



## **Dominant Factors Influencing the Implementation of Safety Protocols in Building Project Sites**

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### **Abstract**

Despite establishing extensive safety regulations and protocols, the construction sector finds it challenging to consistently uphold these norms. This study attempts to investigate the dominant factors influencing the implementation of safety protocols with a view to safeguarding the health and safety of workers while reducing the likelihood of accidents and guaranteeing the reliability and durability of built infrastructure. The study employed a cross-sectional research design and Lagos State served as the research area. The population of the study comprised built environment professionals and site operatives who were conveniently selected. The study utilized two sets of structured questionnaires that were self-administered to the two groups of respondents. Descriptive and inferential statistical approaches were employed to analyze the data collected. The findings revealed that the dominant factors influencing the implementation of safety protocols on building project sites among the built industry professionals and site operatives include management support, regulatory requirements, safety awareness, employee training and education, recognition and encouragement, workers' attitudes, and penalties for non-compliance. The study concludes that regulatory requirement has a profound influence on how safety protocols are being implemented in building project sites. This implies that stringent adherence to regulatory requirements reduces risks and promotes a safety culture, which sustains the safety of building project sites. The study therefore recommends that the management of construction organizations should keep employees abreast of local safety requirements and provide guidelines for its implementation for compliance to be easily incorporated into building site operations. This may be accomplished by maintaining up-to-date information, performing frequent audits, and putting in place robust mechanisms aimed at guaranteeing compliance.

**Keywords:** Building sites, dominant factors, implementation, protocols, safety.

## 1.0 INTRODUCTION

The construction industry stands as a cornerstone of economic development, responsible for shaping the physical infrastructure that underpins modern societies. While it contributes significantly to progress, it is not without its inherent risks and challenges. Kukoyi and Adebawale (2021) buttressed that the construction sector has consistently earned its reputation as one of the most hazardous industries worldwide, particularly in the realm of workplace safety. In the face of rapid urbanization and the expansion of infrastructure projects, the implementation of safety protocols emerges as a critical concern, directly impacting the well-being of construction workers, project timelines, and overall industry sustainability (Adebiyi & Rasheed, 2021). Construction sites are dynamic and complex environments where numerous factors come into play (Mahmoud et al., 2020), making it essential to establish and adhere to stringent safety protocols. In this regard, Adebiyi et al. (2020) posit that a safe work environment is the product of ongoing engineering encompassing a variety of components, including expertise and competencies, machinery, and interpersonal dynamics, all of which are essential to the operational procedures of diverse project participants.

Despite the industry's awareness of the importance of safety, the effective implementation of these protocols remains a formidable challenge (Izobo-Martins et al., 2018). Amoah and Simpeh (2021) corroborate that contractors find it challenging to implement health and safety regulations on construction sites. Over the years, construction projects have grown in scale and complexity, with technological advancements and evolving regulations (Nikolić & Cerić, 2022). This necessitates a constant reevaluation of safety protocols. Consequently, the construction industry has witnessed an increase in the number of accidents, injuries, and fatalities (Kajumulo et al., 2023). This alarming trend underscores the pressing need to investigate the dominant factors that influence the implementation of safety protocols within the sector. The construction industry's failure to consistently implement safety protocols poses a multifaceted research problem (Soyngbe et al., 2019). In Nigeria, a number of researches have been carried out in the realm of health and safety. Nweke and Nouban (2020) researched on health and safety enforcement and education in the Nigerian construction sector. Meanwhile, Mohho et al. (2021) appraised safety practices of construction companies in Rivers State. Besides, Adebiyi et al. (2020) investigated the knowledge and compliance of health and safety information of construction sites workers safety in Nigeria. Moreover, Kolo et al. (2018) assessed safety performance in Nigerian construction. However, these studies and many more did not focus on the dominant factors influencing the implementation of safety protocols on building project sites in Nigeria.

