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**Enhancing Security in Residential Building through Architectural Approach: Improving Building Occupants' Safety through Additional Security Measures**

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**ABSTRACT:** *Insecurity is a crucial challenge confronting the Nigerian nation in recent time with dire consequences of deaths, vandalisms and reversals of developmental strides. This had left many homeless, traumatized and several communities deserted in search of safer habitations. Residential buildings being homes that hold valuables of people and cocoons offering shelter had been targets of perpetrators of insecurity which often takes the forms of stealing, banditry, kidnapping, farmer-herder clashes, terrorism and militancy. The various reports on insecurity suggested that there is a correlation between the architecture of buildings and safety of its occupants when they are confronted with security challenge. This spurs the study to explore how best architectural strategies can be deployed to enhance safety of building occupants. The study area was Lokoja, a city in North central Nigeria where many had suffered insecurity in their homes. A total of 122 questionnaires were circulated among different categories of home-users to obtain data for analyses which provided answers to the various research questions of the study. Finally, SPSS statistical tool was used for the descriptive statistical survey conducted to reveal the study's findings such as the need for additional security measures by respondents and a proof of significant association between the nature of security challenge and knowledge of building design. In conclusion, the study showed that insecurity will continued to be a trendy challenge among the home owners in the light proliferation of firearms and high rate of unemployment in the country.*

**KEY WORDS:** insecurity, residential buildings, safety measures, building units, movement

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## **INTRODUCTION**

Security is the state of being free from danger or threat while residential buildings are building typology that serves as dwelling places for people and their belongings. Hence it is expected to be a form of fortress serving as a cocoon for individuals and their valuables. They are expected to

offer safety, comfort and high sense of confidence in the buildings' ability to protect its occupants and contents.

As homes, residential buildings in their architecture are expected to be conceived as a cocoon offering comfort, privacy and security from any unexpected and uninvited intruder. Unfortunately, this is not the case in recent years across the country (Nigeria). This is against the backdrop of the spate of insecurity in the nation in recent years which often leave confusion, sadness, destruction and loss of monumental proportion in its wake. Nigerians had suffered different forms of insecurity in their homes ranging from stealing to terrorism with no sign of abating in sight of the high rate of insecurity in its various neighbourhoods from the north to the southern part of the country. The level of insecurity is so high in recent time in Nigeria that the United Nation report for 2021 rated the country as the third most terrorized nation in the world.

Residential buildings being physical entities that holds peoples' valuables and served as places of abodes had become targets for the criminal elements who perpetrate the various acts of insecurity whenever they are on prowl. This situation necessitate turning to the makers of buildings to rethink building design with the aim of making them and their occupants more saver. And as more would be expected of future buildings as responses to various challenges confronting the usage of architectural products, architects are expected to be at the center of any move made to drive solution to the challenge of insecurity in buildings in general and residential buildings in particular. Architecture being a profession that defined the aesthetics, firmness and functionality of buildings, the design of residential buildings will be needed to be programmed in ways that make its occupants saver and more likely to escape in case of any form of attack.

While the common forms of security measures incorporated into the architecture of buildings are acknowledged, more is required to confront the new forms of security challenges of present time. And even though they had been known to help mitigate the challenge of insecurity in buildings, there is a need to incorporate additional measures in order to improve security provisions through architectural design. The various buildings to be designed this way will most likely offer a higher level of safety and protection from any invader who would constitute threat and danger to buildings and their occupants.

The focus of this study will be how to design residential buildings that offer improved security measures incorporated in their architecture. The study will seek to know the level of safety offered by the commonly known security measures used in residential buildings in the study area; the correlation between buildings architectural design and occupants' safety when their facility is subject to attack and how to simulate by way of innovation improved security measures in buildings' architectural design. Questionnaires will be used to obtained data from building occupants who had been victims of insecurity in some selected neighbourhoods in the study area in recent time and their responses analyzed to answer the research questions.

The aim of this study is to reveal the need for architecturally designed buildings that has improved forms of security measures as innovative move to respond to the challenge of increase in the rate of insecurity in Lokoja community. While the following steps were taken to realize the aim

- To evaluate the viability of the available security measures in securing building occupants.
- To examine the correlation between buildings' architecture and occupants' safety.
- To identify additional security measures to be incorporated into building architecture.

## LITERATURE REVIEW

The 6<sup>th</sup> edition of Oxford Advanced Learner Dictionary defined security as the activities involved in protecting a country, buildings or persons against attack, danger etc. Merriam Webster Dictionary on the other hand defined security as the state of being protected or safe from harm or things done to make people or places safe. Again, Encyclopedia Britannica defined security and protection system as any of various means or devices designed to guard persons and property against a broad range of hazards, including crime, fire, accidents, espionage, sabotage, subversion and attack. Oxford Dictionary as well defined security as the state of being free from danger or threat. From the various definitions given by these sources, one can deduced that security is about protection from attack and it is what is expected of any setting, system or physical entity such as building to guarantee its sustainability and enhanced its utility value. Insecurity is a problematic issue capable of reversing the fortune of its victims and changing their prosperity into penury.

