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Aim and Scope

Tropical Journal of the Built Environment (TJBE) is a biannual publication of high-quality peer reviewed journal that is published by the College of Environmental Sciences, Joseph Ayo Babalola University (JABU), Nigeria. Tropical Journal of the Built Environment provides a platform where academics and built environment professionals can publish well-researched empirical and theoretical papers on issues related to the built environment. TJBE encourages prospective authors to submit original articles that offer feasible solutions and planning implications for improving the environment.

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Editorial

The publication of Tropical Journal of the Built Environment (TJOBE) Volume 3 Number 2 marks a significant growth of the Journal and the College of Environmental Sciences. This edition of TJOBE reinforces the acceptance of the journal within the academic sphere. The papers in this edition cover a wide range topics and issues affecting the built environment and the society at large. The authors in this issue displayed good understanding of their field of specialization and current trends in research.

The first article by Babalola, et al examined barriers affecting the adoption of Lean Practices (LPs) in Nigeria's building industry. A quantitative research method was adopted, using the survey approach with structured questionnaires administered to various firms in the Nigerian building industry. Findings from this study revealed that barriers to the adoption of LPs in the Nigerian building industry are of two important categories, as the knowledge and support-related barriers were revealed not to limit the adoption of LPs in the Nigerian building industry. The authors recommended that stakeholders view these barriers and others as important to aid the efficient adoption of LPs in Nigerian building industry.

Shittu, et al, in the second paper evaluated the influence of insurance policy on the costs of accidents in medium-sized construction projects in Minna, Niger State. The study adopted a quantitative research approach. The major findings from the study were that the relationship between level of implementing insurance policy and costs of accidents was significant, and the most effective strategy for improving level of implementing insurance policy was "Designation of safety responsibilities to trained personnel". It concluded that the influence of insurance policy on the costs of accidents in medium-sized construction projects in Minna, Niger State is significant.

The third article by Aluko, et al., discussed Dynamics of Windows for Effective Daylighting Design Strategies in Academic Library. The findings revealed that for these to be effective daylighting through the use of windows in the library, the placement, orientation, shading devices, material size, height and the surrounding environment must be given adequate consideration. The study concluded that effective daylighting strategies in libraries require the designers to consider daylighting right from the conceptual development of the design stage, to effectively harness as much natural light as required into the building.

Impact of Gully Erosion on Housing Accessibility: A Case of Ibadan Core Settlements was the fourth article and it examined the causes of gully erosion and its impact on housing accessibility within Ibadan metropolis. The study found anthropogenic and natural factors as the major cause of gully erosion in the area. The impact of gully erosion identified was directly on the environment which include soil loss degenerating into serious threat on accessibility to residential homes, destruction and damages of roads, pedestrian bridge and excavation of landscape. The study recommended that more awareness be created on proper management and maintenance of drainage channels/culverts within the study area.

The fifth article was on Users' Satisfaction with the Condition of Hard Services in an Office Building in Abuja, Nigeria by Buhari et al. The findings from the study indicates that the level of satisfaction derived from a system is directly proportional to its performance. The influence of each of the air conditioners, furniture, the generator, the floor finishes and the sanitary fittings on the productivity is high while the wall finishes, ventilation system, lift system and the lighting systems only average. The conclusion from the study is that there is a direct relation between the condition of the hard services in a building, the level of

satisfaction of the users and consequently their output

Nuhu et al. in the sixth article discussed Benefits of Rural Urban Linkages in the Context of Rental Trends: Evidence from Gidan Kwano Area of Minna, Nigeria. The paper evaluated the symbiotic relationship in the rural urban linkages in the context of Gidan Kwano rental market, with a view to isolating the probable shared gains in the linkages. The identified properties are those in occupation with evidence of over five years' rental inflows. The study found that, under social benefit, health services and educational attainments are highest with 39% and 141% impacts respectively. It further revealed improvement in real property marketability, improved land use development among other factors.

The seventh paper by Ogunleye, et al., examined airport facilities management performance through the formulation of KPIs. They examined the KPIs for efficient facility management in Nigeria using structured questionnaire administered to the Facility Managers. The study concluded that assessment, implementation and review of KPIs has been found to be a subtly effective strategy to improving airport operational performance, standards, benchmarking, and best practices in facility management. It was recommended that airport operators, Facility Managers and the Government Agencies charged with the management and administration of airports should take a keen consideration of the different KPIs.

Impact of COVID-19 Pandemic on the Procurement Process of Public Construction Projects in Kaduna, Nigeria is the 8th paper. It evaluated the impact of COVID-19 pandemic on the procurement process of public construction projects in Kaduna. The study revealed that the procurement activity most likely to be affected by COVID-19 pandemic is: "Tender opening information" (RII = 0.90); the most significant impact of COVID-19 pandemic on the success of the procurement process is "Delays in procurement process" (RII = 0.91). The

major recommendation from the study was that Government should develop a mechanism for enhancing the timely completion of procurement process amidst the wave of COVID-19 pandemic or related world health issues in public construction projects using the components of the strategies proposed in this study as a basis

Odumosu, et al., in the ninth paper discussed Spectral Analysis of Lead Tailings in Topsoil. The study used three different geospatial approaches of processing satellite imageries - a modified Kaufmann's relation, self-developed Normalized Differential Lead Index (NDLI) and Principal Component Analysis to identify the extent of lead pollution within this study area. Results from these three techniques characterized lead tailings in the study area and comparison of the performance of all three techniques reveal that there is high level of consistency in their outputs. Seven (7) lead hotspots with NDLI values ranging from 13-15 were detected in the central region of the study area where built-up area is thickest.

