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An assessment of the implementation for basic constructability practice at the conceptualization stage of property development

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Abstract

Constructability is one of the project management methods to evaluate the whole property development process. During a property development process from the early stage of planning up to delivery and maintenance there are many restrictions to implement constructability. However, partial comprehension of designers of construction and implementation requirements, and resistance of owners to constructability due to extra visible costs in the project, are main difficulties to its implementation. This study assessed the implementation for basic constructability practice at the conceptualization stage of property development process in Rivers State, Nigeria. The data for this study was collected using focus groups and open-ended survey interview questions. A total number of 56 respondents: project managers, employers, consultants, and contractors active in property development representing 93% response rate were drawn for the study. The data was qualitatively analysed using content thematic analysis. The study found that 71.4% of the respondents agree that the benefits of implementing basic constructability practice at the conceptualization stage of property development process is beyond cost saving. Furthermore, majority (64.3%) of the respondents stated that actually put constructability to use: the familiarity with property development process timeline during design, planning, construction and completion would be progressive monitored and task assignment. The study thus recommends that the implementation of constructability should be practiced integrating the design process in the early stages of property development.

Keywords: Assessment, implementation, constructability practice, conceptualization stage, property development

Introduction

Constructability the extent to which the design of a property development process facilitates ease of construction as well as the extent to which the adoption of construction techniques and processes affects the productivity level of structure works' (Authority, 2017) ^[2]. Constructability is one of the project management methods to evaluate the whole property development process. It is defined as a concept with relative, not absolute, value to increase optimization capacity of resources, such as workforce, time, cost, quality and working environment conditions. During a property development process from the early stage of planning up to delivery and maintenance there are many restrictions to implement constructability (Samereh, Ehsan and Ahad (2018) ^[17]. Property development success is not achieved unless through reviewing the construction process and integrating the design and implementation stages. Given the growing complexity of projects and the increased number of failed and abandoned projects, the necessity to implement constructability in projects has become more tangible (Wong, Lam and Chan, 2005) ^[19].

However, due to the designer's poor exclusive information, lack of presence of exclusive contractors in the early stages of study and design, leads to duplications, reduction of executive capacity of the plan, and increased time and costs (Saghatforoush 2014) ^[16]. Constructability achievements can be used for meeting future needs, including (Samereh, Ehsan and Ahad, 2018) ^[17]; identifying poorly designed structure due to mistakes and non-executive decisions of the plan in the conceptual studies phase. Executive engineers have problems with architects and engineers during the property development process, often because it is not possible to implement the plan, and/or contradictory and non-executive plans (Hui-Hsuan, Meng-Hsing, Fu-Cih and Yu-Cheng 2013) ^[6]. With regard to the study of constructability literature, this is a long-term issue and should be continually pursued, and, as far as possible, it should be possible to eliminate and mitigate these problems, as well as

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facilitate the property development, before making it, taking into account existing barriers.

Yustisia (2014) ^[19] stated that studies conducted during 1960 to 1970, indicates the origin of many complex problems in the real estate industry is due to lack of integration of knowledge and experience in the framework of design and property development. This issue directly affects property developments' time, cost and quality. Here, the necessity to apply constructability became more tangible. In addition, since the constructability concept is relatively a new idea in developing countries; lack of implementation relates to the effects of constructability on the traditional approaches of property development process evident and has led to lack of coordination in the performance of property development process, till now there is no comprehensive approach to assess the constructability implementation (Zimmer 2006) ^[21].

Trending, there is an increase in the cost of building materials due to economic factors and flooding due to climate change experienced in Rivers State. Implementing constructability arises to the need for resilience buildings in the area. Property development success is not achieved unless through reviewing the construction process and integrating the design and implementation stages. Yet, such an approach provides an appropriate subjective context for experts and employers in this field to accept and implement constructability. The practice of constructability in property development is still relatively unpopular: for lack of industry awareness not that is a burden or anything that impedes success as many property developers do not currently apply constructability in their property development. The aim of this study is to assess the implementation for basic constructability practice at the conceptualization stage of property development. This study will provide coherent understanding of the value of constructability, and how to apply it to property development during the design process.

