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EVALUATION OF THE IMPACT OF MODULAR CONSTRUCTION ON HOUSING DELIVERY IN SOUTH- EAST NIGERIA.

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Abstract

Housing delivery in Nigeria, particularly in the South-East region, continues to face persistent challenges such as poor quality, project delays, material waste and unsustainable construction practices resulting from over reliance on the conventional building methods. Modular construction has emerged globally as an innovative technique that can reduce project duration and cost while enhancing quality, minimizing waste and promoting sustainability. This study evaluated the impact of modular construction on housing delivery in South-East Nigeria. A descriptive survey research design was adopted. The study population comprised 789 building professionals and fabricators in South-East Nigeria. A sample of 265 participants was determined using the Taro Yamane formula, and participants were selected through simple random sampling using a table of random numbers. Data were collected using structured questionnaire designed to address the study objectives and answer the research questions. The findings revealed that the highest ranked impacts of modular construction were the provision of high-quality buildings (mean = 4.94; 1st), increase in productivity (time and cost) (mean = 4.93; tied 2nd), improved safety (mean= 4.93; tied 2nd) and reduced material waste on construction sites in the study area (mean= 4.92; 3rd). However, the adoption of modular construction remains limited in the study area. The study concludes that wider adoption of modular construction has the potential to significantly improve housing delivery in the region. It therefore recommends that the Nigerian government, corporate organizations, and financial institutions to support the construction industry by establishing fabrication plants, providing subsidized loans to construction professionals, and improving road infrastructure to reduce logistical challenges and promote the adoption of modular construction for sustainable housing delivery.

Keywords: Housing Delivery**,** Modular Construction, Improved Quality, Productivity, Safety and Reduced Waste

1. INTRODUCTION

According to UN-Habitat (2015) the role of housing in the socio-economic development of a country cannot be overemphasized. Housing is a vital element in the generation of economic growth and development. The state of housing always has a positive effect on the growth and development of any society. Furthermore, Omajeh and Okebugwu (2014) commented that, industrial development in Nigeria has been impeded because of her huge infrastructural deficits; and added that only the outputs of the construction industry can solve the infrastructural challenges and put the nation on the path of development. However, delivering construction outputs has not always been successful. According to Amade, Ubani, Omajeh and Njoku (2015), the rate of project failure is alarmingly high. It is not uncommon to see construction projects with schedule overruns and cost overruns of over 100% (Flyvbjerg, Skamris-Holm and Buhl, 2005). In some cases, the quality of buildings delivered in Nigeria is poor as evidenced by the incessant building collapse reported across the country (Kasimu and Usman, 2013). Moreover, performance of the building industry with respect to housing delivery is far below expectation. Nigeria is currently faced with the challenge of housing deficit which is similar to many other developing countries (Kamau, Mireri & Usman, 2013; Usman, Kamau and Mireri 2014).

Due to the persistent housing deficit and inefficiencies associated with conventional housing delivery in Nigeria, including high cost of construction, lengthy project delivery periods, and inability to meet growing housing demand, experts in the Nigerian construction industry have advocated the adoption of alternative construction methods, such as prefabricated building systems, to enhance housing delivery (Nkah, 2013). Therefore, Oloto (2021) noted that, to solve the problem of inadequate housing delivery, there is need to shift from the conventional method that is prone to cost/time overrun, shoddy work and *unsustainable* housing delivery to a more sustainable, adaptable and faster way of construction such as 'Dry Construction'. Dry Construction is explained as a method of construction where majority of the components of the building are pre-fabricated offsite and transported to site for assembling (Ashkin, 2013; Dada, 2013). Modular construction is a form of dry construction. It is a terminology used to describe the use of factory produce pre-engineered building units that are delivered on site and assembled as large volumetric components or as substantial elements of a building. Off-site construction, also called prefabrication or modular construction, allows various building elements from bathrooms to pre-wired light fixtures to exterior walls to be built in factory (Bunch, 2017). According to Modular Building Institute (2020), modular construction is a process in which a building is constructed

offsite, under controlled plant conditions, using the same materials and designing to the same codes and standard as conventionally build facilities but in about half the time. Buildings are produced in "modules" that when put together on site, reflect the identical design intent and specifications of the most sophisticated site-built without compromise. Permanent Modular Institute (2015) noted that, after production of the modules/components by the manufacturers, these units/modules are transported to the site and thereafter installed on permanent foundations. Furthermore, Modular buildings involve sectional prefabricated buildings or houses that consist of multiple sections called modules. The modules are six (6) sided boxes constructed in a remote fabrication site, thereafter delivered to their intended site of use using a crane; the modules are installed on a building's foundation and joined together to make a single building. The modules can be placed side-by-side, end-to-end, or stacked, allowing a wide variety of configurations and styles in the building layout (Ganiron and Almarwae, 2014). Additionally, Ihenketu, Iroegbu and Iwudibiah (2019) reported that, modular buildings are built with the same materials and to the same building codes and architectural specifications as traditional construction. Once assembled, they are virtually indistinguishable from their site-built counterparts. Also, its units may be designed to fit in with external aesthetics of any existing building. The indoor construction environment reduces the risks of accidents and related liabilities for workers.

