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Comparative Analysis of the Construction Cost of a Storey Building and a Bungalow of Similar Features in Minna and Bida Niger State

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In the making of choice of the type of building to put up, cost, availability and size of land are the key factors. In deciding whether to erect a bungalow or a storey building the key factors mentioned above are also very important to be put into consideration. The influence of the cost of erecting any of these types of building is always prominent. This research was carried out to answer some of the several questions that always arise from clients when trying to make choice between a bungalow and a storey building. The paper aimed at determining the significant difference between the cost of erecting a storey building and a bungalow of equal number of bedrooms and similar features. In achieving this aim, a drawing of four number three-bedroom bungalows and a storey building of four number three-bedroom flats were designed, unpriced bills of quantities of these drawings were also prepared. These bills were sent to fifty contractors in Minna and Bida for pricing using simple random sampling technique. The priced bills retrieved from the contractors were then brought out element by element in a tabular form for easy analysis. Student T-test was used for the statistical analysis. The result came out, and out of the six cost of elements used, four were more than 0.05 which shows not significant, only two were less than 0.05 and significant. It was then concluded due to the result of the statistical analysis that, there was no significant difference between the cost of storey building and bungalow. The paper suggested that this type of research could be carried out by putting cost of land into consideration and by also using a wider coverage like six geopolitical zones in the country.

Keywords: Bungalow, Building, Cost, Construction, Storey

Introduction

Building has been defined as an assemble which is firmly attached to the ground and provides total or nearly total shelter for machineries, processing equipment, protection of human equipment, protection of human or any combination of the above. Elinwa and Buba (1993) also defined building also as walled roofed structure; a structure with walls and a roof. It said a good example is house or factory. If a building meets all the definitions given above on building, then it is very essential for human habitation.

From the early times, man had regard and deep respect for use of natural objects such as trees, caves, standing trees or conical architectural design. Changes in structure, materials and techniques occurred as a result of civilization. The social emotional adjustment was made always by preserving their appearances in view of the techniques of usage. The letting and the usual transaction takes place gradually after several generations. A good example to explain this is the Greek do vie building made of timber. This shows the advancement and complication in the mode of construction and erecting. More modification in building came into being as some building materials were introduced to the building construction system such

materials include cement lime, aggregate, steel, timber, paint (Jojo, 2015).

Due to the introduction of these materials, man became dependent in getting his building built; this is because it is impossible for man to process all these building materials on his own, he therefore needs to acquire them from other sources. This dependent nature of man in acquiring building materials made man to be conscious of cost, this is because he has to give out much to acquire what he needed but lacked (Osewa, 2010).

Bungalow and Storey building

Osewa (2010) defined bungalow as a type of single-story house that originated in India. It originated from the word Bengali and such houses were traditionally small, only one story and thatched, and had a wide veranda. He further said that, bungalow is referred to as one-storey house without regards for style or size in Nigeria. The type of bungalow that will be used for this paper is Nigerian type of bungalow. A bungalow in Nigeria can be of different sizes and shapes, It can be from one-bedroom bungalow to as much as ten bedrooms or even more. A storey house is a building that has another one on top of it. A building that is designed to carry as many building structures as possible depending on the design. It ranges from one storey to as high as hundreds of storeys. This paper is focussed mainly on a storey building.

Mbachu and Nkado (2004) noted that a client or a developer usually wants to know the cost implication of a building before embarking on it. The prior knowledge of cost implication helps a developer to make decision on the size, shape and nature of the building he may wish to build. In response to a developer's demand a professional quantity surveyor needs to present to the client the cost implication of the project in a way the client could understand easily (Aje, Odusami & Ogunsemi, 2009).

The need for a client to know the cost implication of a building before he starts is very important; this will help him to decide on the choice of building his limited resources could erect. Apart from the client's demand, knowing the cost implication of many types of building could also help the quantity surveyor in effective and accurate forecasting analysis, planning and cost control. It is important for a Quantity surveyor to know the cost implication of a building like a storey building over bungalow so as to advise their client on their choice (Chueh & Kao 2004).

According to Gorda (2011), the debate between the choice of a bungalow and a two storey building will be based on the following factors: personal preference, age, number of occupants, occupants' mobility (i.e. more or less stairs), lot size and cost.

