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An Evaluation of Impact of Buildability Assessment on Real Estate Investment

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ABSTRACT
There are different ways by which buildability assessment can affect real estate investment. Real estate investment includes residential, commercial, industrial, recreational properties and buildability is the term used to define or explain the way in which project can be best and easily executed. Buildability analysis is use to determine and minimize or remove waste and wasted effort before construction commence on site. In sight of these a field survey was conducted and well-structured questionnaire was designed for clients, contractors and the professionals. Data collected was analyzed using means and frequency table.
Keywords: Buildability, Real estates, Assessments, Professionals

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I. INTRODUCTION

Real estate investment involves huge capital and there are development stages in the construction of real estate which involves different professional teams such as builders, engineers, estate surveyors and valuers, quantity surveyors and so on. Analysis of the construction process is commonly expressed in terms of establishing equilibrium among the three primary concerns of time, cost and quality. Any client would want to construct a facility of highest quality and it is the goal of the project team to maximize cost and time.

Modern buildings are complex edifices and the design, construction and commissioning of a new building is a long complicated process that involves input from a numbers of parties. The concept of building performance shows that satisfactory performance, site organization and methods must be carried out to the highest level of integrity and competence so as to ensure the concept of buildability (Obiegbu, 2004)

Buildability, as defined by the construction industry institute (CII, 1986) has the "optimum integration of construction knowledge and experience in planning, engineering, procurements and field operations to achieve overall project objectives".

Buildability is increasingly becoming a major requirement in building practice. The industry, clients are continuously demanding the best value for money, in terms of the efficiency with which the building is carried out. The integration of good buildability into good overall design is the responsibility of the design team. Researches in part of the country have shown that good buildability leads to major cost benefits for clients, designers, and builders. Secondly, the achievement of good buildability depends upon both designers and builders being able to see the whole construction process through each other eyes. This is the biggest problem because it requires expertise in the two aspects by both role and moreover, the procurement practices do not favour this Involving an expert builder with construction knowledge and experience at the very beginning (design stage) of the project result in maximizing benefits. It has been shown that the integration of construction knowledge during the planning, design and procurement phase of a project brings extraordinary benefits into the delivery of the project.

To review the design after completion is not a buildability programme. It has to start from the beginning, because it is very difficult to make substantial changes in the design once you are through with it. Buildability consideration shaves to be started at the same as the initial project planning and should continue during the entire life of the project. In short, buildability optimizes -the following elements from start to finish: overall project planning, planning and designing, construction to delivering schedule, cost and estimate, construction method.

II. LITERATURE REVIEW

2.1 Buildability in Building Construction

Buildings constructed with the least variation to design are known to give satisfaction to all the major parties of a building project – client,

design team and construction team. It is believed that the use of experienced construction knowledge from the onset to the completion of a project that integrate the methods of construction into the design process, providing benefits and solutions to achieve the design intent in a cost effective and timely manner. In the construction process it is used to drive out waste and enhance cost and program certainty, through properly planning the works and construction logistics and using modern construction techniques.

2.2 Buildability Review

Buildability is the ability to construct a building effectively, economically and to an agreed or specified quality standard from its constituent materials, components and sub-assemblies [Bamisile 2004]. According to CIRIA defined buildability as the extent to which the design of a building facilitates ease of construction, subject to the overall requirements for the completed building.

A.A..C.E international (1996) defined buildability as the optimum use of construction knowledge, expertise and experience gained in planning, design, and procurement and field operation to achieved maximum project objective.

Griffith (1994), 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.

Buildability 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.

2.3BUILDABILITY ATTRIBUTES IN DESIGN PHASE

This study outlines the discussion on buildability concepts in design phase. For this purpose, extensive reviews have been carried out on previous researches on buildability concepts, attributes, principles and other areas related to, and contributing to buildability mainly in the design phase. Even though different terms have been used to describe the so called buildability characteristics, generally the term 'buildability attribute' has been selected to describe those characteristics which directly or indirectly optimize integration of construction knowledge in the building process and balancing the various project and environment constraints to maximize project goals and building performance.

III. METHODOLOGY

The objective of this study was achieved by using two main approaches. The first was through literature review and the second wasthrough field survey. The literature review was used to summarize the consequences and assessment impact of buildability of construction project and estate properties while the field survey involved the use questionnaires. A total number of 50 well-structured questionnaires were distributed toconstruction professionals such as the client, consultant, contractors, architects, engineers, builders, project managers on 50 selected projects. The datacollected was analyzed by the use of mean and simple frequency table.

3.1 Data Analysis

TABLE 1 RESPOND TO THE RESPONDENT TYPE OF COMPANY OR ORGANIZATION INVOLVE IN THE SURVEY.

Respondent	No of respondent	% of respondents
Client	9	18
Consultant	14	28
Contractor	27	54
Total	50	100

Source: *Field Survey*

From table.1: 18% of the respondents were clients, while 28% was consultant and 54% which is the highest percentage was contractors.