The applications of modular construction are multipurpose. Modular construction serves the same application as conventional construction while offering additional advantages including quality, movability and flexibility. According to Colleend (2018), Modular construction can be used as standalone outdoor structure, or assembled inside within a larger building, such as a warehouse, factory, or office building. However, modular construction is most commonly used in general building projects, particularly for apartment buildings, schools/classrooms, dormitories, hotels, hospitals, offices, refugee camps, barracks, industrial facilities, single family development, correctional facilities, and other buildings where units are repetitive. Moreover, there is no project either too big or small for modular construction. Modular buildings are designed to meet a wide range of project requirements, offering flexibility, efficiency, and high-quality finishes. They can be fitted with windows, doors, finished walls, lighting, and flooring of your choice, and can also be pre-wired to suit the building's intended purpose.

This research aims to evaluate the impact of modular construction on housing delivery in South-East, Nigeria, with particular emphasis on its potential to improve cost efficiency, construction time, quality, waste of material onsite, sustainability, safety and overall housing delivery outcomes. The study also examined the social factors and community perceptions that influenced the adoption and implementation of modular construction practices, providing a comprehensive understanding of their implications for housing delivery in South-East Nigeria.

2. Theoretical Framework

This study employed Modular theory of assembling in bulk and repetition to understand the impact of modular construction/prefabrication in delivery of high quality buildings within time and cost limits, reduced waste of materials, improved safety on site and achieving sustainable housing delivery in the study area. Modular theory of assembling in bulk and repetition was propounded by Gentile in (2013). It states that, the theory behind prefabrication and modular construction is that certain components and structures can be assembled in bulk. He explained that "modular attributes arise from predominantly replication of common physical modules in a simple fixed infrastructure, of common materials, simple fabrication, and simple assembly". However, theory of Assembling in bulk explains that a building can be assembled completely within a short time due to the fact that components are already fabricated in a factory, erection is made easy. This theory enables sustainability by saving cost of transportation. All the fabricated components of a particular building will be transported to the construction site together leading to cost saving as compared to traditional method of construction whereby different raw materials such as aggregates, reinforcements etc used for building construction are transported separately thereby increasing cost, and constituting environmental pollution (carbon monoxide and noise).

The implication of this theory to the study is to prove that by adoption of modular construction, building can be erected within some hours, reducing cost, time, conflict, pollution, and increased sustainability. Most of the Assembly stages are repetitive in nature, no need to brainstorming to develop a new way to connect modules together. This also increases fastness of the construction work.

2.1 Study Area

The area is surrounded on its sides by a host of large rivers and other southern and central Nigeria indigenous tribes namely; Bini, Urhibo-Isoko. Ijaw, Ogoni, Igala, Tiv, Yako, Idoma, and Ibibio. It has a total area of 28,958km^2 which is 3.1% of the landmass of Nigeria (923,768km2) and approximately a population of 12,635,555 (Census, 2006). Geographically, it is divided by the lower Niger River into two unequal sections: an eastern (which is the highest) and a western section. It is characterized by the Igbo culture and equally diverse Igbo language, and Christianity is mostly practiced. The people of South-east are predominantly farmers and traders. However, the region has been rapidly developing over the years with the deployment of various building infrastructures. South-east is represented by five states: Abia, Anambra, Ebonyi, Enugu, Imo. According to Lazarus (2020), the five South Eastern states lie between latitude 7^0 N and 5^0 N and longitude 6^0 30^1 E and 8^0 30^1 E within the latitude and longitude of Nigeria.

