



## A Model Public-Private Partnership Students' Hostel for Higher Institutions in Nigeria

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### Abstract

This chapter examined the techno-economic viability of a 50-room students' hostel in Nigerian Universities, as a technical solution to the student housing infrastructural deficiency in the universities. Technical data were obtained through literature, market sampling, questionnaire and site inspection. An engineering economic project analysis framework was used. The study determined a 50-room appropriate housing hostel for students in Nigeria Universities, with a projection of 20 two-bedded rooms and 30 three-bedded rooms. Technical/economic requirements include an initial investment of ₦151,120,155 million, an annual expenditure of ₦3,610,000 million and an annual revenue of ₦15,240,000 million. Profitability Indices include Net Present Value of ₦94,688,682 million, with payback period of 12 – 13 years. About 73.3% of the respondents were willing to pay and stay in the private hostel, out of which 94.4% were female students. The study concluded that the 50-room students hostel infrastructure was technically and economically viable, and a suitable template for Nigeria Universities.

**Keywords:** *Public private partnership (PPP); Build operate transfer (BOT); Students housing hostel; Infrastructural deficit; Project management analysis*

## **1.0. Introduction**

There has been a tremendous increase in the number of young people seeking admission into universities and other higher institutions of learning with attendant request for accommodation, making the issue of students housing a particular problem. In many higher institutions worldwide, majority of students are often provided with on-campus accommodation. However, the increase in the number of students seeking admission into universities in Nigeria, and the decline in university funding, has resulted in a limited number of bed spaces provided by institutions and an increase in the number of students residing off-campus (Adeniji, 1983; Babatunde & Perera, 2017; Eludoyin, 2020). Consequently, accommodation facilities on campuses have subsequently become competitive among the increasing number of students. Many students are forced to live off-campus at varying distances from the school (Adeniji, 1983; Babatunde & Perera, 2017; Iloabanafor, Olawole & Eludoyin 2020).

It is expected of every university, to house not only academic activities but also the students that are seeking knowledge in various fields of endeavour. Hence student accommodation becomes essential. Alaka (2007) sees students' accommodation beyond a mere proposal for the development and erection of physical structures, but also as an avenue to offer bundles of services either as a facility from which the social, psychological and physiological activities of students are nurtured and attained, or one developed strictly for leisure, and as an affordable and safe accommodation. As a facility, the design and housing style should address especially the internal space needs highly needed by the residing students.

Universities in Nigeria have traditionally accommodated students almost exclusively on campuses because student housing has been an integral component of Nigerian universities. However, financial constraints and population explosion of students have made this impossible and difficult for universities to provide on campus accommodation for all students which has resulted in overcrowded buildings, and continuous deterioration and decay of these facilities (Onyike & Uche, 2012). The condition of most hostels in Nigerian universities is not compatible with students' academic pursuits. Presently, these facilities are at the worst stage of decline. According to Muhammad, Dodo & Adamu (2014), overcrowding is the major problem in hostels. The report by the presidential committee on critical needs of Nigerian Universities stated that only 111,509 (8.9%) of the total student population of 1,252,913 students across 61 public universities are accommodated on campus (Edet, 2012). According to Abdul-Azeez, Abdul-Hafeez and Kado (2015) only few universities in Nigeria can accommodate up to 50% of their student population and there is as much as 90% deficit in some Universities. Alaka, Pat-Mbano, and Ewulum (2012) lamented on the overcrowding in hostels in Nigerian universities and this has mounted considerable pressure on the existing facilities. In view of the limitations of the capabilities of universities to provide housing for all students, it becomes imperative to examine how private entities can plan and deliver adequate housing infrastructure for the students. This study therefore assessed a Public Private Partnership (PPP) Build-Operate-Transfer (BOT) option for a 50-room students' hostel for tertiary institutions in Nigeria. Specifically, the study pursued the following objectives; to determine the engineering specifications and economic viability of a 50-room students' hostel; examine the techno-economic benefits of the students' hostel; and examine students' willingness to pay for the facilities offered.