Umar and Alhassan examined Utilization of Concrete Mixers in Selected Construction Sites in Abuja in the tenth paper. The study was conducted at some selected construction sites in Abuja. The research adopted mixed methodology. The study discovered that the commonest type of concrete mixer used by contractors are reversing drum and tilting drum mixers. The study also found that concrete mixers are underutilized through wrong selection criteria, inability to use only trained personnel to operate the mixers, not having spare parts for the mixer before breakdown, and inappropriate methods of operating the mixers. The paper recommends that mixers should be selected for jobs based on their suitability for the job, using only trained personnel to operate mixers.

Gandu, et al, in the eleventh paper examined Alternative Dispute Resolution (ADR) Methods in Construction Dispute Management in Nigeria. The study

discussed the relationship that exist between stakeholders' understanding and their preferred methods, also, the methods widely used were established. Findings showed that less friendly ADR methods which are normally closer to litigation in nature such as arbitration are the most widely used. They further discovered that if the perception of stakeholders in the industry is changed to perceive a method as suitable it will enhance preference on the friendlier methods. It will enhance the application of such methods in dispute resolution, thus, improving performance.

In the twelfth paper by Unah et al, on Housing Flexibility in Abuja Federal Capital Territory: Feedback for Policy and Practice, focused on the possibility of using the external space of dwelling configuration in multiple ways as determined by the flexible nature of the various prototypes. The study used both qualitative and quantitative techniques of data collection and analysis. The study revealed that most of the occupants expressed satisfaction with the flexibility nature of the houses by providing more living spaces either by connecting with more interior dwelling units or by means of attaching extra residences (family) units.

The success of this edition of the journal was demanding given the need to maintain standards. The quantity of energy expended on this volume was doubled from the last edition. I must appreciate the selfless service of the reviewers who ensured that standards were kept. I also congratulate the authors of articles in this edition for their resilience in going through the rigorous process of the review to this final stage of acceptance. I can only continue to crave your support in recommending Tropical Journal of the Built Environment to colleagues (academic/professionals) and institutions as we begin the process of June 2023 edition and beyond.

I welcome the readers to enjoy this Volume 3 Number 2 edition and for the contributors let us kick start **Volume 4 Number 1** immediately.



O.F. Adedayo, PhD
Managing Editor

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Housing Flexibility in Abuja Federal Capital Territory: Feedback for Policy and Practice

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Influence of Insurance Policy on the Cost of Accidents in Medium-Sized Construction Projects in Minna, Niger State

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Abstract

Studies have shown that despite the importance of the construction industry for national economy, construction activities sadly pose serious health and safety (H&S) risks to workers, users of construction facilities and the public. Despite availability of H&S policy with specific insurance considerations; injuries, fatalities and death from construction related activities appear unabated, suggesting possible non-compliance of contractors to established H&S regulations. This study therefore evaluated the influence of insurance policy on the costs of accidents in medium-sized construction projects in Minna, Niger State with a view to enhancing construction site safety. The study adopted a quantitative research approach through the use of questionnaire and data collection checklist. The study's population was 130, comprising of professionals of Government Ministries and safety officers of construction firms actively involved in the projects executed by the with a response rate of 82.31%. Analysis of data was carried out with the use of percentage, Relative Importance Index (RII) and Spearman Rank correlation. Major findings from the study were that the relationship between level of implementing insurance policy and costs of accidents was significant; and the most effective strategy for improving level of implementing insurance policy was "Designation of safety responsibilities to trained personnel" (RII = 0.936). Hence, it was concluded that the influence of insurance policy on the costs of accidents in medium-sized construction projects in Minna, Niger State is significant. It was recommended that construction stakeholders should develop a mechanism that will adequately take cognizance of the proposed strategies of this study.

Keyword: Accidents, Cost, Construction projects, Influence, Insurance policy.

Introduction

The construction industry significantly contributes to economic growth and social development of nations. However, despite the importance of the construction industry for national economy, construction activities sadly pose serious H&S risks to workers, users of construction facilities and the public (Boadu *et al.*, 2020). Based on project risk, construction projects can be classified as Small, Medium or Large sized (Software Education, 2008). In Minna, Niger State, the construction industry is dominated by small and medium-sized construction firms who usually undertake

small and medium-sized projects. These construction firms have the characteristics of Small and Medium Enterprises (SMEs). SMEs as those business whose capital investment do not exceed #5 million (including land and working capital) or whose turnover are not more than N25million annually (Alabi *et al.*, 2015). In view of these, the study considered medium-sized construction projects.