Literature Review

Concept of Constructability

Constructability is the ability to develop a property effectively, economically and to an agreed or specified quality standard from its constituent materials, components and sub-assemblies (Bamisile 2004) ^[4]. According to CIRIA defined constructability as the extent to which the design of a building facilitates ease of construction, subject to the overall requirements for the completed building. Abdul-Kadir and Jaafar (2001) defined constructability as the optimum use of property development skill, expertise and experience gained in planning, design, and procurement and field operation to achieved maximum project objective. stated that buildability is lack of design empathy for construction" it is the functional and economical assessment of design alternative and should be the first stage of builder's professional input in the building process. Constructability can as well be defined as the ability of putting parts together especially building components as a means of transferring what is in the working drawing to the ground without problems that arise during and after assemblies.

According to Motsa, Oladapo and Othman, (2008) ^[11], many of the problems of inadequate design and production methods within both modern and non-modern property development contracts were caused by unclear or missing

project information, inadequacies in the quality of information provided or lack of complete information, and general lack of harmonization of design with property development process. Effective application of the concept of constructability to overcome these problems depends on the availability of the right information at the appropriate level of detail (Pulaski and Horman, 2005) ^[15]. This requires that designers and developers improve the quality of information passed between the various stages, using the right people and doing so at the right time.

Modern Concept of Property Development

Property development is a multi-disciplinary process requiring team activity; and can be reviewed as the use of land in its broadest sense to obtain a satisfactory (Kuye, 2018) ^[10]. Property development is a business process, encompassing activities that ranges from the renovation and release of existing buildings to the purchase of raw land and the sale of developed land or parcels to others (Frey and Peiser, 2003). Property development is different from construction of building, although many developers also manage the construction process. The coordination of all these activities, converting ideas from paper to real property is a modern concept of property development process (Wong, Lam and Chan, 2005) ^[19]. This is because property development process requires skills of many professionals; which according to (Kuye, 2018) ^[10], the architects, landscapers, engineers and site planners to address project design; estate surveyors and valuers to determine demand and a project economics; attorneys to handle agreements and government approvals; environmental consultants and soil engineers to analyse a site's physical limitations and environmental impacts; surveyors and title documentation to provide legal description of a property; and tender to provide financing .

The general contractor of the project lines subcontractors to put the architectural plans into action (Arditi, Elhassan and Toklu, 2002) ^[1]. It critical that assembling a team of professionals to address the environmental, economic, private, physical and political issues are inherent in complex development projects. Constructability is not best when referring to property development in urban areas. According to Wong, Lam and Chan (2005) ^[19], "cities rely on commercial and residential property development growth for their growth for their health and continue existence. Marrying these efforts to a community's character is key to successful growth. To encourage growth, require two things: first, it should expand on the market and space opportunities for existing and future property development, second, however, it should encourage growth that elaborates on small town's or city's aesthetic of downtown area".

Research Methodology

The research design used for this study was that of phenomenological research which relied on qualitative research approach for the analysis. The study focused on the assessment of the implementation for basic constructability practice at the conceptualization stage of property development in Port Harcourt, Nigeria. The population of the study comprises of 60 professionals from public and private the real estate sector that are made up of: estate surveyors and valuers, architects, quantity surveyors, project managers, builders, engineers, construction supervisors, etc. using focus group discussion and interview. An open-ended

survey and interview questions was designed and conducted to assess their perception of constructability and the extent of its implementation for basic constructability practice in design stage of property development. In this study, a comprehensive constructability implementation has been developed in the form of focus group discussion and interview questions, and only 56 of the respondents out of the 60 invited respondents responded using non-probability sampling method. They were project managers, employers, consultants, and contractors active in the field of real estate and particularly property development. They were persons who are well experienced in the built environment professions, so their opinions about the building and their workings could be counted reliable.