Abia state (capital Umuahia) has 17 local government areas with total area of 6,320km (2,440sq mi) and a population of 3,841,943. Imo state (capital Owerri) has 27 local government areas with total area of 5,100km and a population of 5,167,722. Enugu state (capital Enugu) has 17 local government areas with total area of 7,161km2 (2,765 sq mi) and a population of 4,396,098. Ebonyi state (capital Abakaliki) has 13 local government areas with landmass of 5,533km2 (2,136 sq mi) and a total population of 3,007,155. Anambra state (capital Awka) has 21 local government areas with landmass of 4,844km^2 (1,870 sq mi) and a population of 5,599,910 (Kaizenify, 2023). The zone largest cities are Abakaliki, Owerri, Enugu, Onitsha, and Aba

The data collected from five states representing South-east geopolitical zone of Nigeria, such as Abia, Anambra, Enugu, Ebonyi, and Imo, to ascertain the impact of modular construction on housing delivery as shown in figure 1. Hence the targeted population for the study are the professionals (stakeholders) in building industry such as Client, Architects, Builders, Engineers, Quantity Surveyors, Estate Surveyors and fabricators/manufacturers.

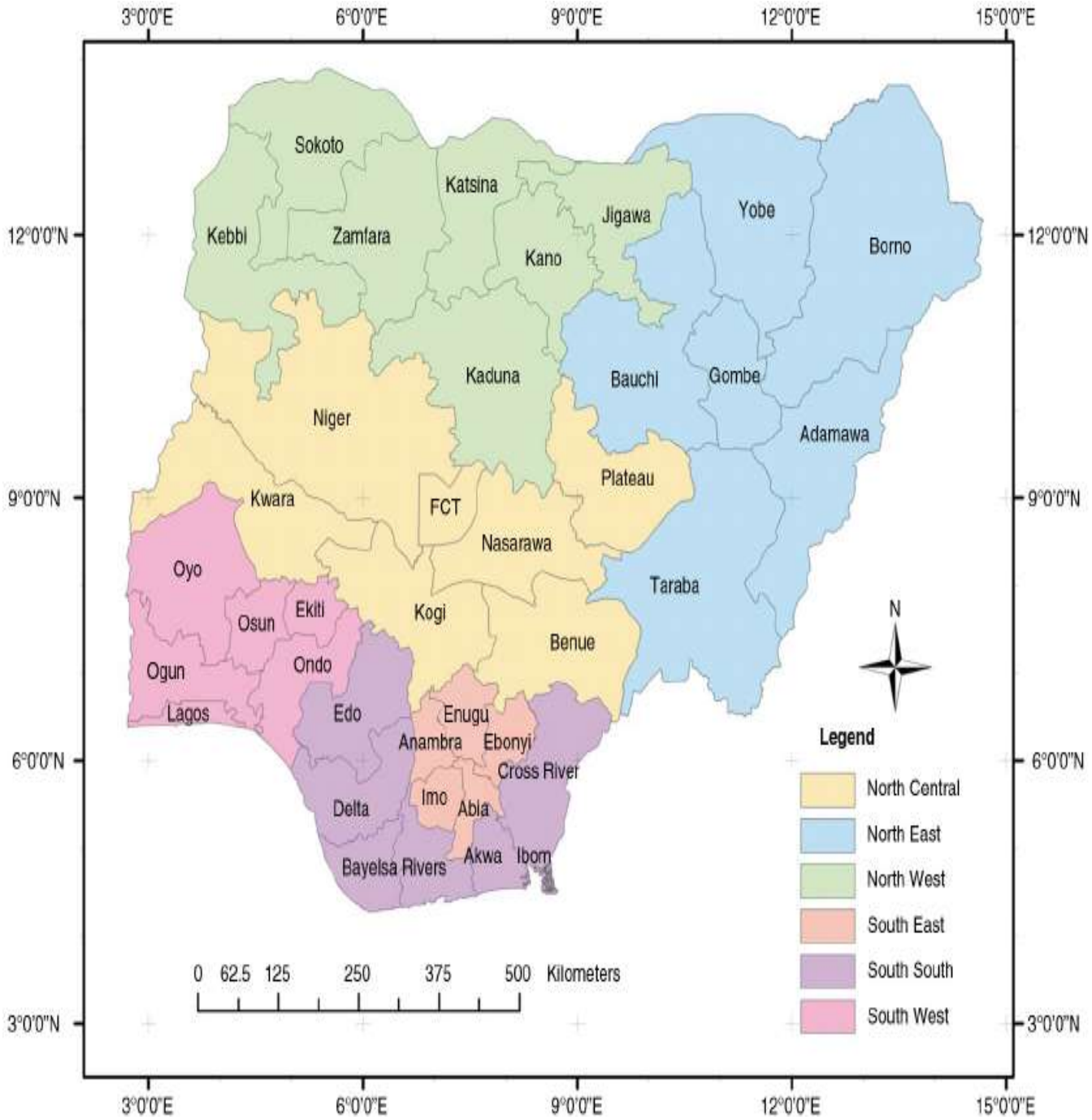


Figure 1: Map of Nigeria, showing South – East states

Source: Map of Nigeria showing South-East states (Lazarus, 2020)