The construction industry, which is responsible for projects involving housing construction, is subject to more risk and uncertainty than many other industries

(Perera *et al.*, 2008; Samuel, 2014; Queen & Satheesh, 2018). Therefore, it is established that in every stage of the building construction process from initial investment appraisal through to construction and use, the built facility is subjected to risks for the parties involved (Perera *et al.*, 2008; Samuel, 2014; Queen & Satheesh, 2018). According to Sola *et al.* (2013), risks are the uncertainties inherent in plans and the possibility of something happening that can affect the prospect of achieving business or project goal. The uncertainty may be positive or negative. In common language, risks are therefore a possible hazard or opportunity that if it occurs it would threaten or benefit business outcomes. Insurance is defined as a contract where by an insurer agrees, in consideration to the premium paid by the insured to protect the insured against loss on the happening of certain events (Sola *et al.*, 2013; Samuel, 2014; Queen & Satheesh, 2018).

Transferring construction risks in an insurance policy is an accepted method worldwide (Odeyinka, 2000; Okongwu *et al.*, 2021). Among the insurance policies used in construction, Contractors' All Risks (CAR) policy is the most popular. CAR insurance is an all-inclusive insurance cover used in construction contracts (Perera *et al.*, 2008). In addition, Sola *et al.* (2013) referred to CAR as Builders risk insurance. This is because Builders risk insurance is also known as "course of construction", "construction all risk" and "contractors all risk insurance", is a specialized form of insurance designed to insure buildings or project against repair or replacement cost while they are under construction and in some cases, for a specific period afterwards. This insurance will usually also cover build materials, fixtures and appliances all of which are intended to become an integral part of the structure under construction. Unfortunately, construction firms do not seem to understand the implication of not taking up employees' insurance (Okongwu *et al.*, 2021). This is because it has also been established that compulsory insurance of buildings under construction revolve around poor compliance structure, ineffective

implementation strategy by the insurance regulator and lack of awareness on the part of the Nigerian public (Jimoh *et al.*, 2019). Hence, the need to evaluate the influence of insurance policy on the costs of accidents in medium-sized construction projects in Minna, Niger State with a view to enhancing construction site safety. In view of this, the study identified the factors influencing the implementation of insurance policy; established the relationship between the implementation of insurance policy and the amount of compensation; number of accidents recorded; and lost time due to accident occurrence in medium-sized construction projects in Minna, Niger State.

The need for this study was as a result of the pilot study carried out for undergraduate academic research which revealed that most of the client's organisations (81.82%) in Minna do not take part in the implementation of insurance policy in construction projects being executed mainly due to lack of awareness and unwillingness. Therefore, in most cases, the responsibility of taking up insurance policy in construction projects is solely left for the contractor to bear.

Literature Review

Factors Influencing of the Implementation of Insurance Policy in Construction Projects

The factors influencing the implementation of insurance policy in construction projects, in this section, are viewed from two perspectives, negative factors (barriers) positive factors (drivers).

Barriers to the implementation of insurance policy in construction projects

Health and safety (H&S) insurance facilities truly attract additional cost to the contractor while such cost is categorized as sunk cost and are irrecoverable. In addition, the challenge of poor leadership is more so identified, when the leadership lack the ability to provide direction, and motivation for compliance with H&S, compliance

naturally becomes difficult. In view of this, studies have identified several barriers to the implementation of insurance policy in construction projects. These barriers are summarised in Table 1.

Drivers of the implementation of insurance policy in construction projects

The implementation of employees' insurance is very important in a construction project in order to ensure that injured workers or participants on site are

adequately and promptly catered for. The enforcement of this insurance policies, according to Health and Safety Executive (2012), can be significantly driving with the use of Employers' Liability Insurance which is compulsory for employers to undertake for the H&S of their employees while they are at work. Based on this, studies have identified several drivers of the implementation of insurance policy in construction projects as presented in Table 2.

Table 2: Barriers to the implementation of insurance policy in construction projects

S/No.	Barriers to the Implementation of Insurance Policy	Source(s)
1	Poor leadership	Idubor and Oisamoje (2013); Ameh and Farinde (2020)
2	Attracts additional cost to the contractor	Idubor and Oisamoje (2013); Samuel and Muhammed (2021); Oknogwu <i>et al.</i> (2021)
3	Lack of concern	Idubor and Oisamoje (2013)
4	Lack of accurate records	Idubor and Oisamoje (2013)
5	Poor statutory regulations	Idubor and Oisamoje (2013)
6	Urgency to allocate a fraction of budget on the safety and health cost in the contract for both the public and private projects	Patrick (2008)
7	Inadequate legal framework	Jimoh <i>et al.</i> (2019)
8	Ineffective implementation strategy	Jimoh <i>et al.</i> (2019)
9	Cultural factors	Jimoh <i>et al.</i> (2019)
10	Low awareness level	Ameh and Farinde (2020); Jimoh <i>et al.</i> (2019); Samuel and Muhammed (2021)
11	Lack of proper enforcement of the Act	Jimoh <i>et al.</i> (2019)
12	Time in time replacement of H&S facilities	Ameh and Farinde (2020)
13	Cost implication of H&S policies	Ameh and Farinde (2020)
14	Poor management commitment	Ameh and Farinde (2020)
15	Fear of not recouping investment in H&S facilities	Ameh and Farinde (2020)

