THE IMPACT OF ENVIRONMENTAL FACTORS ON THE PERFORMANCE OF BUILDING PROJECTS IN ENUGU STATE, NIGERIA

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Abstract

The aim of this study was to ascertain the impact of environmental factors on the performance of building projects in Enugu State. The study considered political; legal; institutional; socio-cultural; construction technology and resources; economic/financial; construction environment and physical factors. It was revealed that all the factors had varying levels of significance on building project performance. The study therefore recommended that stakeholders in the building construction industry should provide adequate, relevant technology and resources to enhance building project performance; Adequate economic and financial supports should be made available for each building project; Enabling construction environment should be provided for every building project; Adequate physical features, institutional, political, legal and socio-cultural structures should be encouraged to achieve building project performance on every site.

Keywords: building, performance, project, impact, construction

1.0 Introduction

According to Building project performance evaluation is a novel research interest in performance measurements (PM) and it is the process of quantifying the efficiency and effectiveness of construction activities. The traditional view of performance measurements highly relies on financial and accounting data which only the past performance. Building project performance is influenced by a number of factors such as age of the building; size of the building; efficiency features of the building; management (operations, monitoring, ongoing commissioning); occupation engagements. The project environment in many developing countries like Nigeria present special challenges for project managers that almost presupposes extensive cost and time overruns even

before a project commences. These challenges arise mainly from inherent risks such as telecommunications systems; lack of adequate infrastructure such as transportation networks, electricity supply; excessive bureaucratic contract procedures and political instability. The project environmental factors that have been generally identified include; political, legal, institutional, cultural, sociological technological resource, economic, financial, and physical infrastructure (Walker, 1989). According to Ajayi *et al.*(2010), the four most important external environmental factors in decreasing order include community issues, weather conditions, economic situation (boom or meltdown) and government policy. Project performance, according to Cheung *et al.* (2004) can be measured and evaluated using a large number of performance indicators that could be related to various dimensions (groups) such as time, cost, quality, client satisfaction, client changes, business performance, health and safety. Generally, performance dimensions may have one or more indicators, and could be influenced by various project characteristics. For example, Iyer & Jha (2005) identified many factors as having an influence on project cost performance, these include: project manager's competence, top management support, project manager's coordinating and leadership skills, monitoring and feedback by the participants, decision-making, coordination among project participants, owners' competence, social condition, economic condition, and climatic condition. Cheung et al. (2004) identified project performance categories such as people, cost, time, quality, safety and health, environment, client satisfaction, and communication. It is obtained by Navon (2003) that a control system is an important element to identify factors affecting construction project effort. For each of the project goals, one or more Project Performance Indicators (PPI) is needed. As obtained by Stewart (1967), human factors played an important role in determining the performance of a project. Ugwu & Haupt (2007) remarked that both Early Contractor Involvement (ECI) and Early Supplier Involvement (ESI) would minimize constructability-related performance problems including costs associated with delays, claims, wastages and rework, etc. The most important practices relating to scope management as obtained by Ling *et al.* (2007) are controlling the quality of the contract document, quality of response to

perceived variations and extent of changes to the contract.

Coordination among project participants, however, was identified as the most significant of all the factors, having maximum influence on cost performance. The studies of Love *et al*. (2005) examined project time–cost performance relationship, and their results indicated cost as a poor predictor of time performance. The identification of these environmental factors and the measurement of their severity would provide useful information that would greatly reduce cost and time overrun in project execution. The failure of any construction project is mostly related to the performance problems and there are many reasons and factors which are attributed to such problems. The studies of Ogunlana *et al*. (1996) stated that the construction industry performance problems in developing economies can be classified into three layers as; problems of shortages or inadequacies in industry infrastructure (mainly supply of resources), problems caused by clients and consultants and caused by contractor incompetence/inadequacies. According to Okuwoga (1996), the performance problem is related to poor budgetary and time control. Samson & Lama (2002) also remarked that performance arises in large construction projects due to many reasons such as: incompetent designers/contractors, poor estimation and change management, social and technological issues, site related issues and improper techniques and tools. Navon (2003) stated that the main performance problem can be divided into two groups: (a) unrealistic target settings (i.e., planning) or (b) causes originating from the actual construction (in many cases, the causes for deviation originate from both sources). Environmental issues appear to be prominent among the factors that affect building project performance in Nigeria and is hereby discussed.