Key issues to note when deciding on what to construct

Jojo (2015) explained some of the key issues to take note of when deciding on what to construct: Space**:** Constructing a two-level house occupies smaller ground space as compared to a bungalow. This is because the entire house (storey) is spread over two levels, and spares the owner some garden space. If all the rooms were on one floor (as in the case of bungalows), the house would occupy rather larger space, which would limit garden space in the case of smaller plots. Costs involved. This is a subjective issue depending on what one is comparing, because a simple storey house may cost less than a big bungalow, but if the room sizes are the same, a storey house will cost more, and some of the critical aspects to look at include the following:

Foundation: The foundation of a storey building covers a smaller area as compared to a bungalow. However, the difference is, in a storey house, it's impossible not to have columns, which can be pure steel columns or reinforced concrete columns necessary to support the upper floors, this may not be necessary in case of a bungalow. The foundation wall of a bungalow takes more bricks, which translates into more cement, sand and water. So, at the end of the day, the foundations for both houses will more or less balance out.

Wall: When it comes to walls, the storey house will cost more in terms of bricks, sand, cement, and since there are columns, it makes the walls even more expensive, this is due to the fact that in a bungalow, you have rooms sharing walls where's in a storey house you build new walls that would rather be shared.

Slab: In a storey house, you must have a suspended floor slab which you don't necessarily need for a bungalow. This slab will cost almost the same amount as the foundation, so this is the major element that differentiates the two types of houses. Slabs may be made of any or a combination of; timber, steel beams, steel bars and concrete, among others.
Roof: The roof of a storey house is smaller than the one of a bungalow and, therefore, costs less. The stair case: In storey houses you must have a means of going up or down stairs, and this is the reason the staircases or lifts are put in place. In a bungalow, you don't have to worry about the cost and space for a staircase, so you spend more on the storey house than on a bungalow.

Material: When it comes to finishing including plastering, painting, plumbing, electrical wiring, the storey house will cost more. Methods of construction: The methods of construction of either of the two houses differ and the storey house involves a more complicated and technically critical procedures. Therefore, given these two houses, one storied and the other a bungalow, with the same room sizes, be sure the overall cost of the storey house will be higher than its counterpart. Jojo (2015) concluded that the cost of building these two houses will differ and the storied house will be more expensive than the bungalow. In trying to make comparison between storey buildings of four number three-bedroom flats and four bungalows of three bedroom flat, there is need to look into what is cost and building and the role cost plays throughout building process.

The cost of a building comprises the cost of elements like, substructure, superstructure, finishing, external works, and electrical and plumbing services. In describing the cost of building to client, it is the cost or price of building materials, labour, profit and overhead that matter. A client needs to sacrifice his cash, a lot of time and effort to get his desired building. Cost plays an important role throughout the building process; it has a serious influence on the size, height, and other design variables. The paper therefore aimed at determining the significant difference between the cost of a storey building and a bungalow of equal number of flats using a storey building of 4no three bedroom flats and bungalow of 4no three bedrooms. This will help the clients, builders, architect, and cost experts when deciding on the choices to make on these two buildings (Ojo, 2009).

Methodology

The paper adopted a survey research design which has been found out by Yin (2009) as the best design for this type of research, a sample size of fifty was gotten using a formula in Aje, Odusami and Ogunsemi (2009). In achieving the aim of this paper a structured questionnaire was prepared, the questionnaire was divided into two sections, the first section was the introductory part which instructed the contractors on how to price the unpriced bill of quantities attached to the questionnaire. This unpriced bills of Quantities were prepared from a drawing of 4 number three-bedroom bungalow and a storey building of three bedrooms of 4 flats. These drawings were designed for the purpose of this paper. These bills were prepared and distributed to contractors in Bida and Minna towns in Niger State to price. These contractors were instructed on the necessary information needed from their pricing through the instruction attached to the bills. The priced bills of Quantities were collected back from these contractors and the total costs of each element were brought out for comparison. Fifty (50) unpriced bill of quantities were sent out to contractors. Forty-three (43) bills were returned priced, this shows 86% response. The average of the cost of the elements and total cost were gotten and used for the analysis.

Results and Discussion

The data were extracted from the priced Bills of Quantities collected from about forty-three contractors. This table shows the average cost in element by element. Table 1 shows Substructure element, the last table shows the average proposed contract sum as priced by the forty-three contractors. The average price of the forty three contractors were determined by adding all their prices together and divided by forty three (43). These were shown below. The costs of each element of the two buildings under study were presented in tabular form for easy analysis and comparison.