Table 2: Drivers of Implementation of Insurance Policy in Construction Projects

S/No.	Drivers of the Implementation of Insurance Policy	Source(s)
1	Employers' Liability Insurance Policy	Health and Safety Executive (2012); Ameh and Farinde (2020)
2	Provision for plan for setting aside replacement cost for plant and equipment	Ijigah <i>et al.</i> (2015)
3	Engaging in research and development	Ijigah <i>et al.</i> (2015); Agyekum <i>et al.</i> (2018)
4	Having clearly written down H&S policy	Ijigah <i>et al.</i> (2015); Agyekum <i>et al.</i> (2018)
5	Upper management support	Agyekum <i>et al.</i> (2018)
6	Involvement of employee in safety and evaluation	Agyekum <i>et al.</i> (2018)
7	Emergency response planning; and Safety and health committees	Agyekum <i>et al.</i> (2018)
8	Proper contracts reviewed by a knowledgeable attorney and reading contracts for consistency	Jimoh <i>et al.</i> (2019)
9	Encouraging ethical practices by all stakeholders	Samuel and Muhammed (2021)
10	Ensuring that construction companies subscribe to one type of insurance in order to reduce risk	Samuel and Muhammed (2021)

Effects of Insurance Policy on Construction Site Safety

According to, Odeyinka (2000), actual replacement cost has a significant relationship with the claim settled in a construction project. In the same vein, Ijigah *et al.* (2015) identified 5 major effects of employees' insurance on the safety performance of construction project performance. These effects range between risk elimination resulting to high morale of management and Risk acceptance ensuring that each party's responsibility is well understood thereby reducing unnecessary conflicts. It has also been emphasized that insurance is very significant to reducing the influence of risks on construction project performance to the barest minimum and boost the economy of the country (Okongwu *et al.*, 2021; Samuel & Muhammed, 2021). In view of this, Okongwu *et al.* (2021) identified several effects of insurance policy on the safety

performance of construction firms: these are: insurance improves safety through creation of awareness; Insurance helps in management of business risk; Insurance helps in economic stimulation; Insurance encourages the holder to plan in advance for life stage (Planning and peace of mind); Spreading risk; insurance provides the benefits of protection against diseases and hospital expenses; and Insurance encourages savings among others.

Strategies for Improving the Implementation of Insurance Policy in Construction Projects

To make the use of insurance effective in managing risks in construction projects, considerable care should be taken in determining the insured sum. Therefore, researchers have identified several strategies for improving the implementation of insurance policy as shown in Table 3.

Table 3. Strategies for Improving the Implementation of Insurance Policy in Construction Projects

S/No.	Strategies for Improving Compliance with Insurance Policy	Source(s)
1	Considerable care should be taken in determining the insured sum in a project	Odeyinka (2000)
2	Contractors should study the exclusion clauses carefully before entering into any contract of insurance	Odeyinka (2000)
3	Designation of safety responsibilities to trained personnel	Olutuase (2014); Cesarini and Kupiec (2016)
4	Direct safety talks with workers	Olutuase (2014)
5	Systematic hazard identification	Olutuase (2014)
6	Assessment of risk level	Olutuase (2014)
7	Safety orientation for new/transferred workers	Olutuase (2014)
8	Pre-project/project safety trainings received	Olutuase (2014); Cesarini and Kupiec (2016)
9	Scheduled in-house inspections	Olutuase (2014)
10	Having resident safety officer at sites	Olutuase (2014); Cesarini and Kupiec (2016)
11	Regular safety audit	Olutuase (2014)
12	Review accidents and near misses	Cesarini and Kupiec (2016)
13	Evaluate each project phase for safety	Cesarini and Kupiec (2016)
14	Work with your insurer and risk management experts	Cesarini and Kupiec (2016)
15	Work toward zero injuries	Cesarini and Kupiec (2016)
16	Construction companies should ensure to subscribe to one type of insurance in order to reduce risk	Samuel and Muhammed (2021)

Methodology

This study adopted a quantitative research approach. The use of structured questionnaire was employed to collect data. The questionnaire was administered to professionals from Niger State Housing Corporation (NSHC), Niger State Ministry of Works and Infrastructural Development (NSM/WID) in Minna and safety officers of construction firms in active sites of NSHC and NSM/WID. The population/sample size was 130 as all the population elements were considered. This agrees with the assertion of Watson (2001) that if the population size is small (200 or less), then it is preferable to take a census of the total population.

The copies of questionnaire administered were 130, while 107 copies were returned and used for analysis, this gives a response

rate of 82.31%. Analysis of data was undertaken using of percentage, Relative Importance Index (RII) and Spearman's Rank correlation analysis. Percentage was used to analyse the profile of respondents while RII and Spearman's Rank correlation were used to achieve the study's objectives. The formula used for calculating RII for data analysis is expressed in Equation 1 while Table 4 presents the decision rule used to interpret the RII values.

$$RII = \frac{\sum W}{A \times N} \dots\dots\dots (1)$$

(Source: Kassem, 2020)

Where Σ = Summation, W = the weights of every one of the factors given by respondents and it was in the range of (1 - 5). ($A=5$) the largest value of weight (i.e. Highest factor) and finally N refers to the Total number of respondents.