2.0 Project Environmental Factors

The project environmental factors identified by Walker (1989) and Hughes (1989) as constituting environment of projects are political, legal, institutional, cultural, sociological, technological resources, economic/ financial, and physical (infrastructure). Both studies directed attention to some factors within the environment that pose greater challenges to projects, management and organizational structure than others and suggested that these factors should form the focus for the management of the projects environment.

2.1 Political

Political environment is concerned with government policy and the effect of political decisions upon construction projects. The significant roles played by the government in the construction industry are mostly clients, regulators of the national economy, and regulators of the construction environment such as laws that guide ethics and construction practices and many others. This inferred that governments can significantly increase or decrease the demand for construction services through budgetary measures and monetary policies. In its capacity as regulators of the construction environment, governments influence the development and building approval processes and enforce compliance with Acts and Regulations. As observed by Mansfield *et al.* (1994), governments may also invoke their powers to initiate or stop projects on political, social and environmental grounds. Political stability, national unity and good political leadership are thus crucial to national development. Thomas & Martin (2004) believed that no project exists in a vacuum but is rather subject to an array of influences from regulatory control to political and industrial intervention and opined that managers of the construction project will take cognisance of the political aspect that can produce an uncertain environment such as unstable government, unpredictable shifts in the economy and unexpected changes in consumer demand.

2.2 Legal

The legal environment facing organizations is becoming more complex and affecting businesses more directly. It has become increasingly difficult for businesses to take action without encountering laws and regulations. The construction operates within the covers of planning and environment regulations, codes of practice, safety regulations, licensing, insurances and taxation laws. These laws, codes and regulations are generally well defined, making it possible to predict their impact on construction projects with reasonable accuracy. However, Thomas & Martin (2004) observed that changes to industrial, safety, taxation and environmental laws are not uncommon and problems may arise when the law changes during the life of a project.

Legislation affects client's activities directly, through factors such as safety, planning law, and building regulations as it

influences the contractual relationships within projects. Oladapo & Olotuah (2007) also pointed to the attention of stakeholders that the legislation in Nigeria is based on the British model, has been an ex-colony and that the Standard form of Building Contract issued by the Joint Contract Tribunal (JTC) in Britain was modified for use in Nigeria. The onus is on the managers of construction works to get acquainted with Planning regulation and Land Use Acts legislation which are parts of the legal environment.

2.3 Institutional

The construction industry professionals in Nigeria have constituted institutions which are established by an Act or a Decree and are also recognized by the Government. Oladapo & Olotuah (2007) viewed that the experiences gathered in the course of many years of professional practice can be borrowed during research processes.

2.4 Socio-cultural factors

The socio-cultural dimensions of the environment consist of customs, lifestyles, and values that characterize a society (Williams, 2002) while population demographics, rising educational levels, norms and values, language and attitudes toward social responsibilities are examples of socio-cultural variables (Engobo, 2009). These variables have the potential to influence or affect organizations that operates within the society.

The study of Engobo (2009) revealed that Delta State communities shared most of the aforementioned variables as it comprises mainly Igbo (Anioma people), Urhobo, Isoko, Ijaw and Itsekiri and in the management of construction projects within the communities, “Pidgin English” which is an adulterated form of the English language is commonly used for oral communication among the illiterate workforce. Also the incessant kidnapping of expatriate construction workers, militancy and the demand by the groups of unemployed youths for illegal fees popularly called “settlement” which usually causes delays ranging from days to weeks on construction activities are examples of the lifestyles.

Thus, William (2002) and Engobo (2009) signaled that managers and supervisors of construction work within this region need to adopt appropriate leadership styles in the management of projects to avoid unnecessary time and cost overruns.

