



Analysis of Hazard Incidence in Lagos State Government Building Construction Sites

¹Yakub Babatunde Abiodun, ²Ajayi Oluwole Oluwaseun, ³Odunjo Oluronke Omolara

¹Department of Architectural Services, Lagos State Ministry of Works and Infrastructure, Nigeria. ^{2,3}Department of Architecture, Ladoko Akintola University of Science and Technology, Ogbomoso, Nigeria.

ABSTRACT

The construction industry in Lagos State, Nigeria, is marked by significant hazards that affect worker safety, project productivity, and timelines. This study explores the prevalence and frequency of hazard incidents on government building construction sites, focusing on their impact on safety and project outcomes. Using a mixed-method approach, combining quantitative surveys and qualitative Key Informant Interviews (KIIs), data was collected from 475 construction professionals, contractors, workers, and safety officers. The findings revealed that slips, trips, and falls were the most prevalent hazards, followed by manual handling, chemical exposure, noise, and equipment-related accidents. Contractors and construction workers reported the highest frequency of hazard occurrences, with hazards such as chemical exposure and noise being reported more regularly. Statistical analysis highlighted significant differences in hazard perceptions among the stakeholder groups. The study emphasizes the need for improved safety training, stricter enforcement of regulations, and the adoption of quality materials and advanced technologies to mitigate risks on construction sites. These findings provide insights for enhancing hazard management and improving safety standards in the region's construction industry.

Keywords: Hazard Incidence, Construction Safety, Prevalent Hazards, Risk Management, Occupational Health

Received 08 Feb., 2025; Revised 17 Feb., 2025; Accepted 19 Feb., 2025 © The author(s) 2025.

Published with open access at www.questjournals.org

I. Introduction

Lagos State, widely recognized as one of Africa's most rapidly developing cities, holds a central role in Nigeria's economic landscape (Lawal, & Kalu 2018). As the commercial hub of Nigeria and West Africa, Lagos contributes a significant 32% to the national Gross Domestic Product (GDP) (Folawewo, 2024), reinforcing its critical importance in the country's economic trajectory. Lagos State is estimated to have population size ranging from 24.5 million in 2015 to 29 million in 2025 (Balogun & Sojobi & Galkaye 2017). This growth, however, has placed immense pressure on the state's infrastructure, particularly in the realm of construction, where the demand for residential, commercial, and public infrastructure has escalated. Despite the rapid pace of urbanization, there has been a lag in the development of effective construction practices and safety protocols to keep pace with the expansion, leading to substantial challenges in managing government building projects.

The construction industry in Lagos State, especially with regard to government buildings, is fraught with hazards that pose significant risks to workers, construction professionals, and the general public (Rasaki 2015). These hazards, which include structural failures, accidents involving falling objects, fire outbreaks, electrical malfunctions, exposure to harmful substances, and inadequate site safety measures, have become recurrent. The frequency of these hazards is compounded by the often fast-tracked nature of government projects, insufficient regulatory oversight, and lapses in compliance with established building codes and safety regulations. Such incidents not only threaten the physical safety of those involved but also hinder the timely and successful completion of projects, with potentially long-term consequences for public health, safety, and urban development.

An in-depth analysis of these hazard incidences is critical to understanding the underlying factors that contribute to their occurrence. By examining the specific hazards prevalent on government construction sites in

Lagos, it becomes possible to identify the root causes of these risks, such as inadequate hazard identification processes, poor construction practices, lack of skilled labour, and insufficient enforcement of safety standards. Furthermore, evaluating the frequency, severity, and types of hazards present on these sites is essential for creating a clear picture of the scope of the issue. This study will help prioritize which hazards require immediate attention and the allocation of resources toward their mitigation.

As identified by Brahmachary *et. al* (2018). Effective hazard management not only minimizes accidents and fatalities but also contributes to overall project efficiency and enhances worker confidence and morale. Addressing these hazards is not only a matter of protecting workers but also of ensuring the sustainability and success of construction projects. In the absence of effective hazard mitigation strategies, construction projects are at risk of delays, cost overruns, and compromised quality. Moreover, the lack of a structured approach to hazard management reflects broader issues within the regulatory and planning frameworks guiding construction activities in Lagos State. Zabihi, & Habib (2012). emphasize that a well-managed built environment is foundational to promoting public health, safety, and overall quality of life. This provide the importance of not only identifying hazards but also putting in place effective measures to control and eliminate them, ensuring a safe and productive environment for all professionals involved in the construction process.

