes it evident that unlike the economic and political factors, the effect of legal factors, social factors, and technological factors was significant at ($\alpha \leq .05$).

Conclusion and Recommendation

The results of the hypothesis testing showed that there is a statistically significant effect at ($\alpha \leq 0.05$) of all external environment factors on the construction in Nigeria. The findings show that environmental factors have a significant effect on construction management. The paper therefore recommends that government with the support of stakeholders in the construction industry should come up with special legislations, codes or standards relating to sustainable construction practices specific to Nigeria's construction environment to ensure its proper and effective implementation. Specifically, the national building regulations should be reviewed to take account of environmental regulations. Besides, all forms of construction activities should be subjected to an environmental impact assessment to determine the potential impacts and also come up with some mitigation measures before they are executed.

References

- Adeoye, A. O., & Elegunde, A. F. (2012). Impacts of external business environment on organizational performance in the food and beverage industry in Nigeria. *British Journal of Arts and Social Sciences*, 6(2), 194-201.
- Al-Siddiq Ahmed, Ali (2018). The interpretative role of the leadership behavior in managing factors of the external environment and the performance of Sudanese public institutions. Unpublished PhD thesis, Sudan University of Science, Khartoum, Sudan.
- Auzair, S. (2011). The Effect of Business Strategy and External Environment on Management Control Systems: A Study of Malaysian Hotels. *International Journal of Business and Social Science*, 2 (13).
- Barile, S., & Saviano, M. (2018). Complexity and sustainability in management: insights from a systems perspective. In *Social dynamics in a systems perspective* (pp. 39-63). Springer, Cham.
- BCI (Business Continuity Institute) (2017). Glossary of Business Continuity Terms. *Disaster Recovery Journal*. Retrieved from: <https://www.drj.com/uncategorised-sp-433/glossary.html> (23/3/2019).
- Bird, L. (2007). *Business Continuity Management (BCM): An International Perspective from the BCI*. Hiles, England.
- Duhra, M. (2016). Crude Oil Price is Behaving Like a Global Tornado. Retrieved from Rudaw: <http://rudaw.net/english/business/09012016?keyword=political%20stability>
- Elliott, D., Swartz, E. & Herbane, B. (2010). *Business Continuity Management: A Crisis Management*.
- Epstein M. J. & Roy M. J. (2001). Sustainability in Action: Identifying and Measuring the Key Performance Drivers. *Long Range Planning*, 34, 585-604