2.5 Construction technology and resources

Technology is an aspect of the environment that should be considered in developing strategic plans. Oladapo & Olotuah (2007) maintained that the appropriate construction technology can be measured by the availability of locally made plant and equipment, skilled manpower resources, extent of local material resources and the degree of utilization of such local construction resources. However, the construction industry in Nigeria following the oil boom in 1970/71 was characterized by the development projects which required the construction technology and resources of developed countries. The lack of technological know-how and the shortage of managerial manpower were considered to be one of the major problems and constraints facing the nation. The situation as at 1980 was described thus: "lack of basic knowledge of production methods and design techniques for machinery constitute a serious constraint to rapid industrialization of the country. The situation is aggravated by acute shortage of managerial manpower". As at today, the country still remains a net importer of technical manpower, virtually most spare parts are imported and most investment in research and development are made abroad, except those sponsored by the government in public owned institutions.

2.6 Economic/ financial

The economic and financial aspect zeroed on the level of general economic activity, as well as the resources available to carry out the work and it includes the economic competition of various degrees around the appointment of all the parties of the building project. Financial limits always seem to exist on building projects according to Obalola (2006) whose study clarified that financial environment forces are distinguished from economic ones on the basis that economics is to do with the deployment of resources, whereas financial limitations are strictly to do with money.

A challenging task for any project manager is to ensure that a project is financially viable within a fluctuating economic environment (Odeh & Battaineh, 2002) and since periodic economic cycles significantly affect the activities of the construction industry, accurate forecasting of economic trends both local and global is important (Oladapo & Olotuah, 2007).

2.7 Construction environment

The construction environment according to Youker (1992) is the aggregate of surrounding things, conditions or influences. Akinsola *et al.* (1997) describe this environment as all external influence on the construction process. Thus, the environment includes virtually everything outside the project; its technology, the nature of its products, customer and competitors, its geographical setting, and the economic, political and even metrological climate in which it must operate. Bennett (1991) in a major review of project management theory established that the environment interferes with the planned progress of construction projects. The less predictable the environment and the greater its potential effects, the more it must be taken into account in managing the development of construction projects.

A review of the results of hundreds of World Bank projects by Youker (1992) indicated that success or failure often depends on factors in the general environment outside the control of the project manager. The review pointed out that in the management of projects, a good understanding of the different features and factors within the environment that can have an effect on the project is essential. This can form a basis for analysis for overcoming or mitigating their effects on project performance.

Project managers, in addition to their traditional functions, must set up a process to scan the environment, to identify potential problems, and to try to establish power relationships that can help in the management of the key actors and factors on which successful implementation depends. The study of Youker (1992) also revealed that some factors within the environment pose greater challenges to projects, management, and organizational structure than others. These factors should form the focus for the management of the projects environment. While an analysis of the key elements of the environment may not necessarily solve all problems, some of which are truly structural, they can provide a basis for establishing reasonable project objectives and also give an early warning of potential problems. Clients who initiate projects must put in place appropriate management, organizational structures, systems, and procedures for overcoming the effects of the environment.

2.8 Physical factors

The physical environment within which a construction project is sited may

impact considerably on its development as construction projects are always affected by physical influences. The geographical location of a project, ground conditions and weather patterns are the most common examples of physical influences. They are unpredictable and as such management actions have not been able to prevent their occurrence. Nevertheless, Thomas & Martin (2004) opined that managers of construction works will take significant consideration of physical effects when planning the management strategies to avoid extremes which can take advantage of available resources.