The student t- test of Paired Two Sample for Means was used to analyse the data gotten from the bill of quantities so as to determine the statistical difference between each of the elements of the buildings and the total contract sum. This was used to check the significant difference between the two types of building under study, that is; the four number three-bedroom bungalows and a storey building of four number three bedroom flats. To know the significant difference between these two types of building with the 95% level of confidence, the decision rules were set to guide the decision. The rules say that the variable would have been statistically significant if the t test is less than 5% but if the T test is more than 5% then the difference is not statistically significant. The summary was as presented in Table 2 below.

This is the summary result of the T test analysis carried out using the raw data presented in Table 1. Table 2 shows the results of the t test conducted on the raw data, in this table it could be seen that, four out of the six elements shows no significant difference while the rest two, doors and window and substructure works are statistically difference. This could be explained by a review done in which it was explained why the cost of construction of substructure in bungalow will differ from that of storey building because of carrying of loads through columns and beams. The doors fixing at the upper floor will attract extra cost than fixing at the lower floor. The rest elements have no significant difference because mostly they will always be the same as the variation will not be significant.

Table 1: Summary of the Bill of Quantities of 4no Three Bedroom Bungalow and a Storey Building of 4no Three Bedroom Flats

Item No	Element	Bungalow ₦	Storey Building ₦
1	Sub structural Works	3,531,005.30	4,186,709.28
2	Super structural Works	1,357,062.81	3,615,704.77
3	Roof Work	4,550,950.26	2,048,521.23
4	Doors And Windows	1,333,752.88	1,453651.70
5	Finishings	2,511,678.56	2,911,891.12
6	Mechanical and Electrical and External Works	1,367,622.40	2,277,125.07
7	Total Cost	14,652,072.21	16,493,603.17

Table 2: Summary of the result from the Student T test analysis

S /No	Element	Variance	T stat	P(T<=t) one-tail	Remark/decision
1	Substructure	Bungalow and Storey building	0.019	0.038	SS
2	Superstructure	Bungalow and Storey building	6.934	1.387	NS
3	Roof work	Bungalow and Storey building	1.152	2.303	NS
4	Doors & windows	Bungalow and Storey building	0.001	0.003	SS
5	Furnishing	Bungalow and Storey building	4.616	9.231	NS
6	Electrical Mechanical & Ex. Works	Bungalow and Storey building	3.173	6.346	NS
7	Total contract sum	Bungalow and Storey building	0.346	0.692	NS

NSS = NOT STATISTICALLY SIGNIFICANT; SS = STATISTICALLY SIGNIFICANT

The total costs of the two building are not significantly difference, this shows that the cost of erecting such buildings will be statistically equal to each other. The choice of this drawing was made because there was need for homogeneity in the study. The floor area, design and any other necessary factors were put to be in the same way. This homogeneity of the two building help in getting the analysis on equal basis. The difference that was recorded between the roof element in bungalow and storey building was neutralized in other areas like substructure in storey building and superstructure in storey building.

From this result it is noted that building a storey building in an area where land is limited and restricted is better and economical than building a bungalow.

Conclusion

The paper concentrated on determining the variance in the cost of constructing a four number three-bedroom flat bungalow and a storey building of four number three-bedroom flat. The analysis carried out shows that there is no significant difference in the cost of constructing bungalow and storey building of the study.

In the analysis it was detected that the cost of constructing each of the elements in the two types of building has no significant difference. If the above analysis is a fact, it can now be concluded that the cost of constructing a storey building and bungalow of equal and same features has no statistically significant difference.

The situation in the country about the economy and its depreciation and also the depression of the economy in the world made the resources for development limited and scarce. So there is need to use the limited resources to obtain a reasonable and useful economic design that will satisfy the client requirements and functional requirement. The analysis of the various elements of the storey building and bungalow shows that: The storey block requires less initial cost of construction in sub structural work. The cost of other important items of work like finishing, roofs etc is lower in storey building than in bungalows. Finally, the paper recommends that a developer should always endeavour to build more than one storey building, this will make the resources spent on a storey building economical. The use of bungalow in an area with limited land resources should be avoided for economic reasons. The effective use of storey blocks for residential purpose as against bungalows of the same number of flat will give the client the best value for his/her money.

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