Table 6: Decision Rule for RII Analysis

Scale	Cut-off Point (RII)	Level of Importance	Interpretation	
			Level of Significance	Level of Compliance
5	0.81 - 1.00	Extremely Important	Extremely Significant	Very High
4	0.61 - 0.80	Important	Significant	High
3	0.41 - 0.60	Fairly Important	Fairly Significant	Average
2	0.21 - 0.40	Less Important	Less Significant	Low
1	0.00 - 0.20	Least Important	Least Significant	Very Low

Source: Adapted and Modified from Shittu et al. (2021)

For the Spearman Rank correlation, the decision rules for the nature of correlation state that if coefficient of correlation (r) = 0.10 to 0.29, then there is small amount of correlation; if r = 0.30 to 0.49 then there is medium amount of correlation, and if r = 0.50 - 1.0, then there is large amount of correlation between the variables, as opined by Pallant (2013). A reliability test was undertaken to validate the research instrument. The results of the reliability test revealed an Inter Item Correlation Matrix comprising of positive values, indicating that the items are measuring the same underlying characteristic. The Cronbach's Alpha observed was 0.856, suggesting very good internal consistency reliability for the scale with this sample. Therefore, the data set are reliable for analysis. This also agrees with the bench mark prescribed by Pallant (2013) that values above 0.700 are considered acceptable.

Discussion of Results

This section shows the results of the analysis carried out in line with the study's objectives.

Respondents' Profile

The profile of respondents considered for the study is hereby presented in Table 5. It can be seen from Table 5 that majority of the respondents are Quantity Surveyors (i.e., 52.71% of the total group). It was also revealed that most of the respondents are BSc/FTech degree holders (37.38% of the respondents). Table 5 also shows that all the respondents are registered members of their respective professional bodies. Finally, it was revealed from Table 5 that majority of

the respondents have 11 - 15 years of experience, representing 31.78% of the total number of respondents. The profile of respondents indicates that the respondents are educated, experienced and knowledgeable enough to provide reliable information required for the study. This has already been confirmed in the result of the reliability test presented in the previous section.

Barriers to the Implementation of Insurance Policy by Construction Firms

The RII result of the barriers to the implementation of insurance policy by construction firms in Minna, Niger State is presented in Table 6.

Table 6 revealed that "Delay in payment of insurance claims" was the most important barrier to the implementation of insurance policy by construction firms (RII = 0.872). On the average, all the barriers to the implementation of insurance policy by construction firms in Minna, Nigeria were important (average RII = 0.722). The result of the study here agrees with result of past studies which revealed that continuity in business could become a major barrier if the contractor is skeptical about continuity in business or have the future plan of quitting operation and shifting towards other lines of business (Jimoh et al., 2019; Odeyinka, 2000; Ameh & Farinde, 2020). On the other hand, the study of Samuel and Muhammed (2021) disagrees with the finding of this study because it revealed that the overall level of barriers to the adoption of insurance policy is moderately significant.

Table 5: Respondents' Profile

PROFILE	STATISTICS	
	Frequency	Percentage
Respondents' Profession		
Architect	14	13.08
Builder	32	29.91
Engineer	26	24.30
Quantity Surveyor	35	32.71
Respondents' Highest Academic Qualification	Frequency	Percentage
ND	15	14.02
HND	29	27.10
BSC/BTech	40	37.38
MSC/MTech	23	21.50
Respondents' Professional Qualification	Frequency	Percentage
MNIA/ARCON	14	13.08
MNIOB/CORBON	32	29.91
MNSE/COREN	26	24.30
MNIQS/RQS	35	32.71
Respondents' Years of Experience	Frequency	Percentage
1 – 5 years	19	17.76
6 – 10 years	23	21.50
11 – 15 years	34	31.78
16 – 20 years	19	17.76
Above 20 years	12	11.21
TOTAL	107	100.00

Table 6: Challenges to the Implementation of Insurance Policy by Construction Firms

Code	Barriers	RII	Rank	Interpretation
B23	Delay in payment of insurance claims	0.872	1st	Extremely Important
B22	Governments non implementation of existing insurance act	0.860	2nd	Extremely Important
B16	Poor safety discipline	0.792	3rd	Important
B17	Absence of clearly stated safety rules;	0.787	4th	Important
B21	Bureaucratic processes involved in purchasing these policies	0.784	5th	Important
B19	Excessive premium charged by insurance companies	0.779	6th	Important
B5	Poor statutory regulations	0.760	7th	Important
B11	Lack of proper enforcement of the Act	0.744	8th	Important
B20	Lack of trust for the insurance companies	0.743	9th	Important
B7	Inadequate legal framework	0.742	10th	Important
B14	Poor management commitment	0.729	11th	Important
B10	Low awareness level	0.727	12th	Important
B8	Ineffective implementation strategy	0.721	13th	Important
B15	Fear of not recouping investment in H&S facilities	0.682	14th	Important
B13	Cost implication of H&S policies	0.699	15th	Important
B18	Continuity in business	0.677	16th	Important
B1	Poor leadership	0.671	17th	Important
B4	Lack of accurate records	0.669	18th	Important
B2	Attracts additional cost to the contractor	0.667	19th	Important
B12	Time to time replacement of H&S facilities	0.665	20th	Important
B3	Lack of concern	0.651	21st	Important
B6	Urgency to allocate a fraction of budget on the safety and health cost in the contract for both the public and private projects	0.611	22nd	Important
B9	Cultural factors	0.578	23rd	Fairly Important
	Average RII	0.722		Important

Drivers of the Implementation of Insurance Policy by Construction Firms

The results of the MIS ranking of the drivers of the implementation of insurance policy by construction firms are presented in Table 7.