Building is one significant asset that is expected to offer functionality, aesthetic value and protection to its occupants. This can only be achieved in buildings that are safe and free from any form of attack. Ernst (2000) submitted that due regard must be given to security arrangement so that conflicts with access and egress in an emergency are resolved. He further revealed that the general principle applied in relation to means of escape is that it should be possible for building occupants to turn away from fire or threat and escape to a place of safety.

### State of Insecurity in Nigeria

The present state of insecurity in Nigeria is alarming and this had left most buildings susceptible to attack. The United Nation report on most terrorized nations in the world rated Nigeria as the third most terrorized country behind Afghanistan and Iran. This gives a clue on the level of insecurity in the nation which had left several persons in different neighbourhoods across the country endangered with several buildings vandalized in its wake. It is important that buildings generally are safe and residential buildings in particular are secured so as to ensure safety of lives and valuables of their occupants. Security is expected to be ensured in residential buildings which according to Olufemi (2020) are a building typology that is to be designed as fortress offering security and privacy from unwanted guests and shield from elements of weather. Jinadu (2007) also corroborated this submission by claiming that generally a functional and good house performs

the functions of providing shelter from weather elements, security against external attack, comfort and convenience for its inhabitants and support decent living.

News report on insecurity in Nigeria had remained trendy for the last twelve years with no end in sight as different insurgent groups sustained the reign of terror on helpless citizens. Olatunji (2021) revealed that one in every three Nigerians have plans to migrate out of the country because of insecurity of lives and properties, dilapidated economy, corruption and terrorism. He went further to claim that insecurity in the nation is growing exponentially as each day goes by. In his appraisal, he warned that nation's state of unrest will completely turn everywhere to miasma of bloodletting if vital steps are not taken. Aliyu (2021) also submitted that Nigeria is faced with an unprecedented wave of different but overlapping security crises- from kidnapping to extremist insurgencies- almost every corner of the country has been hit by violence and crime. Callister (2015) as well opined that insecurity and terrorism has been a major challenge to the Nigerian government in recent times.

### **Causes of Insecurity in Nigeria**

Edeh (2022) listed the following as causes of insecurity in Nigeria: bad governance, poverty, terrorism/kidnapping, weak judicial system, corruption, unemployment, poor security system, porous border and ethno- religious sentiments. George (2020) added high influx of arms, narcotics and political imbalance among Nigerians to the list of causes of insecurity in the country.

### **Forms of Insecurity in Nigeria**

Jihadist movement, clashes between herders and farmers, banditry and kidnapping, separatist insurgency and oil militancy were identified as various forms of insecurity presently confronting the Nigerian nation (Aliyu, 2021). These had created several Internally Displaced Persons' camps across the country. The most terrifying report on insecurity in recent time shows that Niger state experienced 220 banditry attacks with over 200 deaths in the first 17 days of the year 2022. In addition to the various forms of insecurity within the country, there are influx of marauding bandits from neighbouring countries like Cameroon, Niger Republic and Lake Chad (Chizitera, 2019).

### **Available Security Measures in Buildings**

The composition of building shows that it is made up of two basic parts which are sub-structure and super-structure (Olufemi, 2020). While the sub-structure is the part that is under the ground, the super-structure is the part above the ground that consists of walls, doors, windows, ceiling and roof which are the vulnerable portions that intruders usually attack to break through into the house. For this reason most security measures put in place to ensure the safety of building occupants and contents are on the super-structure in order to protect the vulnerable parts.

William (2019) stated that physical address actions that can be taken to protect buildings against intruders should be at three levels. The first is the outer perimeter then the inner perimeter and

lastly the interior spaces. He claimed that if one can implement two or three forms of security at each level then one will more likely have an effective physical security system. Janelle (2019) also stated that the 3Ds of security include 'Deter, Detect and Document'. Access control can be used to deter unwanted invaders from the building premises while alarm system and exterior security equipment can be used for detection. Video surveillance (CCTV) can be used to capture the documentation of activities of any intruder who breached the first two layers of security in buildings.

Janelle (2019) also asserted that adequate access control, effective camera monitoring, well managed door and window keys, well secured parking garage and adoption of culture that value security are measures that can be taken to ensure safety of building occupants and their valuables. Finally, BBC Premises Security Standard of 2020 stated that the boundary of premises is frequently defined by fence or wall and there may be multiple entry/ exit points. This, the authority claimed will act as the first line of defense against illegal incursion. The standard also claimed that design of buildings' perimeter must consider many factors to include lighting, access control, barriers, landscaping, car park, CCTV, perimeter alarms and fence.