This study notes that in spite of the diverse researches on safety in construction sites and the availability of comprehensive safety protocols and regulations, many construction projects continue to exhibit deficiencies in upholding safety norms. These deficiencies translate into real-world consequences, including injuries, fatalities, project delays, increased costs, and legal liabilities. It is therefore essential to comprehend the dominant factors influencing the implementation of safety protocols in order to enhance workplace safety and lower accidents rates in the construction industry. The main objective of this study is to identify the dominant factors influencing the implementation of safety protocols in construction project sites. The study proposes that there is no significant difference in the perception of built environment professionals and site operatives on the dominant factors influencing the implementation of safety protocols in building project sites. This study is significant because it aids in the creation of plans and solutions that will help to increase safety compliance in the building industry while creating a safer working environment and better project results.

## 2.0 DOMINANT FACTORS INFLUENCING THE IMPLEMENTATION OF SAFETY PROTOCOLS IN BUILDING PROJECT SITES

The growth of the world's infrastructure relies heavily on the construction sector, which is renowned for its inherent dangers and risks. Many different factors could influence effective implementation of safety protocols, such as: organization culture, leadership commitment, employee training and education, resource availability, technological advancements, regulatory requirements, and workplace environment, amid other factors. Some of them are discussed as follows:

### 2.1 Organization Culture

In encouraging customs, values, and actions that put safety first, an organization's culture influences the implementation of safety protocols in the construction industry. As such, a working environment where safety is prioritized is created by a culture that values safety. Onoyan-usina et al. (2019) substantiate that safety is ingrained as a fundamental value in an organizational culture that prioritizes safety. This cultural dimension yields

considerable influence over the adoption of safety protocols on construction sites. It is worth noting that varying organizations may exhibit differing levels of commitment to occupational health and safety (Duryan et al., 2020).

## **2.2 Leadership Commitment**

The commitment to safety that is demonstrated by leadership, notably top executives, and project managers, establishes the foundation for a culture of safety within an organization. Previous studies have pinpointed project management, leadership competency profiles, project constraints and system limitations as key barriers to the effective implementation of safety management systems (Yiu et al., 2019). Yet, the pivotal role of safety leadership often goes unrecognized, despite its crucial significance in guaranteeing the secure execution of work practices (Stiles et al., 2021). It remains incumbent upon management to ensure the realization of the organization's safety objectives and plans, underscoring their central responsibility in this regard (Al-Kasasbeh et al., 2022).

## **2.3 Employee Training and Education**

Training and education are indispensable for equipping employees with the knowledge and skills needed to implement safety protocols. Haruna and Keftin (2017) note that it is imperative for management to demonstrate active commitment to the orientation and training of both new and existing employees in construction health and safety. Meanwhile, Kukoyi and Adebawale (2021) reckon that the lack of adequate health and safety trainings among construction professionals constitute a significant barrier to achieving optimal safety performance. Employee training assumes paramount importance, as studies have identified a deficiency of training as a leading cause of accidents on construction sites (Williams et al., 2018). Therefore, the provision of education and training on safety and health matters expedites the establishment of an effective safety program for construction staff across various construction projects (Adebayo & Emoh, 2019).

## **2.4 Resource Availability**

Effective implementation of safety and health protocols in developing nations faces significant hurdles, primarily stemming from resource constraints such as tight project schedules and limited budget allocations for safety initiatives (Shide et al., 2022). The availability of adequate resources, spanning financial provisions, skilled manpower, and essential safety equipment, directly dictates the capacity of construction firms to execute safety measures proficiently. A pivotal strategy lies in the proactive engagement of top management, who can bolster safety endeavours by prioritizing engineering enhancements in equipment, methods, and materials, while also fostering positive shifts in human behaviour through robust education and training initiatives (Al-Kasasbeh et al., 2022). In organizations where safety commitment or resource allocation is constrained, project team members tend to relegate safety to a lower priority (Yiu et al., 2019).