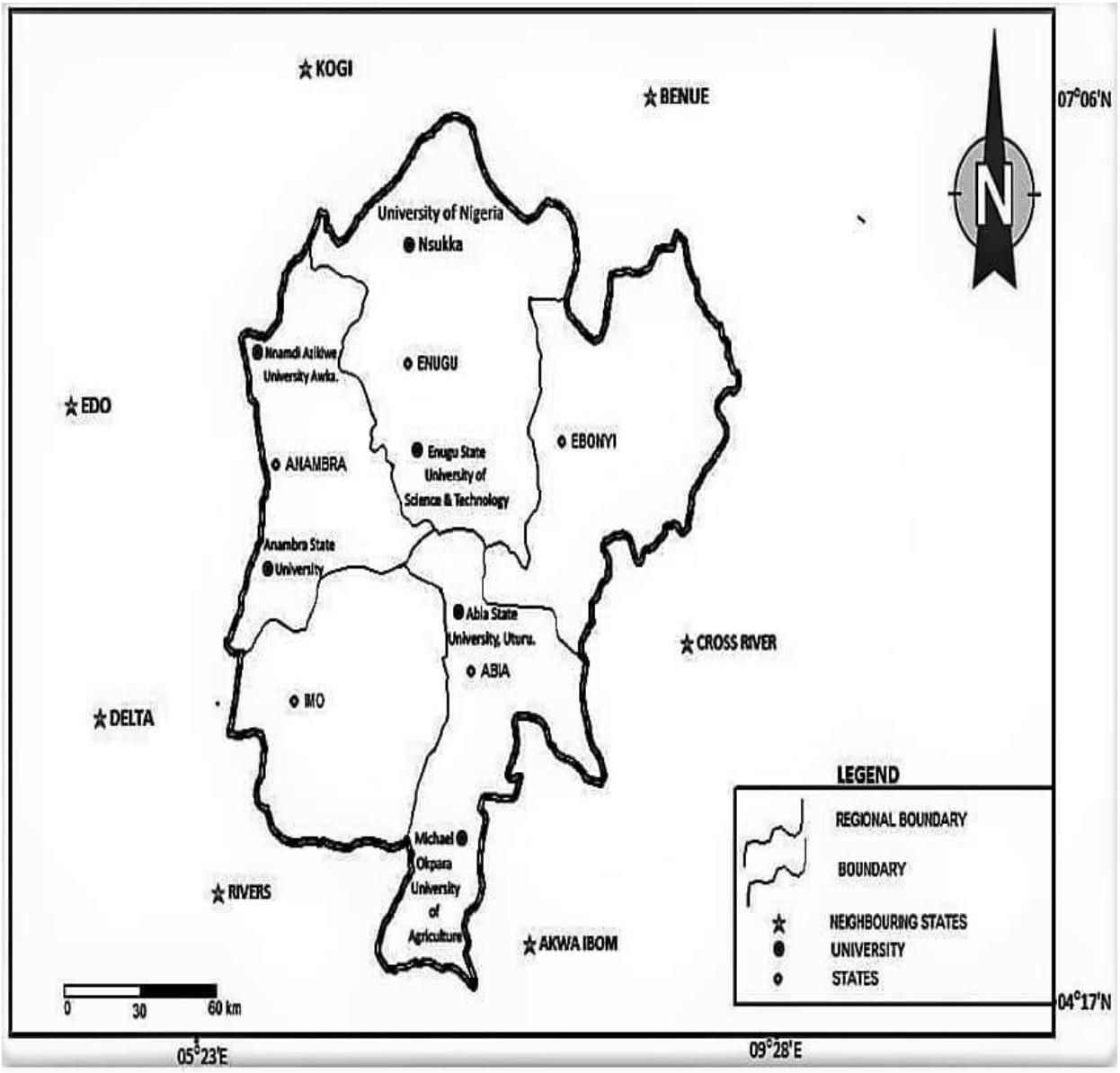


Figure 1.2: Map of South-East Nigeria showing study center

Source: Map of South East showing the study center (Lazarus, 2020)

The region is bordered by Kogi and Benue state in the North, Cross River state in the East, Delta state in the West, and by Rivers state and Akwa Ibom state in the South. The economy of the study

area (South Eastern region) depends primarily on agriculture and commerce. However, the region has been rapidly developing over the years with the deployment of various building infrastructures.