Table 7 shows that the most important driver of the implementation of insurance policy by construction firms was "Ensuring that construction companies subscribe to one type of insurance in order to reduce risk" (RII = 0.886) On the average, all the drivers of the implementation of insurance policy by construction firms in Minna, Nigeria were important (average RII = 0.672). In line with the finding of this study, past studies revealed that these factors are driving forces that can significantly lead to the effective implementation of employees' insurance in construction projects (Health and Safety Executive, 2012; Ijigah et al., 2015; Agyekum et al., 2018; Ameh & Farinde, 2020; Samuel & Muhammed, 2021).

Relationship between Implementation of Insurance Policy and Costs of Accidents in Medium-sized Construction Projects

The use of Spearman Rank correlation analysis was adopted to determine effect of insurance policy on the cost of site accidents in medium-sized construction projects in Minna, Niger State. In view of this, the cost of accidents was measured using the amount of compensation incurred; the number of accidents recorded; and the lost time experienced in the event of accident occurrence for a five-year period (2016 – 2020). However, before conducting the Spearman Rank Correlation Analysis, the suitability of the data for Spearman Rank correlation was tested. The suitability test carried out between the level of implementing insurance policy in construction projects and amount of compensation shows no evidence of outliers with a scatterplot with the data points spread all over the place, suggesting a slightly low correlation. This shows that the data set is fit for Spearman Rank Correlation Analysis. See Figure 1 for scree plot.

Table 7: Drivers of the Implementation of Insurance Policy by Construction Firms

Code	Drivers	RII	Rank	Interpretation
C10	Ensuring that construction companies subscribe to one type of insurance in order to reduce risk	0.886	1st	Extremely Important
C9	Encouraging ethical practices by all stakeholders	0.865	2nd	Extremely Important
C8	Proper contracts reviewed by a knowledgeable attorney and reading contracts for consistency	0.781	3rd	Important
C6	Involvement of employee in safety and evaluation	0.720	4th	Important
C4	Having clearly written down H&S policy	0.688	5th	Important
C7	Emergency response planning, and Safety and health committees	0.656	6th	Important
C5	Upper management support	0.632	7th	Important
C3	Engaging in research and development	0.623	8th	Important
C1	Employers' Liability Insurance Policy	0.454	9th	Important
C2	Provision for plan for setting aside replacement cost for plant and equipment	0.414	10th	Fairly Important
Average RII		0.672		Important

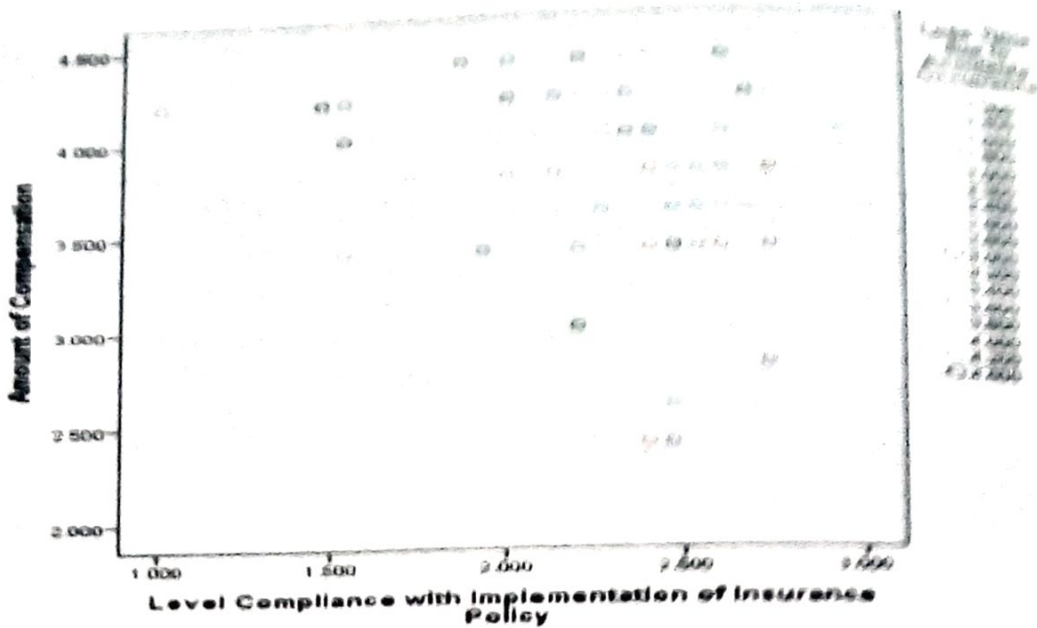


Figure 1: Scree Plot between the Level of Implementing Insurance Policy in Construction Projects and Amount of Compensation

The suitability test carried out between the level of implementing insurance policy in construction projects and number of accidents recorded shows no evidence of outliers with a scatterplot with the data points neatly arranged in a narrow cigar shape, suggesting quite a strong correlation. This shows that the data set is fit for Spearman Rank Correlation Analysis. Figure 2 shows the scree plot.

The suitability test carried out between the level of implementing insurance policy in construction projects and lost time due to accidents occurrence shows no evidence of outliers with a scatterplot with the data points neatly arranged in a narrow cigar shape, suggesting quite a strong correlation. This shows that the data set is fit for Spearman Rank Correlation Analysis. Figure 3 shows the scree plot.