The Interviews were analysed using the Thematic Content Analysis Methodology; a process that is aimed at producing a detailed and systematic recording of the themes and issues addressed in the interviews and linking the themes and interviews together under a reasonably exhaustive category system. The themes, also referred to as codes, are drawn from existing theoretical ideas that the researchers brought to the data (deductive coding) or from the raw data itself (inductive coding). This study employed both the inductive and deductive coding systems. On the other hand, the content analysis approach results are a numerical description of features of a given text or series of images, whereas, the thematic analysis emphasises the qualitative aspects of the material analysed. Content system is seen as a partial quantitative method, and provides room for systematic qualitative analysis. For this study, the Content and Thematic approaches were used in analysing the data gathered from all interviews. A system referred to as 'Thematic Content Analysis'. Non-probability purposive sampling techniques was used to select 56 respondents: estate surveyors and valuers (10), architects (12), quantity surveyors (8), builders (10), engineers (8), construction supervisors (8) representing 93% response rate as detailed in Table 1.

Table 1: Description of the Characteristics of Interviewees Population

Characteristics of Interviewees	Frequency	Percentage (%)
Estate surveyors and valuers	10	17.8
Architects	12	21.5
Quantity surveyors	8	14.3
Builders	10	17.8
Engineers	8	14.3
Construction supervisors	8	14.3
Total	56	100.0

Source: Author's Field Survey, 2021

Results and Discussion of Findings

Benefits of Constructability is Beyond Cost Savings

It was necessary to assess the benefits of the implementation for basic constructability practice at the conceptualization stage of property development process is beyond cost saving. Table 2 showed that 71.4% (majority) of the respondents interviewed indicated that they are not aware of the benefits of the implementation for basic constructability practice at the conceptualization stage of property development process, while only 28.6% claimed to be aware of its benefits and they are beyond cost savings. The benefits reaped from proper implementation of

constructability are both physical and conceptual. Efficiently, quickly developed properties completed with the implementation if constructability does not only get developed property rewarding, but fortify the reputations of each stakeholder involved in the property development process. The ability to complete a develop property on time and save costs is one immediate benefits to the reputation of the property on time and save costs is one immediate benefits to the reputation of the property development team. By using the most basic of equipment and materials in place of costly, needlessly and complex gears; the property development teams demonstrate to prospective clients that they can accomplish design and property development goals that are not only cost-effective but by applying. Constructability during design, planning and building; waste is further reduced, which makes for an attractive final property development.

Table 2: Benefits of Implementing Constructability in Property Development

Benefits of Implementing Constructability	Frequency	Percentage (%)
Aware	16	28.6
Not aware	40	71.4
Total	56	100.0

Implementing Constructability in the Practice of Property Development

The respondents were asked to state from their opinions whether they have been implementing constructability in the practice of property development process. Table 3 showed that 64.3% of respondents agree that they have been implementing constructability in the practice of property development process, while 21.4% disagree and 14.3% of the respondents are not sure of the implementation constructability in the practice of property development process.

Table 3: Implementing Constructability in the Practice of Property Development

Implementing Constructability	Frequency	Percentage (%)
Yes	36	64.3
No	12	21.4
Not sure	8	14.3
Total	56	100.0

Source: Author's Field Survey, 2021

Majority of the respondents stated that to actually put constructability to use; the familiarity with property development timeline of the developer would be progressive monitoring and task assignment. And constructability is a tool for perpetual review of the property development process during design, planning, development and completion. Implementing constructability in property development process; the use of a checklist approach is recommended for each step of the way. The study revealed that a checklist used is a simple way to ensure saving, energy efficiency and waste management, while still meeting design goals. Results of the interview further revealed that, the following are some of the most important view of the respondents that should be performed during property development process:

At the Design Stage: The following should be performed;

- i. Review (between developer, client, estate surveyors/consultants, and architects/designers) whether the property development design is realistic or not; architects can sometimes get carried away, and developers know what is feasible or not.
- ii. Review whether the design can be executed within budget
- iii. Review whether the design will take longer to execute than time afforded to the property development.