2.2 Literature Review

From the foregoing, importance of housing in economic growth and development cannot be over-emphasized; notwithstanding this fact, the entire Nigeria including South-Eastern States are facing a huge challenge of housing deficit. Therefore, there is great need for efficient housing delivery in Nigeria to achieve more productivity and sustainability in housing industry. According to Adebowale, Morakinyo and Ana (2017); Udoh and Uyanga (2013) considering much effort made towards housing delivery for Nigerian citizens, adequate provision should be made towards adopting a better sustainable building method than the conventional method that is prone to cost and time overrun, shoddy work and unsustainable housing delivery.

Modular construction as earlier stated is a more sustainable construction process its impact on housing delivery includes the following:

i. **Efficiency (Reduced Construction Time):** According to Alderton (2019) modular construction has been proven to be a time-saving construction method with up to 60% to 70% reduced time in comparison to traditional construction techniques. Furthermore, Musa & Mohammad (2015) noted that, modular construction work occurs simultaneously with building site work, allowing projects to be completed in half the time of traditional construction method. Modular construction processes are executed concurrently which leads to reduced construction time whereas in a traditional construction settings work/Jobs are performed sequentially and in most cases result to late delivery and cost overrun. According to Ihenketu, Iroegbu and Iwudibiah (2019) the required time for off-site/modular construction includes the following: projects that are restricted by schedule such as schools and dormitories that must open for new school year or semester, embassies that must be built for operations in foreign country quickly, or retail units that must open doors to gain an increased return on revenue. However, it is hard to think of any building type today that does not demand a shorter

construction schedule. Accordingly, modular construction technique should be adopted for construction of buildings that are time-bound such as Churches, temple, medical and healthcare facilities and retail shops, fast food joints etc (Akok and Prakask, 2017)

ii. **Reduced Cost:** One of the most significant economic sustainability benefits of modular construction is cost-effectiveness. The ability to manufacture building components in a controlled factory environment reduces labour cost and minimizes the potential for delays and errors often associated with on-site construction. Modular construction ensures simultaneous site development and construction which will definitely shorten project timelines and finally lead to cost savings (Avon modular, 2023). According to Morton (2011) modular construction can reduce build time by 30 – 50% and provide an alternative solution in today's tough market. Morton maintained that, in a market where construction costs is of great concern, permanent modular construction (PMC) is recommended as a way to acquire a new building in a tough economy and should be considered. According to a research study on the analysis of cost of prefabrication/modular and that of conventional construction, the study proves that the overall cost required for constructing a building with prefab construction method is reduced by 20% when compared to conventional method. Costs are saved through reduced requirements from formwork, scaffolding and less reliance on wet trades. Also, reduced on-site supervision by the main contractor is an added advantage to the cost savings realized through modular process (McKinsey Global Institute, 2017).

iii. **Reduced labour/Labour Shortage:** The high degree of machine utilization in producing IBS components at factory reduced the construction process and the number of labour required at site. In another development, it reduces the manual labour onsite (up to 40 – 50% of the input in conventional construction), especially in skilled trades such as formwork, masonry, plastering, painting, carpentry, tiling and pipe laying (electrical and water supply). According to Ayedun and Oluwatobi (2011) skills shortage is identified as one of the problems hampering the effective delivery of housing in Nigeria. As a result of this, one of the drivers to the adoption of OSM is reduced skill (Arif *et al.*, 2012a; Blismas & Wakefield, 2009; Gibb & Isack, 2003). Since, OSM takes away most of the construction processes to a controlled environment (factory), as such the number of operatives needed is reduced since minimal work is

done onsite. Moreover, as a result of production of modules and components at the factory; modular construction reduces the number of laborers on site, which results in less labor congestion leading to higher craft productivity (Na, 2007; Haas, O'Connor, Tucker, Eickmann, & Fagerlund, 2000).

iv. Q**uality Delivery:** According to Gibb (2001); Gibb and sack (2003) achieving greater quality was one of the major benefits of OSM and one of the driving forces for its adoption. Thereby, adopting modular/OSM will improve housing delivery efforts in terms of quantity and quality. Similarly, higher quality can be achieved with the use of modular construction due to controlled manufacturing facilities in which components and modules are built. Constructing under factory conditions, repetitive processes and operations, and automated machinery, can result in a higher level of production quality (Ambler, 2013). Moreover, adopting modular construction offers high-quality materials and precision manufacturing techniques. The controlled factory environment ensures that each component is produced to exact specifications, reducing the likelihood of defects and ensuring consistent quality across all units (Bello, Eje, Idris, Semiu, and Khan, 2023)