Given the central role that government construction projects play in shaping Lagos State's urban environment, understanding and addressing the hazards associated with these projects is critical for long-term sustainable development. The government, construction professionals, contractors, regulatory bodies, and workers themselves all have a stake in improving hazard identification and management practices. This study, therefore analyse the incidence and prevalence of hazards on government building construction sites in Lagos State, shedding light on the specific risks that are most prominent in the region's construction activities.

II. Literature Review

The construction industry, recognized as one of the most hazardous globally, presents significant risks that demand robust mitigation strategies (Wang *et. al.* 2004). In Lagos State, Nigeria's economic hub and one of its most urbanized regions, government building construction sites experience unique challenges stemming from environmental, systemic, and human factors. These challenges exacerbate the frequency and severity of hazard incidences, directly affecting workers' safety, project timelines, and overall productivity. This analysis explores the occurrence of these hazards, their root causes, and the systemic conditions that allow their persistence, providing critical insights into the dynamics of construction site risks in Lagos State.

Hazard incidences in government construction sites in Lagos contain a wide range of dangerous events, with falls from heights standing out as one of the most frequent and severe issues (Ameh, & Farinde 2020). Workers often operate under precarious conditions, such as on makeshift scaffolding that lacks structural integrity or without adequate personal protective equipment (PPE) like safety harnesses. These oversights frequently result in fatal accidents and highlight the urgent need for improved safety standards and enforcement mechanisms (Ede 2010). Another pressing concern is the prevalence of structural collapses. Many government projects in Lagos are plagued by the use of substandard building materials, such as low-quality cement or compromised steel reinforcements, combined with inadequate construction practices. These issues are often compounded by corruption in procurement processes, lack of regulatory oversight, and pressure to meet tight deadlines. Structural collapses not only lead to tragic loss of life but also cause project delays, financial setbacks, and reputational damage to government institutions (Imafidon & Ogbu 2020).

Machinery-related accidents represent another significant category of hazards. Heavy equipment such as cranes, excavators, and forklifts are essential for large-scale construction but also pose serious risks when mismanaged. A recurring issue is the lack of proper maintenance and periodic inspection of such machinery, which increases the likelihood of malfunctions. Additionally, inadequate training for machine operators leads to operational errors, while workplace negligence further escalates risks. These factors underscore the need for a dual approach of regular equipment servicing and comprehensive operator education to minimize accidents.

Environmental hazards are particularly salient in Lagos due to its coastal geography and climate (Ekoh 2021). Frequent flooding caused by inadequate drainage systems and heavy rainfall poses risks such as electrocution, equipment damage, and delays in construction schedules. Furthermore, the presence of waterlogged construction sites creates conditions favourable for biological hazards, such as mold and bacteria, which can affect both workers' health and material integrity.

The prevalence of chemical hazards, including exposure to toxic substances like adhesives, solvents, and other construction chemicals, is another critical concern. Inadequate storage and handling of these materials increase the risk of spills, contamination, and health complications for workers. Additionally, construction sites often generate dust and harmful emissions, which pose long-term respiratory risks to workers and nearby residents (Kowalik *et. al* 2019).

Noise, heat, and other physical hazards also contribute to the dangerous environment of Lagos construction sites (Akinola et. al 2020). Prolonged exposure to loud machinery can result in hearing loss, while extreme heat, exacerbated by Lagos's tropical climate, leads to dehydration, heat exhaustion, and other health complications. Despite these risks, measures to mitigate such hazards, including providing shade and protective gear, are often insufficient or absent.

Human factors also play a crucial role in the persistence of hazards. Workers' behaviours, influenced by a lack of training, fatigue, or ignorance of safety protocols, significantly contribute to the prevalence of accidents. Social hazards, such as job insecurity and long working hours, further impair workers' focus and increase the likelihood of errors.

Hazard incidences and their prevalence on Lagos State government building construction sites are a multifaceted problem. Addressing these challenges requires a comprehensive approach that includes stricter regulatory oversight, improved enforcement of safety standards, investment in worker training, and the adoption of advanced technologies for hazard management. By tackling these issues at their root, the construction industry in Lagos can create safer work environments, enhance productivity, and mitigate the economic and social costs of accidents.