### **Study Area**

The study area of this research work is Lokoja which is the capital city of Kogi State in North Central Nigeria. Lokoja served as administrative headquarter of Colonial government during the pre-independent era. This made Lokoja to have several relics of colonialism on its landscape till date. Lokoja later became headquarter of Lokoja Local Government Area under the old Kwara State. The transformation of the city continued in 1991 when Kogi state was created and Lokoja became its capital. The city presently served as home to Federal University Lokoja, which was created in 2010 and located at Adankolo but had its permanent site in Felele axis of the city at Crusher. Lokoja also had Kogi State Polytechnic, Felele Campus which was created in 1991 located along Lokoja-Abuja Federal Road beside Lokoja International market. Again, there is the Confluence stadium Lokoja and The Central Bank of Nigeria both found along Zone 8 axis in the City.

These are prominent physical features of development around which living quarters were built that swell up the population of the City. All these combined had made Lokoja had its experience of urbanization like most other Nigerian cities and as it is being rightly adduced in criminology that crime is part of every society, hence as the city of Lokoja grew in population and the daily activities within it spew into its suburbs, insecurity challenges also increased as well.

### **METHODOLOGY**

In order to understand the nature of security challenges in the study area and ascertained certain assumptions associated with them; data was obtained from primary source through interviews and

questionnaires. Individuals dwelling in the study area who had been victims of insecurity in their dwelling places are the respondents in this research work from which responses were obtained, collated and analyzed to make deductions that drive the various recommendations suggested. Moreover, literature that featured the works of previous researchers on security was reviewed for insight into the issue of security challenges and how architecture of buildings can be explored to militate against them.

### **Statement of Research Problem**

Insecurity had become a common problem in virtually every neighbourhood across the country with building occupants suffering unimaginable loss in its wake; this is calling for different approach in finding solution to the menace. Establishing a correlation between buildings' architecture and occupants' safety in the light of how buildings response to the various forms insecurity challenges called for incorporation of improved forms of security measures in buildings' architecture so as to produce safer buildings.

### **Research Questions**

The research work will attempt to answer the following questions in order clarified the need for a review of the existing security measures incorporated in residential buildings with the view to simulate by way of innovation additional architectural design strategies for enhancement of security in buildings generally and residential buildings in particular.

- Are the available security measures commonly used in buildings good enough to guarantee security of building occupants?
- Is there a correlation between buildings' architecture and building occupants' security?
- Is there a need for simulation of improved additional security measures to be incorporated in buildings' architecture?

## **RESULTS AND DISCUSSIONS**

Data was obtained from the study area (Lokoja) through the use of questionnaire that was designed to capture the reality of respondents' security challenge, available security measures in respondents' buildings and correlation between buildings' architecture and occupants' safety. 130 questionnaires were distributed out of which 122 returned in good form acceptable for analysis. The SPSS (IBM Version) statistical tool was used for analyses of the data collected and a descriptive statistical survey was conducted on the data to obtain the research findings.

The socio-demographic characteristics of the respondents show that they are all adults with a minimum of primary school certificate educational qualifications and as such in a good position to respond to the various questionnaire items that define the study.



**Table I: Age of Respondent**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 15-20 years	5	1.1	4.1	4.1
21-25 years	12	2.7	9.8	13.9
26-30 years	9	2.0	7.4	21.3
31-35 years	9	2.0	7.4	28.7
36-40 years	18	4.1	14.8	43.4
40+ years above	69	15.6	56.6	100.0
Total	122	27.6	100.0	

Authors 'Field Work (2022)

**Table II: Educational Qualification**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Primary	3	.7	2.5	2.5
Secondary	9	2.0	7.4	9.8
ND/HND	37	8.4	30.3	40.2
First Degree	24	5.4	19.7	59.8
Post Graduate	49	11.1	40.2	100.0
Total	122	27.6	100.0	

Authors 'Field Work (2022)

The nature of security challenge suffered by respondents in the study area include petty stealing, night/ day robbery, kidnapping, terrorism and some had suffered a combination of 2 or 3 of these in their house/ apartment.

**Table III: Nature of the challenge**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Petty stealing	38	8.6	31.1	31.1
Night/Day robbery	70	15.8	57.4	88.5
Combination of any 2 or more	14	3.2	11.5	100.0
Total	122	27.6	100.0	

Authors 'Field Work (2022)

None of the respondents had suffered kidnapping and terrorism but 38 (31.1%) of them had been victims of petty stealing, 70 (57.4%) of them had been robbed at night/ day time in their houses/ apartments while 14 of them which represent 11.5% had experienced both petty stealing and night/ day robbery.