v. **Safety Delivery:** Construction challenges in conventional construction can be reduced by 80% - 85% if prefabricated construction is utilized; because modular construction significantly enhances safety in construction projects by shifting large quantity of work (about 80%) to a controlled factory environment, thereby reducing on-site hazards and improving overall safety outcomes (Pan, Wong and Hui, 2011). This approach minimizes exposure to common construction risks like falls from height, equipment accidents, and inclement weather, leading to a safer and more productive work environment. Accordingly, Lawson et al., (2012) reported that accidents in modular can be 80% less than conventional construction. Furthermore, O'Connor, O'Brien, and Choi (2015) noted that, adoption of modular construction technique clearly shows that there is opportunity to reduce safety accidents because it is not extremely affected by external environmental factors, such as rainfall and wind. Workers can become familiar with the workspace and work because they perform repetitive tasks in manufacturing factories. As the volume of on-site work decreases, fewer workers will be required, and it will be comparatively easy to manage them. Therefore, due to these advantages

modular construction is regarded as a safer method than conventional construction method

vi. **Waste Reduction/Control:** Construction industry views prefabrication and modular construction as an effective method to reduce waste generation. According to Jaques (2000) found that "modular design" is perceived as the second and third most effective measures to reduce waste by architects and quantity surveyors respectively. Modular construction significantly reduces waste generation compared to traditional on-site construction methods. By fabricating building components in a controlled factory setting, modular construction minimizes material waste through precision cutting, optimized material usage and efficient recycling programs. Kamali and Hewage (2016) noted that, Offsite construction generates less waste through a precise approach to purchasing, planning, material cutting and recycling. The factory environment enables the control, reuse and recycle of material waste generated. Accordingly, Waste & Resources Action Program (WRAP) (2009) notes that, modular construction can reduce waste materials like timber, cardboard, plastics and concrete by up to 90% compared to traditional construction methods.

vii. **Weather Condition/Delay:** According to Ismail, (2001) modular construction is less affected by weather; its construction operation is not affected by adverse weather condition because prefabricated components are done in a factory controlled environment. Moreover, as IBS components are mostly fabricated in the factory; about 80 – 90% of modules/components are carryout in a factory and the work on site are erection/placing of the components and joining to form a complete structure; therefore, the effect of weather on construction is less.

viii. **Simplicity and ease in the construction process:** Modular houses proffer a simple and effective solution for providing adequate and decent surroundings. The simplicity seen in the on-site assembly is one of the qualities that make modular homes an ideal choice for any nation trying to solve a housing crisis, such as developing countries like Nigeria (Coker, 2023; Mckeever, 2024). Similarly, the primary reason for this simplicity is that modular homes are fabricated off-site in factories using advanced machinery and techniques. This means that all the components of the home, including walls, floors, ceiling, doors, and windows are prefabricated and shipped to the site for

assembly (Mckever, 2024). Therefore, the need for complex or skilled on-site construction work such as bricklaying or plastering is reduced. Moreover, since each module is constructed in a factory under strict quality control, the end product has consistently precise dimensions. This makes the assembly process even easier as the pieces fit together seamlessly like a puzzle. The precision also ensures that there are no gaps or errors during assembly which can lead to structural problems later on (Coker, 2023; Mckeever, 2024).

3. Methodology

The research design adopted was descriptive survey study in an attempt to explain the impact of modular construction on housing delivery. The survey was used because it is best suited to answer the research questions in the study. A well-structured questionnaire was administered to respondents, and the responses were used to elicit relevant information from the respondents on the purpose of the study. The distribution of the questionnaire was done in less than a week. The study population comprised 789 building professionals and fabricators in South-East Nigeria. The sample size was made up of 265 respondents which is purely construction industry workers since the entire population cannot be studied. The researcher used Taro Yamane formula to determine the sample size and simple random sampling technique was implemented using a table of random numbers method to ensure that each member of the population had an equal chance of being selected, thereby minimizing bias. Taro Yamane's formula was used to determine a sample of 265 respondents who were randomly selected from the registered building professional contractors and fabricators/manufacturers of modular components in South-East, Nigeria, and a questionnaire was administered to them. Mean as a descriptive statistic was used to analyze the data collected for the study. The mean score was used to rank the respondent's opinions or responses obtained.