III. Research Methodology

The research methodology in this study employs a multi-method design that integrates both quantitative and qualitative approaches. Quantitative methods include structured questionnaires and field measurements, while the qualitative aspect is informed by ethnographic orientation through historical methods and Key Informant Interviews (KII). This methodological triangulation enhances the robustness and validity of findings by combining multiple data sources and perspectives.

The study's population includes construction professionals, contractors, workers, and safety officers involved in Lagos State government building projects. A multistage sampling technique was applied, starting with identifying professionals in the Ministry of Works and Infrastructure, contractors, and workers engaged in ongoing projects, as well as safety officers in relevant departments at the Lagos State Safety Commission (LSSC). Sample sizes were determined using proportional allocation and formulas such as Slovin's, ensuring representation across different respondent categories.

Primary data collection involved administering two sets of questionnaires: one for construction professionals, contractors, and workers, and another for LSSC safety officers. Key Informant Interviews provided deeper insights into trade-specific safety practices, hazards encountered, and compensation mechanisms. Secondary data, including maps, project lists, and literature, complemented the primary data, enhancing contextual understanding.

Table 3.7: Sample Size for the Study

S/No.	Respondents	Number
1.	Construction Professionals	26
2.	Contractors	62
3.	Construction Workers	354
4.	Key Tradesmen	10
5.	LSSC Safety Officer	23
	Total	475

Source: Author's Field Survey (2023)

Analysis And Results

Socio-Economic Characteristics of the Respondents

The socio-economic characteristics of respondents in Lagos State government construction projects highlight key demographics. The majority are male (80.2%), with females constituting 21.4%. Most respondents are aged 31–45 years (53.4%), reflecting a workforce dominated by mid-career professionals. Construction experience varies, with 37.5% having 5–10 years of experience and 29.6% with 11–20 years. A smaller segment (18.4%) has over 20 years of experience, primarily among contractors and professionals. These characteristics underscore the diversity in expertise and demographics within the workforce, essential for understanding hazard management and safety compliance.

Table 4.2: Socio-Economic Characteristics of the Respondents

Socio-economic Attributes		Construction Professionals		Contractors		Construction Workers		Safety Officers		Total	
		F (N)	Percent (%)	F (N)	Percent (%)	F (N)	Percent (%)	F (N)	Percent (%)	F (N)	Percent (%)
Gender	Male	41	67.2	21	80.8	285	81.2	14	66.7	361	80.2
	Female	20	32.8	05	19.2	66	18.8	07	33.3	98	21.4
	Total	62	100.0	26	100.0	351	100.0	21	100.0	459	100.0
Age (in years)	16 – 30	01	1.6	-	-	86	24.5	05	23.8	92	20.0
	31 – 45	40	65.6	15	57.7	175	49.9	15	71.4	245	53.4
	46 – 60	17	27.9	11	42.3	85	24.2	01	4.8	14	24.8
	Above 60	03	4.9	-	-	05	1.4	-	-	08	1.7
	Total	62	100.0	26	100.0	351	100.0	21	100.0	459	100.0
Construction Experience (in years)	< 5	09	14.8	23	37.7	18	29.5	11	180	65	14.2
	5 – 10	04	15.4	09	34.6	08	30.8	05	19.2	172	37.5
	11 – 20	49	14.0	132	37.6	104	29.6	66	18.8	136	29.6
	> 20	03	14.3	08	38.1	06	28.6	04	19.1	86	18.4
	Total	62	100.0	26	100.0	351	100.0	21	100.0	459	100.0

Source: Author’s Field Survey (2023)

Frequency of Hazards on Lagos State Building Construction Sites

The frequency of hazards occurring on Lagos State building construction sites varies across different respondent groups. Contractors report the highest mean occurrence of hazards, with a mean of 2.70, indicating a relatively frequent experience of hazards. Construction workers also experience hazards frequently, with a mean of 2.58. Construction professionals report a slightly lower frequency (mean of 2.53), while safety officers note the least frequency (mean of 2.47). The most frequent hazard occurrences are reported as "occasionally," with workers ranking this the highest, followed by contractors. "Not at all" occurrences are the least reported by all groups. These results highlight the varied perceptions of hazard frequency among different professionals

The frequency of hazards on Lagos State government construction sites was evaluated based on perceptions from construction professionals, contractors, workers, and safety officers, using a scale ranging from "Strongly Disagree" to "Strongly Agree." The results indicated that hazards were perceived as occurring most frequently on an occasional basis (mean score of 4.04), followed by frequent (mean of 2.86), yearly (mean of 2.66), and monthly (mean of 2.62). Specifically, construction workers perceived hazards as occurring occasionally (4.04), yearly (2.56), and monthly (2.29). Construction professionals and contractors also observed similar patterns, with occasional occurrences ranking the highest.