## **2.5 Technology Advancements**

Advancements in technology have introduced innovative tools and systems that enhance safety on construction sites. Advances in automation, communication, and monitoring brought about by technological progress influence safety protocols and result in safer and more productive work environments in construction sites. According to Ganah and John (2015), the problems of construction health and safety can be resolved by implementing cutting-edge digital technologies and procedures. It is in this regard that Haupt et al. (2019) note that the safety of building sites has been addressed using a variety of technologies and treatments.

## **2.6 Regulatory Requirements**

The implementation of safety protocols in construction is governed by regulatory requirements, which establish legal standards and guarantee compliance. Al-Otaibi and Kineber (2023) opine that a critical factor influencing safety implementation is the absence of requisite safety standards, guidelines, and designated safety personnel. The perceived ineffectiveness of government enforcement in health and safety regulations leads contractors to consider these mandates as an unwarranted financial burden, particularly in the potential requirement to hire dedicated health and safety personnel (Amoah & Simpeh, 2021). This perception can hinder the prioritization of safety measures within the construction industry. The intricacy of regulatory frameworks can engender uncertainty, particularly in discerning requisites for personal protective equipment (PPE) vis-à-vis conventional respirators (Choi & Staley, 2021). This ambiguity may dissuade construction stakeholders from

investing in safety measures perceived as unclear. In light of this, it is advisable for the government to mandate the appointment of a dedicated full-time safety coordinator/manager for construction sites (Al-Kasasbeh et al., 2022). These determinants collectively underscore the imperative for a more streamlined and unequivocal approach to safety regulations within the construction industry.

## **2.7 Workplace Environment**

The physical workplace environment, including factors like terrain, weather conditions, and site layout, can significantly impact the implementation of safety protocols. Al-Otaibi and Kineber (2023) substantiates that the improvement of management's commitment to occupational health and safety (OHS) is essential to addressing issues associated with a negative work environment, which is a key factor influencing the implementation of safety practices on construction sites. Therefore, strengthening management's commitment to OHS is crucial in addressing challenges arising from unfavourable workplace conditions, a pivotal factor in safety practices on construction sites (Alzyoud & Ogalo, 2020).

## **2.8 Recognition and Encouragement**

When it comes to safety protocols in the construction industry, recognition and encouragement are essential. Employees are encouraged to prioritize and follow safety protocols via financial incentives, acknowledgment, and a safety-conscious culture. Yiu et al. (2019) noted that the challenge of a lack of motivation by project teams or sub-contractors indicates a deficiency in incentives and support from authorities, clients, and senior management within organization. This discontent among employees stems from a perceived lack of encouragement and recognition from management for those who prioritize safety in their work (Al-Mawli et al., 2021).

## **2.9 Penalty for Non-Compliance**

Adherence to robust safety values by top management stands as a pivotal factor in ensuring workplace safety (Al-Kasasbeh et al., 2022). Organizations, in their commitment to meeting legal obligations concerning Safety Management Systems (SMS), aim to prevent legal repercussions and associated penalties, while also striving to fulfil contractual SMS requirements to avert contractual liabilities and their ensuing penalties (Yiu et al., 2019). Addressing the impact of these challenges on health and safety regulations within construction sites necessitates a comprehensive review and update of existing laws and regulations to align with current realities. This includes the implementation of stringent penalties for violations of labour laws and the provision of insurance coverage for workers (Famakin et al., 2020).

## **2.10 Communication**

The implementation of safety protocols on construction sites requires effective communication. Rivera et al. (2021) note that communication is a vital factor influencing the implementation of health and safety on construction sites. Clear and effective communication plays a pivotal role in safety program implementation (Issa et al., 2021). Workers adhere to protocols when given clear instructions, notifications, and feedback, thereby lowering accident rates and improving general safety.

## **2.11 Feedback Mechanisms**

Indeed, feedback mechanisms hold significant importance in the successful implementation of safety protocols. When accidents, incidents, and near misses are promptly and comprehensively reported and documented, it paves the way for the effective implementation of appropriate policies and measures (Kukoyi & Adebowale, 2021). This ensures that lessons are learned, and proactive steps can be taken to prevent similar occurrences in the future, thereby enhancing overall workplace safety.