## **2.0. Literature Review**

### **2.1. Student housing**

Inadequate infrastructural facilities are a major problem encountered by students in Nigerian public universities. Infrastructural facilities like electricity, internet services, water, accommodation, lecture halls, libraries, laboratories, ICT facilities and examination halls are lacking in virtually all the public universities in the country. Many public universities do not have adequate infrastructural facilities particularly students' hostel, thus leading many of the students in public universities to stay off-campus or rent house outside the school environment and spend transport to come to school every day (Jacob,

Elizabeth & Ahaotu, 2020). Furthermore, the conditions of most hostels in Nigerian universities are not congruent to students' academic pursuits and is at its worst decline in the last decade. According to Muhammad, Dodo and Adamu (2014) overcrowding is the major problem in hostels. This is supported by the report of the presidential committee on critical needs of Nigerian Universities, which stated that only 111,509 (8.9%) of the total student population of 1,252,913 students across 61 public universities are accommodated on campus (Edet, 2012). Similarly, Abdul-Azeez *et al.* (2015), were of the opinion that only a few universities in Nigeria can accommodate up to 50% of their student population and there is as much as 90% deficit in some Universities. Alaka *et al.* (2012), lamented on the overcrowding in hostels in Nigerian universities and this has mounted pressure on the facilities.

Students' housing is a housing unit where students stay for the period of their studies (Amole, 2012; Khozaei *et al.*, 2010a; Thomsen, 2008; Zaransky, 2006). Housing hostels for students are either located on- or off-campus. They may be owned and managed by the institution; by a private entity; or by partnership between the institution and a private entity. Student hostels can be institutionally or privately managed; self-catering or with catering services; and a variety of shared amenities like bathrooms, kitchens, laundries, lounge and recreational facilities. In other cases, basic amenities can be en-suite. Student Housing must be well managed to promote and sustain a safe and comfortable environment that promotes the living and learning experience of occupying students (Penven, Stephens, Shushok & Keith, 2013).

One of the major problems facing public universities in Nigeria is shortage of housing for student accommodation. This shortage has led to private sector being brought into this space to contribute towards providing hostels through BOT options. According to Ibrahim *et al.* (2018), the major challenge of BOT mode of procurement in providing student housing in universities in Nigeria is mainly finance sourcing. The authors further reported that developers perceive investment in student housing under BOT as worthy of investment and are willing to go into BOT for student housing. However, private investors face the problem of lack of long-term loans, time and cost intensiveness of such BOT projects, high interest rate on loans, disinterest on the part of lending institutions, and preference for the traditional procurement route. These issues hinder the adoption of BOT in Nigeria to develop student accommodation.

It has also been shown that private developers under the BOT arrangement will contribute to a large proportion of the entire housing infrastructure for students Raimi, Ibisola & Abdul (2019) suggest that private developers will provide accommodation for between 70-80% of the entire students' populace in public universities in no distant future and a market profitable for would be investors. Raimi *et al.* (2019), also revealed in their study that there is a relatively steady growth in rental values of student accommodation.

The importance of students housing to the overall wellbeing of students cannot be overlooked, as it covers multi-faceted dimensions of the entire socio-economic aspects of its occupants. Therefore, the significance of housing to students should not be underscored, because it has profound influence on their personal development and academic pursuits. Since student housing is to provide social and behavioural stability to students, the productivity of students may not be totally unconnected to the condition of their housing (Aluko, 2011).

## 2.2. Public private partnership (PPP)

There is an increasing demand for public infrastructure and services globally and government's budgets are restricted. As the gap between the growing demands for public services and infrastructure, on one hand, and financial and budgetary constraints, on the other hand, is constantly widening, governments around the world especially in developing countries are interested in implementing public private partnership (PPP) projects as a way of delivering the much-needed infrastructure, including student accommodation (Khmel and Zhao, 2016). According to Zhang and Chen (2013) Public-Private Partnerships (PPPs) play an important role in bringing the benefits of the competitive nature of the

private sector to public monopolies in infrastructure development and service provision. The PPP model also assists in merging resources of both public and private sectors to better serve the public.