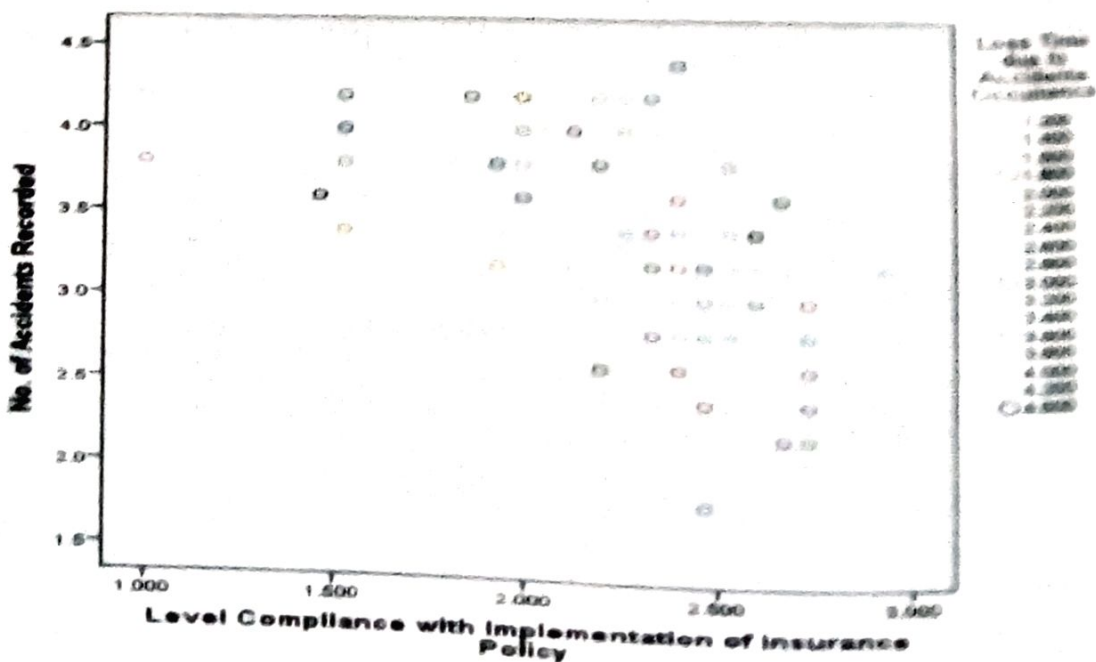


Figure 2: Scree Plot between the Level of Implementing Insurance Policy in Construction Projects and Number of Accidents Recorded

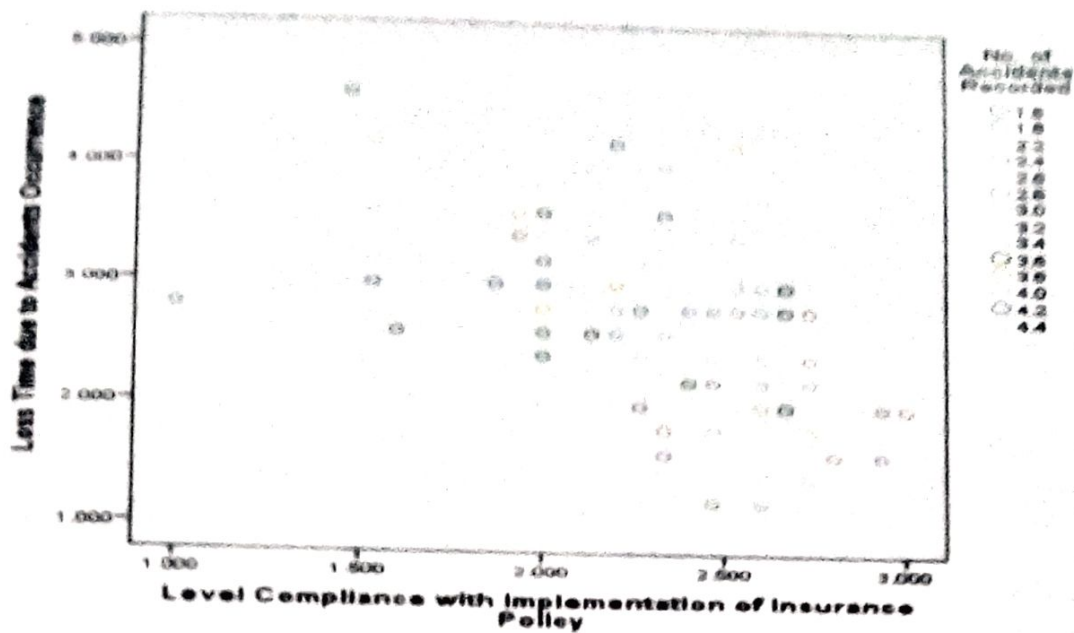


Figure 3. Scree Plot between the Level of Implementing Insurance Policy in Construction Projects and Lost Time due to Accidents Occurrence

The first Spearman Rank correlation analysis shows that the relationship between the level of implementing insurance policy in construction projects and amount of compensation is slightly weak, negative and significant. The correlation coefficient (r value) observed was -0.234 indicating slightly low degree of association between the variables. Hence, the correlation between the variables is small (Pallant, 2013). The second Spearman Rank correlation analysis shows that the relationship between the level of implementing insurance policy in construction projects and number of accidents recorded was strong, negative and significant. The r value observed was -0.663 , indicating strong degree of association between the variables. Hence, the correlation between the variables is large (Pallant, 2013). The third Spearman Rank

correlation analysis shows that the relationship between the level of implementing insurance policy in construction projects and lost time due to accidents occurrence is strong, negative and significant. r value was -0.594 , indicating strong degree of association between the variables. Hence, the correlation between the variables is large (Pallant, 2013). See Table 8 for the summary of the results of the Spearman Rank correlation analysis.