## **2.12 Peer or Social Norms**

Employee adherence to safety protocols may be influenced by peer pressure and the actions of co-workers. Shortcuts can erode safety programs should they become the norm. This phenomenon of mirroring behaviour, influenced by cultural norms, can manifest both positively and negatively. Rivera et al. (2021) note that it is not uncommon for workers to face instances of playful teasing or discouragement from peers for adhering to safety protocols and utilizing protective equipment.

### **2.13 Market Competition**

Organizations mostly rely on their competitive advantage over their counterparts to thrive. Market rivalry might have an impact on the implementation of safety protocols in the construction industry. In very competitive marketplaces, there could be a strong incentive to cut shortcuts, potentially jeopardizing safety precautions to save money and gain contracts. John et al. (2022) note that Nigeria is a very competitive country, and the country's construction market is no exception. Noting that the high client expectations, risks, shortage of trained labour, growing number of experts, and other factors have all contributed to the heightened competitiveness in Nigeria construction market.

### **2.14 Personal or Past Experience**

Personal or previous experiences have a significant influence on the implementation of safety protocols in construction. People who have experienced accidents or close calls are more cautious and comply with safety protocols. Raza et al. (2022) note that in maintaining a comprehensive record of all risk-related information is crucial for owners, whether received from external sources or gleaned from prior experience. This repository of knowledge serves as a valuable resource for informed decision-making and proactive risk management in future endeavours.

### **2.15 User Friendly Documentation**

A user-friendly documentation facilitates understanding and implementation of safety protocols, resulting in more successful execution of projects, fewer errors, and improved worker safety. Adebayo and Emoh (2019) note that insufficient documentation has been identified as a significant issue in the realm of safety management. This deficiency in recording and reporting crucial safety data hinders the accurate assessment and rectification of potential hazards, underscoring the critical need for improved documentation practices in safety protocols.

### **2.16 Pre-Qualification Criteria**

Pre-qualification requirements may have a profound effect on how building sites implement safety protocols. Safety protocols in projects may be prioritized and enforced more frequently by companies that adhere to strict safety regulations. According to Huang and Hinze (2006), a successful pre-qualification procedure for contractors might facilitate the building of an appropriate Health and Safety (H&S) implementation. By making H&S a pre-qualification requirement, construction companies might enhance their H&S procedures (Kukoyi et al., 2021). Musonda et al. (2009), however, assert that clients do not consider H&S to be significant or include it in contract execution and documentation. This implies that clients prioritize the financial and schedule goals of building projects (Kukoyi et al., 2021).

### **2.17 Management Support**

The attitude and actions of management play a pivotal role in shaping safety outcomes (Famakin et al., 2020). However, challenges persist, with a critical barrier being the lack of budget allocation and a tendency to prioritize production over safety in the construction industry (Shide et al., 2022). These factors undermine the effective implementation of Occupational Safety and Health (OSH) practices on construction sites, necessitating a shift in priorities. Additionally, "project management and leadership" emerge as the most substantial obstacle category for the implementation of Safety Management Systems (Yiu et al., 2019).

### **2.18 Safety Awareness**

In companies demonstrating a robust dedication to safety, there tends to be a heightened level of safety awareness among project team members. This can be attributed to the companies substantial investments in safety promotion and comprehensive training initiatives (Yiu et al., 2019). Conversely, a significant obstacle arises from a deficiency in safety knowledge encompassing skills, risk awareness, and safety inspection proficiency. These components are intricately linked, where deficient training can result in a limited understanding of hazards, compounded by management's oversight of safety concerns and inadequate safety inspections (Al-Otaibi & Kineber, 2023).

### **2.19 Company Size**

The implementation of safety protocols in construction is influenced by the size of the company. Larger companies could have the resources to implement safety protocols and enforce them, which might improve compliance with safety standards. According to Windapo and Cattell (2011) and Patel and Yadav (2021), the large-scale construction companies are seen to be established contractors since they have specialized safety departments and follow strict safety protocols. Hence, are able to implement safety protocols.