### 2.3. Build Operate Transfer (BOT) in providing student housing

Private sector participation is the involvement of formal and informal private enterprise in the provision and management of accommodation in tertiary institutions (Asare-Kyire *et al.*, 2012). One of the reasons for private sector participation is that governments are facing deep budget and public finance difficulties. University authorities have also complained that there has been no finance to adequately provide student accommodation. The Federal Government of Nigeria has been responsible for providing the capital and recurrent expenditure of the Federal owned universities in Nigeria. Over the years the capital allocations to universities have been declining. Consequently, the Nigerian government is no longer able to provide adequate funding to enable universities meet their management needs. The Federal Government of Nigeria in 2004 directed Heads of Tertiary Educational Institutions in the country to hand over hostels in campuses to private managers and also encourage private investors to build hostels for students. However, the policy was not fully implemented. In 2006 the Federal Government issued a policy statement directing that new hostels can only be constructed through Public-Private Partnership (PPP) based on Build Operate and Transfer (BOT) basis. According to Okebukola, Abdullahi, Balogun and Bankole (2004) the objective of the policy is to encourage private sector participation in the provision of hostel facilities in universities and to encourage private sector to plough back some of their profits into very critical areas of national need. By involving the private sector, universities are able to channel their resources more to teaching and research activities rather than to municipal functions.

### 3.0. Methodology

Figure 1, below shows the ground floor working drawing plan for the proposed 50-room students' hostel, depicting the rooms as self-contained apartments with kitchens and wardrobes. Twenty-five rooms will be at the ground floor, and four accessible stair cases for easy movement, with a main reception hall and a porter's lodge. These inputs are to allow for a psychological and physiological friendly hostel for the students. Furthermore, there are three open courtyards to allow for adequate sun and air orientation in the hostel. Figure 2, as can be seen below is the working drawing plan for the proposed 50-room students hostel first floor. The first has 25 rooms available for use and the rooms are self-contained like the ground floor. However, there is a common room for student's relaxation and socialization as the case may be. All the rooms have its own kitchen, wardrobe, toilet, bathroom and a reading table. Figure 3, on the other hand is showing the roof plan of the proposed 50-room student's hostel. The direction of the rain water shown by the arrow indicates a pyramid roofing pattern, where rain water flows to either side of the roof.

Figure 4, is showing the elevation of the proposed 50-room student's hostel, with positioning of the rooms and windows clearly shown. The main entrance is a wide door to take care of the expected volume of student's traffic in and out of the hostel, and to forestall any form of stampede in case of any emergencies. Also, an additional four exits could be seen. The main purpose of any student's hostel is to provide a conducive environment that will aid the learning of the students and provide safe, healthy and recreational place of abode while at the same time encourages learning. This is in line with the findings of Ramli *et al.* (2018), that learning environments particularly students' hostel, sports and transportation facilities were all significant to impact students' academic performance.

Engineering economy techniques particularly net present value (NPV) method was used to compute the viability and payback period of the investment. A set of questionnaire was equally administered to 300 students drawn from six randomly selected universities. These universities are Obafemi Awolowo University (OAU), University of Ibadan (UI), University of Lagos (UNILAG), University of Abuja, University of Ilorin, and Federal University of Technology, Akure (FUTA). Respondents were asked to indicate their willingness to pay more for a hostel accommodation with modern facilities and a

conducive environment. Descriptive statistics was used to analyze the responses obtained from the respondents through the questionnaire.

#### 4. Results and Discussion

The availability of land is one of the first items to be considered in any building related project. As shown in Table 1, the cost of securing a land for this project is ₦200,000. The land is a government land within the school premises and it is not being sold to prospective developer. This cost is merely an administrative cost, since the government land is not transferable and the project is on a public private partnership (PPP) of build operate and transfer (BOT), which means that the building will be handed over to the school authority at the expiration of the lease. Total cost of the building as at the time of this research and considering the present economic reality in the country, was ₦151,120,155 (One hundred and fifty-one million, one hundred and twenty thousand, one hundred and fifty-five naira). The breakdown of this includes the building cost from excavation to painting (₦122, 186,155), cost of interior furniture (₦15,234,000), cost of transformer (₦10,500,000), and cost of borehole drilling with overhead tanks and scaffolding (₦3,000,000).

Yearly recurrent expenditure on the other hand comprises of the staff's salary (hostel manager, hostel supervisors/porter, hostel cleaners, security guards), building maintenance, advertisement, and utilities (electricity and generators). This sums up to **₦3,610,000**. This amount is equally subjected to the prevailing economic situation in the country. Though as at the time of this study the amount is what is obtainable in the country. Revenue expected from the project is **₦15,240,000** (Fifteen Million, two hundred and forty thousand naira only), with rooms divided into 3 bed spaces of 30 rooms (90 occupants with each paying ₦100,000 per bed space for a year), and 2 bed spaces of 20 rooms (40 occupants with each paying ₦150,000 per bed space for a year) based on earlier studies conducted on the rent paid by students in private hostels in Nigeria.