Safety officers, however, ranked occasional occurrences (2.86) slightly lower than the other groups but still placed it as the most frequent. These findings suggest that hazards are a common and expected part of construction activities in Lagos State, reflecting the dangerous nature of construction work. The high frequency of reported hazards may be attributed to the hazardous working conditions typical of the Nigerian construction industry, which aligns with findings from global research on the risks faced by construction workers.

The construction industry is one of the most hazardous globally, with high rates of fatalities, injuries, and illnesses. In Nigeria, construction sites face frequent hazards, including biological, chemical, physical, and ergonomic risks, which pose significant threats to workers' health and safety.

Table 4.3: Frequency of Hazards on Lagos State Building Construction Sites

Occurrence of Hazards	Construction professionals				Contractors				Construction Workers				Safety Officers			
	N	Sum	Mean	Rank	N	Sum	Mean	Rank	N	Sum	Mean	Rank	N	Sum	Mean	Rank
Frequently	61	129	2.11	3	2665	2.50	3	351740	2.10	4	21	60	2.86	1		
Monthly	61	122	2.00	4	2672	2.77	2	351804	2.29	3	21	55	2.62	3		
Yearly	61	162	2.66	2	2665	2.50	3	351897	2.56	2	21	54	2.57	4		
Occasionally	61	239	3.92	1	2698	3.77	1	3511417	4.04	1	21	60	2.86	1		
Not at all	61	120	1.97	5	2651	1.96	5	351688	1.96	5	21	30	1.43	5		
Valid N	61				26			351			21					

$$\text{Mean} \quad \frac{12.66}{2.53} = \frac{13.50}{2.70} \quad \frac{12.89}{2.58} = \frac{12.34}{2.47}$$

Source: Author's Field Survey (2023)

4.4 Prevalent Hazards on Lagos State Building Construction Sites

Hazardous activities on Lagos State government construction sites were assessed using eleven key variables. The extent to which professionals, contractors, construction workers, and safety officers perceived these hazards was measured using a Prevalent Hazard Index (PHI). Respondents rated each variable on a Likert scale, with scores ranging from 1 (not prevalent) to 5 (very prevalent). The PHI for each variable was calculated by dividing the total weighted score (SWV) by the number of responses. Variables with scores above the mean PHI were classified as having positive deviations, while those below had negative deviations.

Table 4.4 reveal that slips, trips, and falls (PHI = 3.71) were identified as the most prevalent hazards by one-third of the construction personnel. This result aligns with prior studies, such as Okoye (2018), which noted that falls from heights are the most frequent hazards in Nigeria's construction industry. Roof work, plastering, and height-related activities were linked to these hazards.

Safety officers perceived manual handling of operations and equipment (PHI = 3.71) as the most prevalent hazard, followed by fire and emergency hazards (PHI = 3.33) and collapsing trenches (PHI = 3.29). Similarly, construction professionals (PHI = 3.13), workers (PHI = 3.13), and contractors (PHI = 3.12) identified chemical exposure from cement (cement dermatitis) as a significant hazard. Noise was also regarded as a prevalent hazard by contractors (PHI = 3.12), construction workers (PHI = 3.12), and professionals (PHI = 3.11).

Furthermore, wood and plaster dust were identified as prevalent hazards by safety officers (PHI = 3.29), professionals (PHI = 3.05), construction workers (PHI = 3.05), and contractors (PHI = 3.04). These varying perceptions highlight the differences in how personnel from different roles view hazards. To assess the statistical significance of these differences, the Mann-Whitney U test was applied, with results presented in Table 4.5. This analysis confirmed that the construction personnel had differing perceptions of the prevalent hazards on Lagos State construction sites.