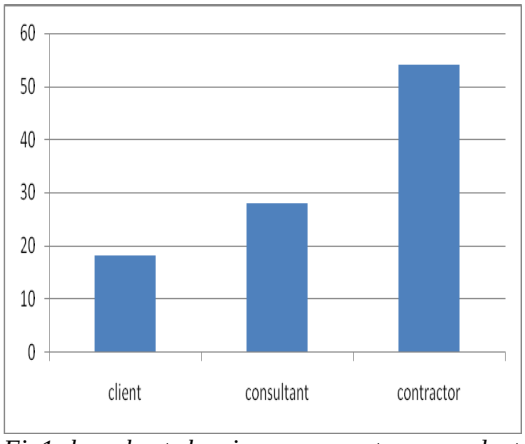

Fig1: bar chart showing response to respondent type of company or organization involves in the survey.

TABLE 2: RESPONSE TO ROLES OF RESPONDENTS IN THEIR ORGANIZATION OR COMPANY.

Respondent	No of respondent	% of respondent
Architect	6	12
Engineer	12	24
Builder	10	20
Project manager	12	24
Client	7	14
Site supervisor	3	16
Total	50	100

***Source**: Field Survey, 2016*

From the analysis above, most of the respondents are engineers, followed by project managers and builders with 24%, 24% and 20% respectively.

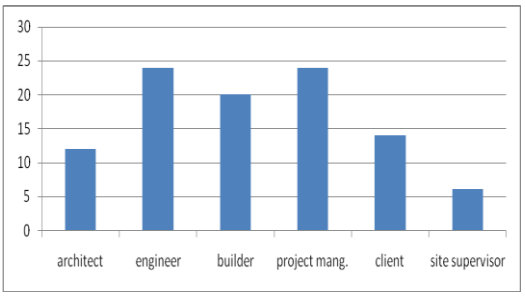

FIG.2: BAR CHART SHOWING RESPONSE TO ROLES OF RESPONDENT IN THEIR COMPANY OR ORGANIZATION.

TABLE 3: RESPONSE TO YEARS OF EXPERIENCE BY THE RESPONDENTS.

Rank of years	Midpoint (x)	Frequency (f)	Fx
0-5	2.5	5	12.5
6-10	8	25	200
11-15	13	10	130
16-20	18	4	72
21-25	23	6	138
Total		50	552.5

***Source:** Field Survey, 2016*

4

Mean (x) years of experience $= \frac{\sum Fx}{\sum F}$

$= \frac{552.5}{50} = 11.05 = 11$ years.

Table 3: shows that the average year of experience of the respondent is 11 years. This indicates that all data collected for this analysis are from reasonable experienced clients, contractors and consultant.

Table 4: Response to the number of design error detected why studying production information.

Respondent	No of respondent	% of respondent
Yes	43	86
No	3	6
No response	4	8
Total	50	100%

***Source:** Field Survey, 2016*

Table 4.: shows that majority of the respondent have experienced design errors in some of the project they have executed, indicating that design error is commonly experienced in theconstruction industry which also indicate that proper buildability assessment on most project are not been carried out.

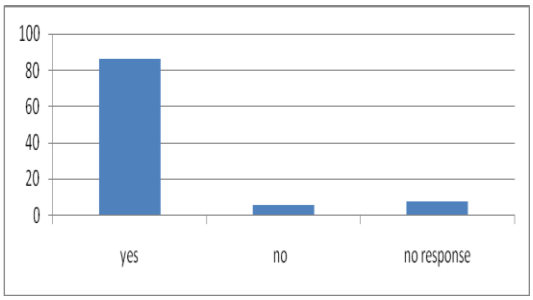

Fig 3: bar chart showing response to when studying the production information have you ever detected error.

Table 5: Response to if yes how many times?

Rang of project	Midpoint (x)	Frequency (f)	Fx
0-5	2.5	7	17.5
6-10	8	5	40
11-15	13	9	117
16-20	18	10	180
21-25	23	12	276

***Source:** Field Survey, 2016*

Mean number of design error encountered

$\sum fx = 630.5 = 14.66 = 15$ projects

$\sum F \quad 43$

From the above table 5, on the average of 15 projects out of total project executed by those respondents have experienced design errors.

TABLE 6: RESPONSE TO LIKELY FACTORS TO BE CONSIDERED WHEN CARRYING OUT BUILDABILITY ASSESSMENT ON A DESIGN AT THE DESIGNING STAGE.

Respondent	No of respondent	% of respondent
Error, omission, under/over design	-	-

Construction difficulties	-	-
Construction safety	-	-
All of the above	48	96
None of the above	-	-
No response	2	4
Total	50	100

Source: *Field Survey, 2016*

From the above analysis the factors to be considered when carrying buildability assessment on a design at the design stage includes checking for errors, omissions, under design/ over design, construction difficulties and construction safety. 96% of the respondent agreed.

TABLE 7: RESPONSE TO IF CONSTRUCTION SAFETY AND CONSTRUCTION DIFFICULTIES ARE NOT FULLY CONSIDERED, WILL THERE BE AN IMPACT ON PROJECT TIME DELIVERY.