The expected yearly profit thereby is the deduction of the yearly expenditure from the yearly revenue, and this is expected to yield a yearly profit of ₦11,630,000 (Eleven million, six hundred and thirty thousand Naira only). The minimum attractive rate of return (MARR) which is the interest rate with minimum profit to the investor is most times guided by the banks appointed interest rate, and in most studies an assumption is often made of the MARR (Gonzalez-Romero *et al.*, 2014; Willianson & Coenraad, 2016; Kim, 2019). Although the banks' interest rate in Nigeria is 11.7%, for this study, it is assumed that MARR is 20%, with the project not having a salvage value (the building cannot be put up for sale by the private developer after the expiration of the lease year) since it is a BOT arrangement between the investors and the school management (the building will be returned back to the school management after the expiration of the number of years agreed upon). 20-years lease was assumed for this project, and payback period of 13 years is expected. The NPV is **₦94,688,682** (Ninety-four million, six hundred and eighty-eight thousand, six hundred and eighty-two Naira) which is positive. This indicates that viability of the project. Even though there are several methods to evaluate a project's financial feasibility, most studies in the literature focusing on the evaluation of feasibility for projects related to building use the NPV method (Arnold & Yildiz, 2015). Arnold & Yildiz (2015), state that an NPV equal to zero indicates that the investor completely recovers the invested capital plus an appropriate interest rate. On the other hand, a negative NPV implies that the investment did not generate enough funds to compensate for the opportunity costs. Projects with positive NPV generate funds above the expected average profitability.