3.0 Results and Discussions

Table 1: Statistical Analysis of Results of Predictors of Building Project Performance in Enugu State

S/N	Predictor	Mean Score	P-value	Percentage of Impact (POI)	Remarks
1	Political Factor	3.24	0.0046	64.8	Significant
2	Legal factors	2.91	0.0048	58.2	Moderately significant
3	Institutional factors	3.32	0.0042	66.4	Significant
4	Socio-cultural factors	2.75	0.0049	55	Moderately significant
5	Construction technology and resources factors	4.43	0.0020	88.6	Highly significant
6	Economic/financial factors	4.10	0.0030	82	Highly significant

7	Construction environment factors	3.86	0.0035	77.2	Significant
8	Physical factors	3.52	0.0040	70.4	Significant

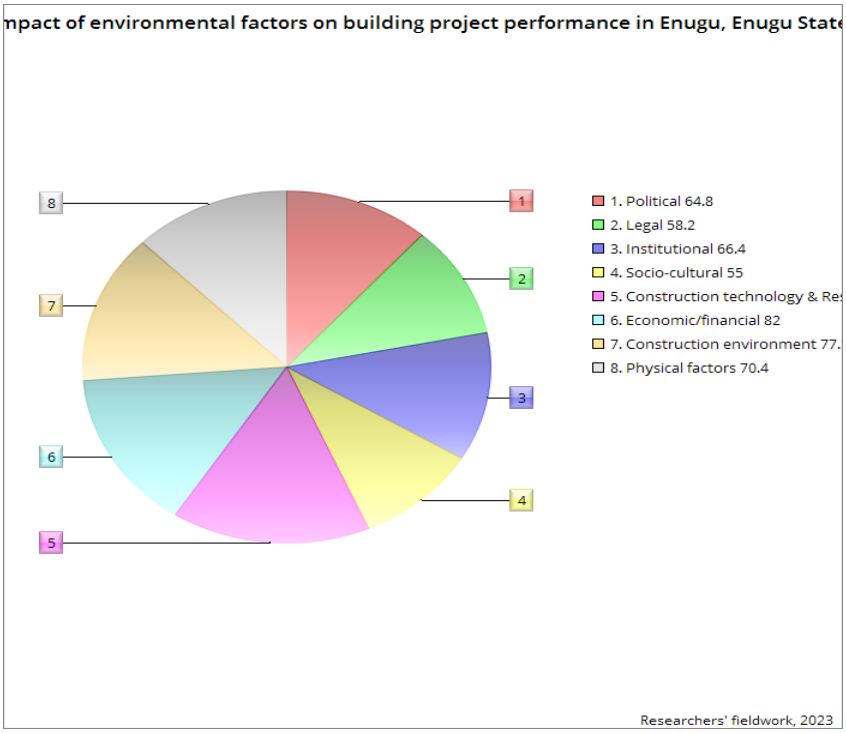

Fig. 1: Percentage of Impact (POI) of Predictors of Building Project Performance in Enugu State

From Table 1 and Fig. 1, above, construction technology and resources had the greatest impact on building project performance (mean Score= 4.43; p-value = 0.0020 and POI = 88.60. This was a highly significant impact. Economic/financial factors had a mean Score of 4.10, p-value= 0.0030; POI = 82 and the impact was also rated as highly significant. Construction environment had a mean Score of 3.86; p-value= 0.0035; POI = 77.2 and its impact was significant. Physical factors had a mean

Score= 3.52; p-value= 0.0040 and POI = 70.4 and its impact was significant. Institutional factors had a mean Score of 3.32; p-value= 0.0042; POI = 66.4 and its impact was significant. Political factors had a mean Score of 3.24; p-value= 0.0046; POI = 64.8 and its impact was significant. Legal factors had a mean Score of 2.91; p-value= 0.0048; POI = 58.2 and its impact was moderately significant. Socio-cultural factors had a mean Score of 2.75; p-value= 0.0049; POI = 55 and its impact was moderately significant on building project performance in Enugu State.

4.0 Conclusion

From the findings of this study, building project performance is significantly influenced by construction technology and resources; economic/ financial factors; construction environment; physical factors; institutional, political, legal and socio-cultural factors in Enugu State.

5.0 Recommendations

The following recommendations were made:

a. Stakeholders in the building construction industry should provide adequate, relevant technology and resources to enhance building project performance;

b. Adequate economic and financial supports should be made available for each building project;

c. Enabling construction environment should be provided for every building project;

d. Adequate physical features, institutional, political, legal and socio-cultural structures should be encouraged to achieve building project performance on every site.

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