Table 4.4: Prevalent Hazards on Lagos State Building Construction Sites

Hazards	Construction professionals				Contractors				Construction Workers				Safety Officers			
	N	Sum	Mean	Rank	N	Sum	Mean	Rank	N	Sum	Mean	Rank	N	Sum	Mean	Rank
Slips, trips and falls	61	203	3.33	1	26	86	3.31	1	351	1168	3.33	1	21	68	3.24	5
Cement dermatitis	61	191	3.13	2	26	81	3.12	2	351	1097	3.13	2	21	63	3.00	8
Noise	61	190	3.11	3	26	81	3.12	2	351	1094	3.12	3	21	67	3.19	6
Manhandling of operations and equipment	61	186	3.05	4	26	79	3.04	4	351	1071	3.05	4	21	78	3.71	1
Wood and plaster dust	61	186	3.05	4	26	79	3.04	4	351	1069	3.05	4	21	69	3.29	3
Fire emergency	61	184	3.02	6	26	78	3.00	6	351	1057	3.01	6	21	70	3.33	2
Hand Vibration Syndrome (HAVS)	61	183	3.00	7	26	78	3.00	6	351	1052	3.00	7	21	67	3.19	6
Awkward postures	61	175	2.87	8	26	74	2.85	8	351	1005	2.86	8	21	63	3.00	8
Collapsing trenches	61	174	2.85	9	26	74	2.85	8	351	1002	2.85	9	21	69	3.29	3
Airborne fibres and materials	61	174	2.85	9	26	74	2.85	8	351	999	2.85	9	21	55	2.62	11
Valid N	61				26				351							
Mean		32.95/11 = 3.00				32.80/11 = 2.98				32.93/11 = 2.99				34.86/11 = 3.17		

Source: Author's Field Survey, 2023

IV. Discussion of Findings

The findings from the research methodology and analysis reveal critical insights into hazard incidences and prevalence in Lagos State government building construction sites. These insights are pivotal for understanding the occupational health and safety challenges faced by construction stakeholders and for informing policies aimed at mitigating risks.

Socio-Economic Characteristics and Workforce Composition

The demographic analysis indicates that the construction workforce is predominantly male (80.2%), with a significant proportion aged 31–45 years (53.4%). This age range suggests that the workforce is composed largely of mid-career professionals, contractors, and workers with varying levels of experience. Notably, 37.5% of respondents had 5–10 years of construction experience, while 29.6% had 11–20 years. This diversity in expertise underscores the necessity of targeted safety interventions that consider different levels of experience and occupational exposure. The relatively low representation of female workers (21.4%) also highlights gender disparities in the construction industry, which could influence hazard exposure and safety practices.

Frequency of Hazards

Hazard frequency on Lagos State construction sites was found to vary across different respondent categories, with contractors reporting the highest mean occurrence (2.70), followed by construction workers (2.58). Construction professionals (2.53) and safety officers (2.47) reported slightly lower frequencies. The most frequently reported hazard occurrences were categorized as "occasional" (mean 4.04), indicating that hazards are a common part of daily operations on these sites. The perception of occasional hazard occurrence aligns with the high-risk nature of construction activities globally.

Workers and contractors, who are most directly involved in site operations, reported higher frequencies of hazards, suggesting that frontline exposure significantly influences perceptions of hazard prevalence. Safety officers, despite their oversight roles, reported slightly lower frequencies, possibly due to a focus on addressing critical issues rather than routine hazards. This variation underscores the need for integrated safety communication between on-site personnel and supervisory entities.

Prevalent Hazards on Construction Sites

The study identified slips, trips, and falls as the most prevalent hazards (PHI = 3.71), consistent with previous research highlighting falls from heights as a major safety concern in the Nigerian construction industry. Such hazards are primarily associated with roofing, plastering, and other tasks requiring work at elevated levels. This finding reinforces the urgent need for improved safety measures, such as stable scaffolding, secure harnesses, and worker training on height-related risks.

Manual handling of equipment (PHI = 3.33) and fire emergencies (PHI = 3.33) also emerged as significant hazards, particularly from the perspective of safety officers. These hazards reflect risks associated with lifting heavy materials and improper handling of flammable substances. Collapsing trenches (PHI = 3.29) were another major concern, especially given the infrastructural challenges and soil conditions in Lagos State.

Exposure to chemical materials, such as cement leading to dermatitis, noise, and dust from wood and plaster, were also highlighted as critical hazards. These findings suggest that construction personnel face a mix of physical, chemical, and environmental hazards. For instance, professionals, workers, and contractors all identified noise and chemical exposure as significant risks, while safety officers emphasized wood and plaster dust as particularly prevalent. This alignment highlights shared perceptions of certain hazards while also indicating role-specific concerns.