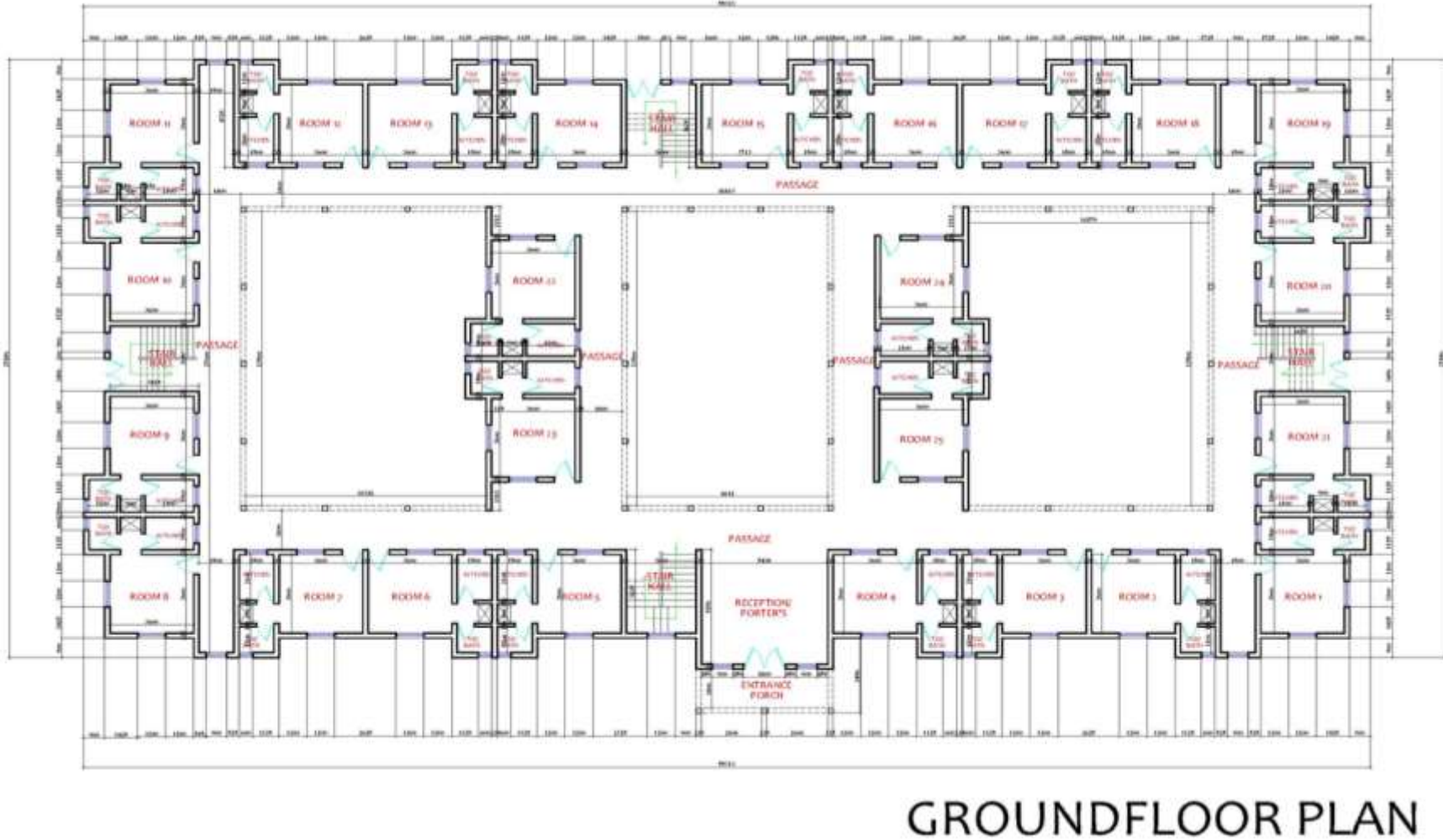
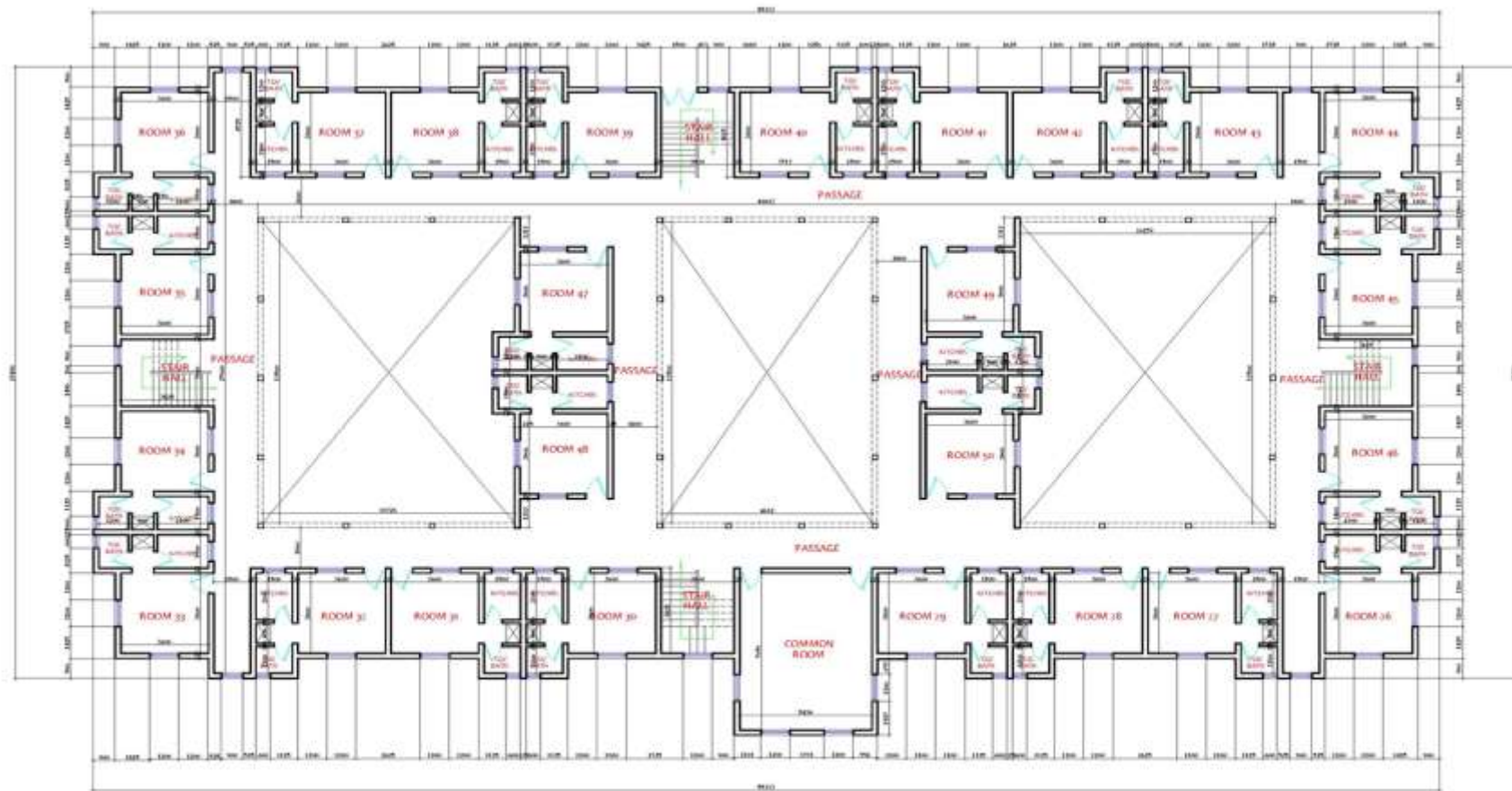