### **2.20 Pressure From Client**

Intense work pressures exert a significant influence on safety practices within the construction industry. Specifically, the widespread adoption of contractual penalty schemes by clients in response to project delays has created an environment where contractors are compelled to adhere strictly to project schedules to avert additional costs (Yiu et al., 2019). This introduces a concealed psychological barrier for certain project teams, as the imperative to meet deadlines may inadvertently eclipse the prioritization of safety measures. Balancing the urgency of project timelines with the imperative of maintaining a safe work environment remains a crucial challenge in contemporary construction practices.

### **2.21 Workers' Attitude**

Personal attitudes and convictions on safety might differ. It is possible that some workers are more personally dedicated to safety than others. According to Khosravi et al. (2014), Kukoyi and Adebawale (2021), sufficient training is required, as is the role of organisation, and management in eliminating negative worker attitudes that contribute to construction site accidents. Besides, Swallow and Zulu (2019) are of the view that cultural and human behavioural factors, which are influenced by cost and training, are the main causes of the construction industry's inadequate safety. Also, the manner in which employees perceive safety protocols have considerable influence on how well they implement them. A negative opinion may result in disregard and increased workplace safety hazards, whilst a positive perception promote compliance. Also, the implementation of safety protocols in construction is heavily influenced by how applicable the process is to the work at hand. When protocols are closely related to their present work, workers are more inclined to follow them, which improves safety. Besides, the implementation of safety protocols in construction is influenced by public opinion. Negative impressions of a company's safety performance can lead to damage to reputation, litigation issues, and lost commercial prospects. Furthermore, safety methods are applied in construction more frequently when their effects on harm prevention and well-being are demonstrated. Benefits that are clearly apparent encourage employees to follow safety protocols as suggested. Moreover, the implementation of safety protocols in construction might be influenced by their financial standing. A financially sound contractor could put more money into safety protocols, improving their overall performance in terms of safety. Additionally, adherence to safety protocols is greatly influenced by managerial competency. Safety protocols are given top priority by competent managers, who also enforce them, encouraging compliance and lowering the number of accidents in the workplace.

## **3.0 RESEARCH METHOD**

A cross-sectional research design was used for the study. Lagos State served as the research area. The choice of Lagos State was due to the city's abundance of construction companies and numbers of on-going projects. The study's population comprised of key built environment professionals and the site operatives in building project sites involved in the day-to-day operations and management of construction projects. The built environment professionals include architects, builders, engineers, and quantity surveyors. The opinions of the built environment professionals and the site operatives were necessary because they are the major players involved in the implementation of safety protocols on building project sites.

A convenience sampling approach was employed for the study. This was necessary because the researchers were unable to locate an up-to-date, exhaustive list or database of built professionals and site operatives working on construction sites in Lagos State at the time of conducting the study. A convenience sampling, according to Umeh (2018) and Obilor (2023), is a non-probability sampling strategy in which the researcher chooses the sample units depending on whether members of the frame are easily identified, readily available, readily offered, or quickly assessed.

A closed-ended structured questionnaire was created in order to collect primary data from the two categories of respondents. There were two components to the survey: Section A and B. While section A provided information on the respondents' demographics, section B assessed the dominant factors influencing the implementation of

safety protocols on construction project sites using a Likert scale of 1-5. Where 1 indicates no influence, 2 indicates slight influence, 3 indicates moderate influence, 4 indicates high influence, and 5 indicates very high influence. A total of 150 questionnaires were self-administered to the professionals out of which 92 was correctly filled, while the remaining 58 that were poorly filled were discarded for use for the study. The 92 questionnaires that were correctly filled was used for the analysis representing a 61.3% response rate.