Table 1: Breakdown of Study Population

Registered building contractors and fabricators/manufactures of modules/components (Professional bodies)	Number of members in South-east Nigeria					
	Imo	Abia	Anambra	Enugu	Ebonyi	Total
Registered Builders (CORBON)	72	30	65	34	50	251
Registered Architects (ARCON)	80	25	30	40	30	205
Registered Quantity Surveyors (QSRBN)	30	25	35	50	22	162
Registered Engineers Structural(NIStructE)	30	27	25	45	25	152
Fabricators/Manufacturers of modules	8	6	-	-	5	19
Total						789

Source: Professional bodies state chapters' chairmen (2026).

Table 1 presents the breakdown of study population

Table 2: Summary of sample size

Professional bodies	**Sample size of members in South-East Nigeria**					
	Imo	**Abia**	**Anambra**	**Enugu**	**Ebonyi**	**Total**
Registered Builders (CORBON)	24	10	22	11	17	84
Registered Architects (ARCON)	27	9	10	13	10	69
Registered Quantity Surveyors (QSRBN)	10	8	12	17	7	54
Registered Structural Engineers (NIStr.E)	10	9	8	15	9	51

Fabricators/Manufacturers of Modules	3	2	0	0	2	7
Sample size					=	265

Source: Author's Fieldwork (2026)

Table 2: presents a summary of the population sample size. It shows the number of respondents for each professional association in each state in South-East Nigeria.

4. Result Presentation and Discussion

Bio Data of the Respondents

This section of the study analyzes the bio/demographic data of respondents. The demographic data includes: Respondent's designation, Academic qualification and Professional qualification, Type of organization and Years of experience of the respondents.

Table 3: Respondents' designation

Designation	**Number**	**Percentage %**
Registered builders	88	32.4
Registered Architects	72	26.5
Registered Quantity Surveyors	58	21.3
Registered Structural Engineers	49	18.0
Fabricators/Manufacturers of Modules	5	1.8
Total	272	100

Source: Authors Field Survey 2026

Table 3: shows that, 32.4 percent (32.4%) of the respondents were registered builders, 26.5 percent (26.5) were registered architects, 21.3 percent (21.3%) were registered quantity surveyors whereas 18 percent (18%) were registered structural engineers and 1.8 percent (1.8%) were fabricators/manufacturers of modules/components. This result shows that the respondents are professionals from different professions in the built environment. Therefore, there responses should be treated with utmost regard.

Table 4: Respondents years of experience

Years of Experience	Number	Percentage %
0 – 4	12	4.4
5 – 9	38	13.9
10 – 14	78	28.7
15 and above	144	52.9
Total	272	100

Source: Authors Field Survey 2026

From table 4, it can be seen that, 4.4 percent (4.4%) of the respondents had 0 – 4years work experience in built environment, 13.9 percent (13.9%) had 5 – 9 years' work experience, 28.7 percent (28.7%) had 10 - 14 years' work experience whereas 52.9 percent (52.9%) had 15 years and above work experience in the industry. This result shows that majority of the respondents had 15 years and above working experience in the built environment. It therefore, means that the respondents had acquired enough skills and experience in the built environment.

Table 5: Academic qualification of respondents

Academic Qualification	Number	Percentage %
Technican	10	3.7
HND & B.Sc/B.Tech	125	45.9
M.Sc/MBA/Ph.D	137	50.4
Total	272	100

Source: Authors Field Survey 2026

Table 5 above shows that, 3.7 percent (3.7%) of the respondents were Technicians, 45.9 percent (45.9%) of respondents had acquired HND& B.Sc/B.Tech qualifications, whereas, 50.4 percent (50.4%) of the respondents had acquired M. Sc/MBA and Ph. D qualifications. The result shows that greater percentage of the respondents was graduates and majority of the respondents were M. Sc/MBA & Ph. D qualification holders in built environment.

Table 6: Professional qualification of the respondents

Professional Qualification	Number	Percentage %
Graduate member	75	27.6
Corporate member	178	65.4
Fellow	19	6.9
Total	272	100

Source: Authors Field Survey 2026

From Table 6 above it was seen that, 27.6 percent (27.6%) of the respondents were Graduate member of different professional bodies in built environment, 65.4 percent (65.4%) of the respondents were corporate member of different professional bodies in built environment whereas 6.9 percent (6.9%) of the respondents were fellows of different professions in the built environment. The result shows that greater percentage of the respondents were corporate member of different professional bodies in Nigeria.