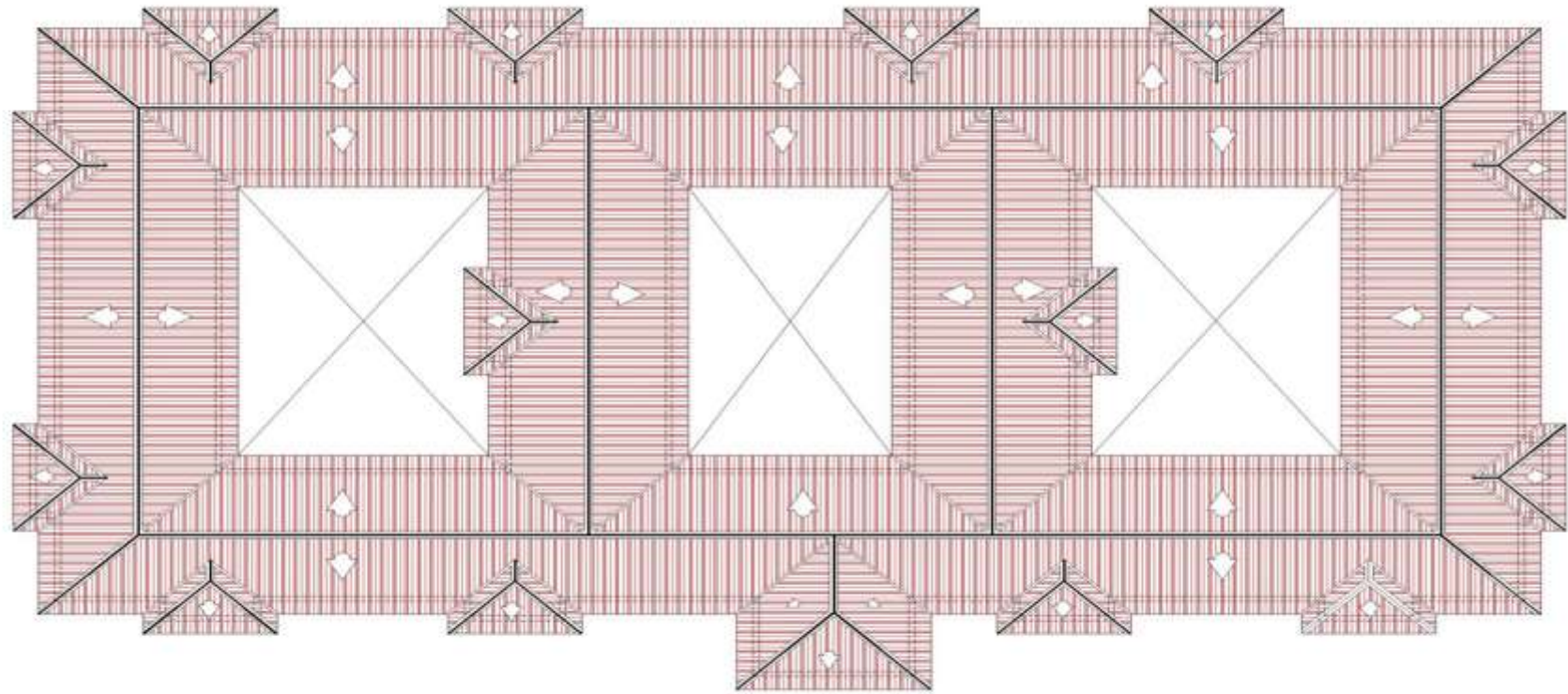