Respondents	No of respondent	% of respondent
Yes	47	94
No	2	4
No response	1	2
Total	50	100%

Source*: Field Survey, 2016*

From the analysis above it shows that failure to take note of construction safety and difficulties will leads to delay in project time delivery.

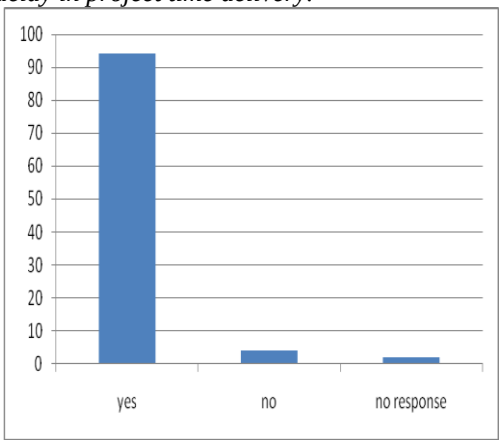

Fig.4; bar chart showing response to if construction safety and construction difficulties are not put in to consideration will there be an impact on project time delivery.

Table 8: Response to does neglect of buildability assessment at the designing stage of a design will as impact on project delivery.

Respondent	No of respondent	% of respondent
Yes	48	96
No	1	2
No response	1	2
Total	50	100

Source: *Field Survey, 2016*

From the above table 8, it indicate that absence of buildability assessment at the design stage of any project will have will affect project delivery due to the response of 48- person 96% of respondents on it.

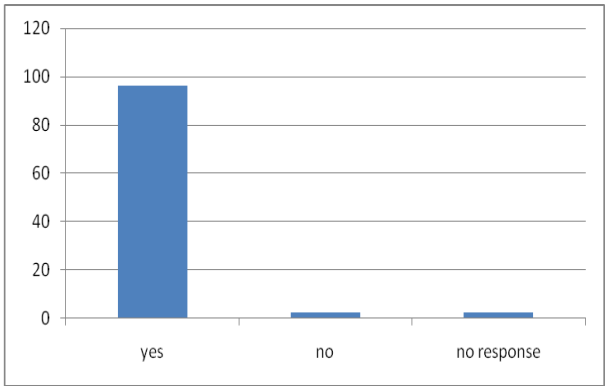

Fig.5; bar chart showing response on does not buildability assessment at the design stage affect project delivery.

TABLE 9: RESPONSE TO IS ALL DESIGN BUILDABLE.

Respondent	No of respondent	% of respondent
Yes	40	80
No	10	20
No response	-	-
Total	50	100

Source*: Field Survey, 2016*

From the table 9: Indicated that 40-person/80% of the respondent, response that all designs are buildable while 10-person/20% indicate that all design is not buildable.

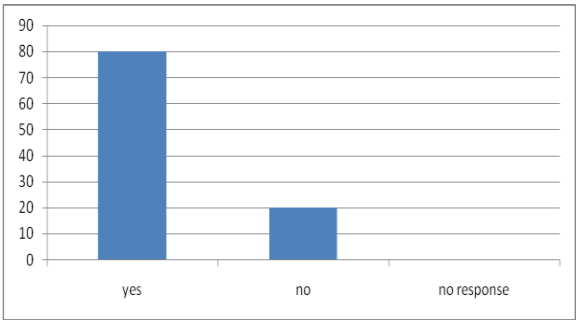

Fig.6; Bar chart showing response to all design buildable

IV. CONCLUSION

In conclusion, the research work has assessed and evaluates the impact of buildability assessment on a building delivery. The research as revealed that most of the construction project executed experienced buildability problem. The result of the analysis revealed that the major factors responsible for failure of buildability assessment are resistance of client to buildability programme, incorrect and inadequate design detailing, errors, omission, under/ over design, incorrect specification of materials, construction difficulties, optimize materials usage, simple installation, nature of soil etc.

In conclusion, failure to carried out buildability assessment on building project design at the design stage before delivery is a phenomenon that has brought about building buildability problems to avoid and stop these problem involvement of a professional builder at the early stage of design and till final completion of the project, carried out adequate soil investigation, use of high quality material, adequate funding by clients, effective planning and adequate implementation of project teamwork should be emphasize, while bureaucracy should be eliminated to enhance good quality project delivery.

V. RECOMMENDATION

Based on the result of the research analysis and the conclusion already drawn, the following recommendations are being proposed to the construction of a project.

- A professional builder should be invited to carry out buildability analysis before the commencement of the work on site with the aim to remove waste, wasted efforts, and impediments to construction.
- Professionals involved in project execution should ensure that the client is adequately advised on area that is likely to be amended to avoid waste of materials.
- Planning should be given utmost priority before and during the execution of project and this will include feasibility study, finance, materials usage and labour.
- Soil investigation should be embarked upon before commencement of work; this is to know the type of foundation best suited for the project and also to assess working drawing of the architect by knowing whether the working drawing can be transferred easily to ground without any complication that will come up.
- Evaluation of the design by the designer land the contractor, and ensuring continuous team work through the duration of the project execution

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