Table 7: Number of projects handled by the respondents

Projects	Number	Percentage %
1 – 5	10	3.7
6 – 10	22	8.1

11 – 15	66	24.3
Above 15	174	63.9
Total	272	100

Source: Authors Field Survey 2026

From table 7 above, it can be seen that 3.7 percent (3.7%) of the respondents had handled 1 – 5 number of projects since practicing in the industry, 8.1 percent (8.1%) of the respondents had handled 6 – 10 number of projects since inception, whereas 24.3 percent (24.3%) of the respondents had handled/constructed 11 – 15 projects since practicing in the built environment and 63.9 percent (63.9%) of the respondents had handled/executed over 15 projects since practicing in the industry. Therefore, the result shows that majority/greater percentage of the respondents had handled/executed over 15 projects since inception/practicing.

Table 8: Mean Responses of the Impact of Modular Construction in the Study Area

S/N	Impact of Modular Construction	SA 5	A 4	NO. 3	D 2	SD 1	Mean Score	RANKING
1.	Increase in Productivity	263	4	1	2	2	4.93	2nd
2.	Improved Cost Certainty of the final Project Cost	255	6	4	4	3	4.86	7th
3.	Efficient and Effective provision of Quantitative and Qualitative Housing Delivery (Provision of High Quality Standard Buildings)	265	3	1	2	1	4.94	1st
4.	Strict Adherence to Specifications	218	45	3	2	4	4.73	12th
5.	Improved Safety	258	11	1	1	1	4.93	2nd
6.	Reduced Waste	260	7	2	1	2	4.92	3rd
7.	Reduced Rework	238	25	1	5	5	4.75	11th

8.	Improved in Environmental Sustainability	258	9	1	2	2	4.91	4th
9.	Reduced Construction Delay	242	24	1	3	2	4.84	9th
10.	Absence of Surplus Ordering	224	16	13	15	4	4.62	14th
11.	Jobsite Improvement (Fewer Disruptions)	252	12	4	2	2	4.88	5th
12.	Lower Maintenance Cost	241	25	3	2	1	4.85	8th
13.	Improved Esthetic view of Buildings	250	10	5	5	2	4.84	9th
14.	Simplicity and ease in Construction Process	248	16	6	1	1	4.87	6th
15.	Improved Strength and Stability of Buildings	255	6	4	4	3	4.86	7th
16.	Elimination of Damage by handling Errors	218	45	3	2	4	4.73	12th
17.	Adequate Storage of Materials	228	26	4	9	5	4.70	13th
18.	Avoidance of Damages generated by poor Co-ordination with Trade	224	16	13	15	4	4.62	14th
19.	Good Relationship between Builders and Clients	238	24	6	2	1	4.83	10th
	Total						91.61	

Source: Authors Field Survey, 2026.

From the responses shown in table 8, it was revealed through ranking that the three most important impact of modular construction on housing delivery in the study area are Efficient and Effective Provision of Qualitative and Quantitative Housing Delivery (Provision of High Quality Standard Buildings) and was ranked first (1st) as the most important/significant impact of modular construction in the study area. Increase in Productivity (Time and Cost) and Improved Safety on site were ranked second (2nd), Reduced Waste of Materials on Site was

ranked third (3rd) Whereas, Adequate Storage of Materials, Absence of Surplus Ordering and Avoidance of Damages Generated by Poor Co-ordination with Trade were ranked least/lowest important/significant impact of modular construction on housing delivery.

5. Conclusion and recommendation

In conclusion, the study established that modular construction can enhance housing delivery through improved productivity, reduced construction time, better cost efficiency, enhanced quality control, improved site safety, minimized material waste, and greater environmental sustainability. These outcomes contribute to the efficient delivery of both qualitative and quantitative housing while promoting resource optimization and improved project performance.

The study recommends the following:

i. Stakeholders in building construction industry should implement targeted awareness and advocacy initiatives to improve understanding and acceptance of modular construction as a viable approach to housing delivery. This can be achieved through coordinated public engagement campaigns utilizing television, radio, and digital media platforms to disseminate information on the benefits and practical applications of modular construction.

ii. Professionals bodies within the built environment, particularly the Nigerian Institute of Building (NIOB), should organize seminar workshops aimed at training and educating their members- including contractors, subcontractors, and clients-on the benefits of modular construction as a means of achieving successful and sustainable project delivery. Such initiatives can contribute significantly to reducing the persistent housing deficit in society

iii. A call on the government, corporate bodies and financial institutions to encourage the professionals in building construction industry by providing financial incentive in form of grant scheme/subsidize loans to procure specialized machinery and equipment for effective production of modules and components in a large scale manufacturing.

iv. Stakeholders in building construction industry should ensure that modular construction is frequently/always utilize in the study area to minimize poor housing delivery experience with traditional/conventional methods; thereby achieved time efficiency, reduced waste, reuse and

recycling of building materials and components, delivery of high standard buildings and use of sustainable materials etc.

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