Figure 1. The ground floor plan of the 50-room Student's hostel



## FIRSTFLOOR PLAN

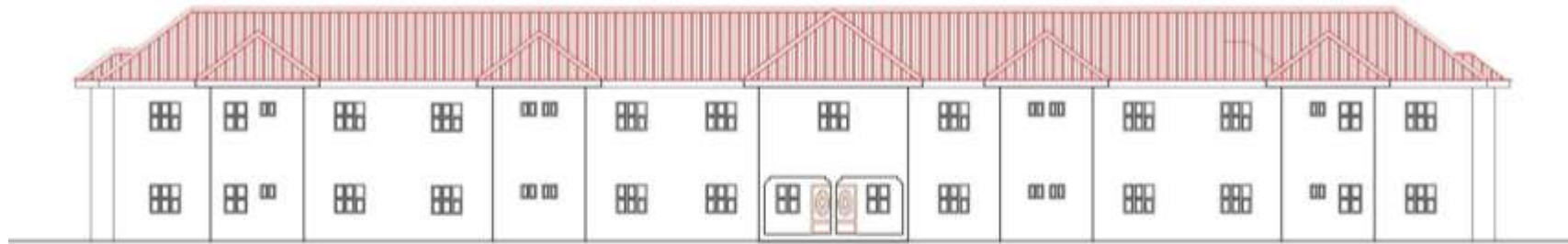
Figure 2. First floor plan of the 50-room Students hostel



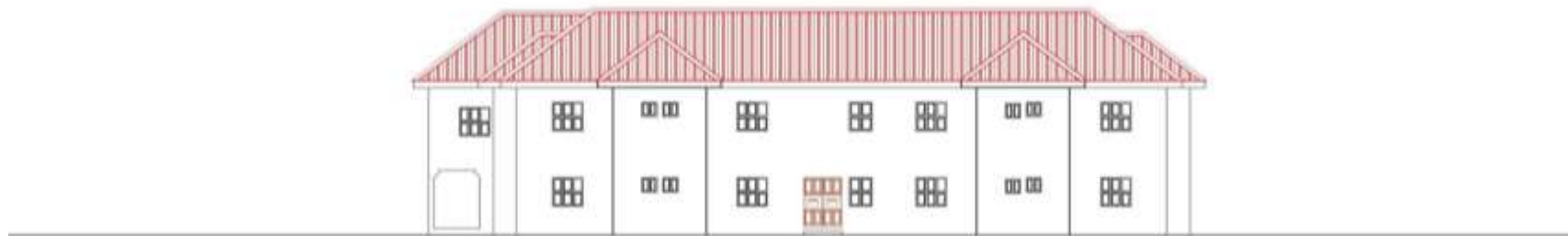
**ROOF PLAN**

Figure 3. The roof plan of the 50-room Students hostel





APPROACH VIEW



RIGHTSIDE ELEVATION

Figure 4. Elevation of the 50-room Students hostel

**Table 1:** Techno-Economic Assessment of a 50 room private students' hostel in higher institutions in Nigeria

S/N	DESCRIPTION	AMOUNT (₦)
<b>1</b>	<b>Capital cost</b>	
	i.) Cost of land	200,000
	ii.) Cost of building	122, 186,155
	iii.) Cost of Furniture	15,234,000
	iv.) Cost of transformer	10,500,000
	v.) Generator (30KVA)	3,700,000
	v.) Borehole (Industrial)	3,000,000
	<b>Total</b>	<b>154,820,155</b>
<b>2</b>	<b>Operational cost (per annum)</b>	
	i.) Staff's salary	
	Manager (40,000/month)	480,000
	Supervisor (30,000/month)	360,000
	Cleaners (4) (30,000/month)	1,440,000
	ii.) Building maintenance	200,000
	iii.) Advertisement (posters/pamphlets)	50,000
	iv.) Utilities	
	Power (National Grid)	1,200,000
	Generator (Diesel engine)	1,260,000
	v.) Security guards (2) (30,000/month)	720,000
	<b>Total</b>	<b>5,710,000</b>
<b>3</b>	<b>Revenue</b>	
	i.) 30 rooms (3 bed spaces)	
	90 occupants × 100,000	9,000,000
	ii.) 20 rooms (2 bed spaces)	
	40 occupants × 150,000	6,000,000
	iii.) Buttery (2 at 10,000/month)	240,000
	iv.) Salvage Value	Nil
	<b>Total</b>	<b>15,240,000</b>
<b>4</b>	<b>Expected Profit (Annual)</b>	
	Yearly Revenue-Yearly Cost	9,530,000
<b>5</b>	<b>MARR = 20%</b>	
<b>6</b>	<b>Life of the project = 20 years</b>	
<b>7</b>	<b>Profitability Index</b>	
	Pay-back Period in Years	16
	<b>NPV</b>	<b>94,688,682</b>