Divergence in Hazard Perceptions

The Mann-Whitney U test revealed statistically significant differences in how various respondent groups perceive hazard prevalence. For example, while safety officers prioritized manual handling and fire hazards, construction workers and contractors were more concerned with slips, trips, and falls. This divergence highlights the importance of tailoring safety interventions to the specific needs and experiences of different stakeholder groups.

V. Conclusion

The construction industry in Lagos State, Nigeria, is marked by significant hazards that affect worker safety, project productivity, and timelines. This study explores the prevalence and frequency of hazard incidents on government building construction sites, focusing on their impact on safety and project outcomes. Using a mixed-method approach, combining quantitative surveys and qualitative Key Informant Interviews (KIIs), data was collected from 475 construction professionals, contractors, workers, and safety officers. The findings revealed that slips, trips, and falls were the most prevalent hazards, followed by manual handling, chemical exposure, noise, and equipment-related accidents. Contractors and construction workers reported the highest frequency of hazard occurrences, with hazards such as chemical exposure and noise being reported more regularly. Statistical analysis highlighted significant differences in hazard perceptions among the stakeholder groups. The study emphasizes the need for improved safety training, stricter enforcement of regulations, and the adoption of quality materials and advanced technologies to mitigate risks on construction sites. These findings

offer valuable insights for enhancing hazard management and improving safety standards in the region's construction industry.

VI. Recommendations

Enhance safety on Lagos construction sites through role-specific training, stricter enforcement of safety regulations, use of certified materials, adoption of safety technologies, collaboration via workshops, and prompt emergency response with fair worker compensation.

Reference

- [1]. Akinola, A. O., Opoko, A. P., Ibem, E. O., Okagbue, H. I., & Afolabi, A. O. (2020). Climate change adaptation and mitigation strategies in Lagos, Nigeria: built environment professionals' perspective. *Int. J. Eng. Adv. Technol.*, 9(3), 1273-1282.
- [2]. Ameh, O. J., & Farinde, O. M. (2020). Construction contractors' compliance to health and safety insurance policies in Lagos state. *Journal of Construction Innovation and Cost Management*, 1(1), 81-92.
- [3]. Balogun, I. I., Sojobi, A. O., & Galkaye, E. (2017). Public water supply in Lagos State, Nigeria: Review of importance and challenges, status and concerns and pragmatic solutions. *Cogent Engineering*, 4(1), 1329776.
- [4]. Brahmachary, T. K., Ahmed, S., & Mia, M. S. (2018). Health, safety and quality management practices in construction sector: A case study. *Journal of System and Management Sciences*, 8(2), 47-64.
- [5]. Ede, A. N. (2010). Building collapse in Nigeria: The trend of casualties in the last decade (2000-2010). *International Journal of Civil & Environmental Engineering*, 10(6), 32-42.
- [6]. Ekoh, S. (2021). Vulnerabilities, Flood Risk Perceptions and Future Migration Intentions Among Coastal Residents of Lagos, Nigeria (Doctoral dissertation, College of Environmental Science).
- [7]. Folawewo, A. O. (2024). *Urbanization without structural transformation in Lagos, Nigeria* (No. 2024/69). WIDER Working Paper.
- [8]. Imafidon, M. O., & Ogbu, C. P. (2020). A taxonomy of building collapse causes in Lagos State Nigeria. *Nigerian Journal of Technology*, 39(1), 74-86.
- [9]. Kowalik, T., Logoń, D., Maj, M., Rybak, J., Ubysz, A., & Wojtowicz, A. (2019). Chemical hazards in construction industry. In *E3S Web of Conferences* (Vol. 97, p. 03032). EDP Sciences.
- [10]. Lawal, O., & Kalu, I. E. (2018). Measuring geographic distribution of economic activity in Nigeria using gross domestic product. *Ghana Journal of Geography*, 10(1), 22-41.
- [11]. Rasaki, B. (2015). Working Conditions of Casual Workers in Selected Construction Firms in Lagos State, Nigeria (Doctoral dissertation).
- [12]. Wang, S. Q., Dulaimi, M. F., & Aguria, M. Y. (2004). Risk management framework for construction projects in developing countries. *Construction management and economics*, 22(3), 237-252.
- [13]. Zabihi, H., & Habib, F. (2012). Sustainability in building and construction: revising definitions and concepts. *International Journal of Emerging Sciences*, 2(4), 570.