- Fahey, L., & Narayanan, V.K. 1986. Macroenvironmental analysis for strategic management. New York: West Publishing Co.
- Firtinidou, D. K., Gkotsis, I., Eftychidis, G., Sfetsos, A., Petrovic, N., & Stranjik, A. (2019). Climate Related Business Continuity Model for Critical Infrastructures. *Annals of Disaster Risk Sciences*, 2(1-2).
- Foster, S. P., & Dye, K. (2005). Building continuity into strategy. *Journal of corporate real estate*, 7(2), 105-119.
- Grubich, T. Y., & Shrolik, A. V. (2015). SWOT-analysis of medical and diagnostic center. In *The Strategies of Modern Science Development: Proceedings of the VIII International scientific-practical conference*. (pp. 114-116).
- Hunger, S. P., Lu, X., Devidas, M., Camitta, B. M., Gaynon, P. S., Winick, N. J., & Carroll, W. L. (2012). Improved survival for children and adolescents with acute lymphoblastic leukemia between 1990 and 2005: a report from the children's oncology group. *Journal of clinical oncology*, 30(14), 1663.
- Janković, M., Mihajlović, M., & Cvetković, T. (2016). Influence of external factors on business of companies in Serbia. *Ekonomika*, 62(4), 31-38.
- Johnson, G. (2016). *Exploring Strategy: Text and Cases*. Pearson Education.
- Kamel, Mahmoud A. (2015). Business Continuity Strategies and Catastrophe Prevent Strategies in New Suez Canal Area. First Scientific Conference on Optimizing New Strategic Management in New Suez Canal: Faculty of Commerce, Benha, Egypt, 23- 24/12/2014, 1-46.
- Kraja, Y. B., & Osmani, E. (2015). Importance of external and internal environment in creation of competitive advantage to SMEs. (Case of SMEs, in the Northern Region of Albania). *European Scientific Journal*, 11(13).
- Krell, E. (2006). *Management Accounting Guideline: Business Continuity Management*. Published by The Society of Management Accountants of Canada and the American Institute of Certified Public Accountants.
- Kume, S., Uzu, T., Horiike, K., Chin-Kanasaki, M., Isshiki, K., Araki, S. I., ...& Koya, D. (2010). Calorie restriction enhances cell adaptation to hypoxia through Sirt1-dependent mitochondrial autophagy in mouse aged kidney. *The Journal of clinical investigation*, 120(4), 1043-1055.
- Kuznetsova, N. V., Rahimova, L. M., Gafurova, V. M., Simakov, D. B., Zinovyeva, E. G. & Ivanova, L. A. (2017). External Environment as a Factor of Ensuring the Competitiveness of Organizations in the Regional Market of Medical Services. *European Research Studies*, 20 (4A), 308-322.
- Liu, H. (2017). How Information Strategy and Business Strategy Influence the Organization's.
- Mohamed, Mustafa (2019). Building a proposed model for business continuity management system in organizations. *Journal of the College of Administration and Economics for Economic, Administrative and Financial Studies*, 11 (2), 418-431.
- Nandonde, F. A. (2019). A Pestle Analysis of International Retailing in the East African Community. *Global Business and Organizational Excellence*, 38 (4), 54-61.
- Oginni, B.O. and Adesanya, A.S., 2013. Business Environmental Factors: Implications on the Survival and Growth of Business Organisations in the Manufacturing Sector of Lagos Metropolis. *Business and Management Research*, 2(3), p.p146
- Pheng Low, S., Liu, J. & Sio, S. (2010). Business Continuity Management in Large Construction Companies in Singapore. *Disaster Prevention and Management: An International Journal*, 19 (2), 219-232.
- Pierre Berrgeron (1993). *Lagestion Modern TheorieetCas*, Gaetanmmorinditeur, Quebec.
- Pulaj, E., & Kume, V. (2013). How the Albanian external environment affect the construction industry. *Annales Universitatis Apulensis: Series Oeconomica*, 15(1), 295.
- Rastogi, N. I. T. A. N. K., & Trivedi, M. K. (2016). PESTLE technique—a tool to identify external risks in construction projects. *International Research Journal of Engineering and Technology (IRJET)*, 3(1), 384-388.
- Sawalha, I.H.S. (2013). Organizational Performance and Business Continuity Management: A Theoretical Perspective and a Case Study. *Journal of Business Continuity and Emergency Planning*, 6 (4), 360-373.
- Sekaran, U. (2006). *Research method of business: A skill-building approach*. Writing.

- Semolic, B. (2007). In Search for Innovative Business Model or How to be Successful in Nowadays Business Environment. International Federation for Information Processing.
- Sharp, J. A. (2012). The Route Map to Business Continuity Management: Meeting the Requirements of ISO 22301. BSI.
- Sholla, A. & Nazari, E. (2018). Influence of External Environment Factor on Strategic Management in Commercial Banks in Albania. International Journal of Economics, Commerce and Management United Kingdom, VI (12).
- Vlados, C., & Chatzinikolaou, D. (2019). Crisis, institutional innovation and change management: Thoughts from the Greek case. Journal of Economics and Political Economy.
- Voiculet, A., Belu, N., Parpandel, D. E. & Rizea, I. C. (2010). The Impact of External Environment on Organizational Development Strategy.
- Wheelen, Thomas L. & Hunger, J. David, (2015). Strategic Management and Business Policy. 11th Ed, Upper Saddle River, Pearson Education Inc., New Jersey.
- Živanović, N. (2014). Strategic Management. Faculty for Business and Industrial Management, Belgrade.