The payback period was calculated using the payback period calculation.

$$\text{Payback Period} = \frac{\text{Initial Investment}}{\text{Annual expected profit}}$$

Thus, Payback period for the hostel accommodation is  $= \frac{151,120,155}{11,630,000} = 12.99$  years or approximately 13 years

The NPV calculated as shown in Table 2, clearly depicted the present value in each year of the project up to the 20-year lease. Cash flow from year one up to year twenty being ₦11,630,000, while discount factor was calculated as thus:

$$\frac{1}{(1 + i)^t}$$

Where, *i* is the discount rate and *t* is the time of the cash flow

Table 3, shows the willingness of the respondents to stay in the private hostels as opposed to the schools’ public hostels. About 67% of the respondents prefer not to stay in the schools’ hostels, while 33.3% of the respondents would rather stay in the schools’ hostels. The number of students that were willing to pay more and stay in a private owned hostel in the school is higher (73.3%) than the number of students that chose not to (26.6). Interestingly, there are more female students willing to pay more for a private hostel than the male students, as 94.4% of female respondents prefer to stay in a private hostel and pay more than the existing amount charged by the school-managed hostels, while 41.6% of the male students are willing to pay more for a private hostel.

**Table 2: Net Present Value (NPV) of the Proposed Students Hostel**

Year	Cash	Discount Factor	PV (₦)
0	-154,820,155	1	-154,820,155
1	11,630,000	0.833	9,691,666
2	11,630,000	0.694	8,071,220
3	11,630,000	0.578	6,722,140
4	11,630,000	0.482	5,605,660
5	11,630,000	0.401	4,663,630
6	11,630,000	0.335	3,896,050
7	11,630,000	0.279	3,244,770
8	11,630,000	0.232	2,698,160
9	11,630,000	0.181	2,105,030
10	11,630,000	0.161	1,872,430
11	11,630,000	0.134	1,558,420
12	11,630,000	0.112	1,302,560
13	11,630,000	0.0934	1,086,242
14	11,630,000	0.0778	904,814
15	11,630,000	0.0649	754,787
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20	11,630,000	0.026	302,380
		<b>NPV</b>	<b>94,688,682</b>

**Table 3:** Willingness to pay for a private hostel accommodation in the school premises

S/N	Characteristics	Frequency	Percentage
1	Gender		
	Male	120	40
	Female	180	60
2	Year of Study		
	100 level	100	33.3
	200 level	80	26.6
	300 level	50	16.6
	400 level	40	13.3
	500 level	30	10
3	Stay in School Hostel		
	Yes	100	33.3
	No	200	66.6
4	Stay in Private Hostel and Pay More		
	Yes	220	73.3
	No	80	26.6
5	Males Preferring Private Hostel		
	Yes	50	41.6
	No	70	58.3
6	Females Preferring Private Hostel		
	Yes	170	94.4
	No	10	5.5

### 5.0. Summary and Conclusion

This study examined the public private partnership (PPP) in a build operate and transfer (BOT) arrangement for students' hostels in Nigerian Universities as a panacea for the drastic shortfall in infrastructure particularly, students housing as embedded in the National Universities Commissions guidelines for the establishment of Universities in Nigeria. A project foresight management analysis framework was used. The study established that a 50-room students' hostel with 2 to 3 beds in a room is appropriate for the initiatives in the Universities. The engineering economy analyses further established that the 50-room students' hostels would cost an estimated ₦151,120,155 million. Furthermore, an estimated annual operations costs of ₦3,610,000 million, and estimated annual revenues from rents of ₦ 15,240,000 million, and estimated annual profits of ₦11,630,000 million per annum. Profitability Indices indicated Net Present Value of ₦94,688,682 million and payback period ranges from 15-16 years. The study also revealed that about 73.3% of students studying in Nigerian Universities will prefer to pay more to live in a private student's hostel, while 94.4% of this are female students.

From the results, it can be concluded that the 50-room students hostel initiative for Nigerian Universities is technically feasible and economically viable, and suitable to be deployed as a strategic template for solving the student housing infrastructural deficit in Universities in Nigeria.

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