The result presented in Table 8 is in line with findings from past studies which revealed that insurance policy implementation is very significant in reducing the influence of risks on construction project performance to the barest minimum and boost the economy of the country (Okongwu et al., 2021; Samuel & Muhammed, 2021).

Table 8: Relationship between Level of Implementing Insurance Policy in construction projects and Costs of Accidents

Variables		Observations			Inferences	
X ₁	X ₂	r (%)	LOS	P-value	Strength of Relationship	Remark
Level of Implementing Insurance Policy in Construction Projects	Amount of Compensation	-0.234	0.01	0.001	Slightly Weak	SS
Level of Implementing Insurance Policy in Construction Projects	Nr of Accidents Recorded	-0.663	0.01	0.000	Strong	SS
Level of Implementing Insurance Policy in Construction Projects	Lost Time due to Accidents Occurrence	-0.594	0.01	0.000	Strong	SS

KEY:

- SS = Statistically Significant
- R = Correlation Coefficient
- LOS = Study's Level of Significance
- P-value = Calculated Probability Value

Strategies for Improving the Implementation of Insurance Policy in Medium-sized Construction Projects

The results of the RII ranking of the strategies for improving the implementation of insurance policy in medium-sized construction projects in Minna, Niger State are presented in Table 9.

Table 9 revealed that the most effective strategy for improving implantation of insurance policy in medium-sized construction projects was "Designation of safety responsibilities to trained personnel" (RII = 0.936). On the average, all the identified strategies for improving implantation of insurance policy in

medium-sized construction projects in Minna, Niger State are effective (average RII = 0.732). In agreement with the findings of this study, past studies have established that in order to provide room for improving compliance with insurance policy in construction projects for improved safety performance, the safety management system of a construction firm should make provision for all the major strategies for improving implantation of insurance policy in medium-sized construction projects identified in this study (Odeyinka, 2000; Olutuase, 2014; Cesarini & Kupiec, 2016; Okongwu *et al.*, 2021; Samuel & Muhammed, 2021).

Table 9 Strategies for Improving the Implementation of Insurance Policy in Medium-sized Construction Projects

Code	Strategies	R/I	Rank	Level of protection
F1	Designation of safety responsibilities to trained personnel	0.936	1st	Extremely Effective
F10	Having resident safety officer at sites	0.905	2nd	Extremely Effective
F16	Construction companies should ensure to subscribe to one type of insurance in order to reduce risk	0.888	3rd	Extremely Effective
F1	Considerable care should be taken in determining the insured sum in a project	0.865	4th	Extremely Effective
F2	Contractors should study the exclusion clauses carefully before entering into any contract of insurance	0.865	4th	Extremely Effective
F8	Assessment of risk level	0.855	6th	Extremely Effective
F14	Work with your insurer and risk management experts	0.839	7th	Extremely Effective
F5	Systematic hazard identification	0.811	8th	Extremely Effective
F4	Direct safety talks with workers	0.810	9th	Extremely Effective
F11	Regular safety audit	0.693	10th	Effective
F7	Safety orientation for new/transferred workers	0.625	11th	Effective
F15	Work toward zero injuries	0.543	12th	Fairly Effective
F8	Pre-project project safety trainings received	0.536	13th	Fairly Effective
F13	Evaluate each project phase for safety	0.528	14th	Fairly Effective
F12	Review accidents and near misses	0.519	15th	Fairly Effective
F9	Scheduled in-house inspections	0.490	16th	Fairly Effective
<i>Average R/I</i>		0.732		Effective

Conclusion and Recommendations

It was found that the most important factors influencing the implementation of insurance policy in medium-sized construction projects are "Delay in payment of insurance claims" as the barrier and "Ensuring that construction companies subscribe to one type of insurance in order to reduce risk" as the driver. The study also shows that the relationship between level of implementing insurance policy and costs of accidents is significant. Finally, the study found that the most effective strategy for improving level of implementing insurance policy in medium-sized construction projects is "Designation of safety responsibilities to trained personnel". It can therefore be concluded that the influence of insurance policy on the costs of accidents in medium-sized construction projects in Minna, Niger State is significant. In the light of this, it is

highly recommended that in order to improve the level of implementation of insurance policy in medium-sized construction projects, construction stakeholders should develop a mechanism that will adequately take cognizance of the proposed strategies of this study.

Finally, the implication of this study is that it will serve as a guide to all the major parties to a construction contract on the need to implement insurance policy in order to mitigate the risk of accidents in construction projects. However, further studies can be carried out to assess the effect of insurance policy on the safety performance of workers on construction site using a different study area where there are more of larger-sized construction projects and construction firms.

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