This is a proof that there is a problem of insecurity in the houses/ apartments of the respondents in the study area that need attention to stem the tide.

#### Security Measures Obtained in Respondents Houses/ Apartments.

Despite the previous findings confirming the need for solution to pressing security challenge in the respondents' houses/ apartments, the following security measures are available in the said homes of the respondents: CCTV devices, fence/gate, security guard/ neighbourhood watch, entrance security doors, burglary proofs, exit, solid external walls and room closets.

The table below shows the number of each of the security measures available in the houses/ apartments of the respondents.

**Table IV: Security Measures Available in Respondents' Houses/ Apartments**

Security Measures	Number of Respondents	Percentage
CCTV Device	-	0%
Fence/Gate	80	65.5%
Security Guard/ Neighbourhood Watch	31	22.9%
Entrance Security Door	28	22.9%
Burglary Proofs	122	100%
Exit(s)	42	34.4%
Solid External Walls	122	100%
Room Closet	4	3.2%

Authors 'Field Work (2022)

The table shows that all the 122 respondents had burglary proofs and solid external walls in the houses, 80 of them had fence/gates, 31 are with security guard/neighborhood watch, 28 had entrance security door, 42 are with exit(s), and 4 had room closet security measures put in place to guide against security challenges in their houses/apartments. Meanwhile none of them had CCTV device installed in their home.

The implications of these are that all known security measures are not utilized in the respondents' houses/apartments which may be responsible for their vulnerability. Again, those with virtually all of these measures in place were still attacked which shows that there is need for more or a different approach to security provision in the respondents' houses/ apartments.



**Correlation Result****Table V: Correlations**

	House unit arrangement supported safety	Other aspects of building design that aid safety
House unit arrangement supported safety	1	.187*
Pearson Correlation		
Sig. (2-tailed)		.040
N	122	122
Other aspects of building design that aid safety	.187*	1
Pearson Correlation		
Sig. (2-tailed)	.040	
N	122	442

\*. Correlation is significant at the 0.05 level (2-tailed).

The table above is obtained by finding the correlation between building architecture and occupants' safety using the correlation tab of the Descriptive statistics in SPSS App. The result shows there is significant correlation between building's architecture and occupants' safety. This is because at 0.040 in a 2-tailed significant co-efficient table, the observed figure is less than the bench mark of 0.05.

This answered the second research question of the study and shows the realization of the second objective. The last table is the crosstab showing relationship between two variables of the nature of security challenge and knowledge of building design. The table shows that there is a significant association between the natures of security challenge and knowledge of building design. The Chi-square result of P value 0.000 put the X value at 54.747.

This means that insecurity problems like petty stealing, Night/ Day robbery and combination of 2 or 3 of them will be on the rise with increase in the level of knowledge of building design possessed by criminals. A building whose architectural design is known is an insecure building hence caution must be taken not to expose buildings' design and layout to any would-be invader.

**Chi Square or Crosstab Result****Table VI: Nature of the challenge \* Knowledge of building design Crosstabulation**

			Knowledge of building design			Total
			Yes	No	Maybe	
Nature of the challenge	Petty stealing	Count	37	1	0	38
		% within Knowledge of building design	54.4%	4.8%	0.0%	31.1%
	Night/Day robbery	Count	28	20	22	70
		% within Knowledge of building design	41.2%	95.2%	66.7%	57.4%
	Combination of any 2 or more	Count	3	0	11	14
		% within Knowledge of building design	4.4%	0.0%	33.3%	11.5%
Total	Count	68	21	33	122	
	% within Knowledge of building design	100.0%	100.0%	100.0%	100.0%	

Authors' field work (2022)

**CONCLUSION AND RECOMMENDATIONS**

Residential buildings are dwelling places of individuals where their valuables are kept, hence every effort in spending and studying is necessary to be deployed to ensure safety and protection. However, it is obvious that with the current 16% rate of unemployment, porous borders and reported 178,459 firearms missing in the armory of the Nigerian Police as at 2018, security threats will remain with us for years to come, hence the need to tackle the menace through any means possible has become necessary.

Based on findings from the study, the following are recommended solutions to improve security in residential buildings and enhanced safety of buildings' occupants.

- Screening compartment should be attached to the entrance door in order to create double layer of entrance.
- Viewing hole(s) should be inserted in strategic walls in the house to enhance viewership and proper monitoring of the interior space.
- The use of split level to halt hasty movement should be adopted in designing residential buildings.
- Zoning of building units to achieve privacy and restrain movement of visitors from private area in the house should be encouraged to boost security.
- Designers, development authority and building owners/ occupants should be security conscious in building production, approval process and usage respectively.
- Appropriate burglary proof design patterns with closely netted bars should be used to secure openings (such as windows and doors) on building walls.

- Complete deployment of all known security measures in buildings to achieve full security.

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