At the Planning Stage: The following should be performed;

- i. Review which material will be necessary to complete the design, which are the most cost effective, while still achieving the design-vision.
- ii. Review which equipment is necessary to achieve the property development, and which can be done without; eliminate luxury, but non-essential construction equipment.
- iii. Perform a cost benefit analysis on equipment quantity demand (i.e. with using one machine for multiple roles which takes more time, saves more property development capital than investing in multiple machines for accomplishing individual roles more quickly).
- iv. Review proposed site soil composition and how it will impact property development.

At the actual Construction Stage: The following should be performed;

- i. Review how quickly the developer is performing the development, whether it is on schedule or falling behind.
- ii. Review whether design expectations are being met.
- iii. Review how development waste is being managed
- iv. Review again if there is any extraneous, non-essential equipment being used during site development

Property development is essential for community success, which can sometimes be frowned upon, as it changes the face of the landscape, creates more traffic, changes ecosystems and habitats; it is imperative for the prosperity of the community. It can generate more jobs, bring desired curb appeal, unite community values. Whether the property development is residential or commercial, construction brings economic stability by finding a balance between growths and maintaining the character development, as well as, weighing the pros and cons.

Construction and property development can create added waste to the landfills and not all building materials are environmental friendly. In urban areas that are highly populated and build up, a "heat island effect" occurs. Thus, making it warmer in these areas than rural areas due to the volume of energy being consumed. Property development can have a positive impact of the environment. Governing entities may require developers to bring property developed to current code or clean-up contaminated sites from a previous development. Site clean-up is costly, but it brings added value to the environment. Incentives are sometimes offered for using sustainable material or building Green or a LEED certified structure. Oftentimes developer will clear out invasive/non-nature trees and replace them with native trees.

Constructability in property development process is all about making smart decision early in the property development life cycle. Therefore, laterally, review and assess the design from the perspective of those that will carry out the development of properties is the right thinking. Putting effort into gaining a comprehensive understanding of all intricacies that directly affect the outcome of property development. It is critical to the success of property development: that all key decisions informed are strategic; by finding solutions that maximize the design integrity and returns on investment. And rules of successful property development design process would be based on:

- 1) Allowing economic use of developer's resources
- 2) Enabling design requirements to be easily visualized and coordinated by site staff
- 3) Enabling developer to develop and adopt alternative development details.

Summary of Opinions of key Informants on the implementation for basic constructability practice at the conceptualization stage of property development process. Key informants indicated that constructability can be achieved in its assessment and implementation through three basic goals and practices:

- a) The greatest level of ease with which a property development design will allow for construction, while still meeting construction codes.
- b) Team integration of property development knowledge during the design phase to construct, while still achieving design goals
- c) Team integration of property development knowledge during building to ensure that the lowest level of environmental impact occurs during development.

Conclusion and Recommendations

The study assessed the implementation for basic constructability practice at the conceptualization stage of property development process in rivers State, Nigeria. this study demonstrated that developers has not yet use constructability in property development process to their advantage. And on the average, property developments that uses constructability are more likely to finish on time and save the property development capitals. The established that collaboration efforts between stakeholders involved, along with enhanced communication, and mutual agreement between all stakeholders before moving forward each step of constructability; is the way of enhancing efficiency. And that it would reduce waste and savings on energy expenditure, while keeping cost low, will turn into a scion of the property development sector taking full advantage of constructability. The study thus recommends that the implementation of constructability should be integrated in the design process in the early stages of property development; as construction contradiction will be less, and consequently property development delivery will be more secure.

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