The collected data was processed through the use of Statistical Packages for Social Sciences (Version, 23.0). The descriptive statistical tools adopted for the analysis includes percentages, frequency distribution, relative importance index (RII), and ranking while, the inferential tools deployed for the analysis was Mann-Whitney U test. The reliability of the questionnaire utilized to gather the data was tested using Cronbach's alpha. The instrument related to the investigation yielded a reliability value of 0.75. This implies that the instrument utilized was consistent.

## 4.0 RESULTS AND DISCUSSION

This section presents the results and discusses the findings.

### 4.1 Demographic Information of the Respondents.

Table 1 shows the demographic information of the respondents; which has been divided into four: academic qualification, years of working experience, size of organization, and job category. It can be seen that the highest number of respondents are qualified with a Bachelor's degree (46.7%), whilst the lowest number of respondents only have an Ordinary National Diploma Certificate (5.4%). Table 1 further reveals that a vast majority of the respondents (42.4%) had years of experience between 11-20 years, while 16.3% of the respondents have the least number with over 20 years of experience. Meanwhile, majority of the respondents (48.9%) works in small organization, while the least numbers of respondents works in large organisations (14.1). Moreover, 73.9% of the respondents are built environment professionals, while 26.1% of the respondents are site operatives. The low response rate of the site operatives can be attributed to the low literacy level that exist among construction artisans in the Nigerian building industry.

**Table 1.** Demographic Information of the Respondents.

<b>Description</b>	<b>Frequency (N)</b>	<b>Percentage (%)</b>
<b>Highest Academic Qualification</b>		
First School Leaving Certificate	15	16.3
National Technical Certificate	9	9.8
Ordinary National Diploma	5	5.4
Higher National Diploma	6	6.5
Bachelor's Degree	43	46.7
Master's Degree	14	15.2
<b>Total</b>	<b>92</b>	<b>100.0</b>
<b>Years of Experience</b>		
1 - 5 years	16	17.4
6 - 10 years	22	23.9
11 - 20 years	39	42.4
> 20 years	15	16.3
<b>Total</b>	<b>92</b>	<b>100.0</b>
<b>Size of Organization</b>		
Large (More than 250 staff)	13	14.1
Small (1-50 staff)	45	48.9
Medium (51 – 250 staff)	34	37.0
<b>Total</b>	<b>92</b>	<b>100.0</b>
<b>Job Category</b>		
Built Industry Professional	68	73.9
Site operative	24	26.1
<b>Total</b>	<b>92</b>	<b>100.0</b>

#### 4.2 Dominant Factors Influencing the Implementation of Safety Protocols

Table 2 reveals the dominant factors influencing the implementation of safety protocols on building project sites. The objective of the study was to identify the factors that influence the implementation of safety protocols in construction project sites. Twenty-seven factors were provided to each participant using a structured questionnaire for the purpose of achieving the objectives. The respondents were asked to rate the level of influence of each factor using a 5-point Likert scale; whereby 1 indicates no influence to 5 indicates very high influence. Through the use of the following scale, the relative implementation index (RII) interpretation decision rule was modified and adapted from (Simeon et al., 2023). Where  $0.76 \leq RSI \leq 1.00$  signifies most significant (MS),  $0.67 \leq RSI \leq 0.75$  signifies significant (S),  $0.45 \leq RSI \leq 0.66$  signifies less significant (LS), and  $0 \leq RSI < 0.45$  signifies not significant (NS).

The results in Table 2 indicate that the built industry professionals ranked regulatory requirements and safety awareness in a tie ( $RSI = 0.94$ ) respectively, as the most significant factor influencing the implementation of safety protocols on building project sites. They further ranked employee training and education and management support in a tie ( $RSI = 0.92$ ) respectively, in third position. While, recognition and encouragement ( $RSI = 0.91$ ), and penalty for non-compliance ( $RSI = 0.90$ ) were ranked fifth and sixth respectively, among other factors. On the other hand, the most significant factor influencing the implementation of safety protocols according to the site operatives is management support ( $RSI = 0.96$ ). Subsequently, the site operatives ranked employee training and education and safety awareness ( $RSI = 0.94$ ) respectively, as the second most significant factor. Workers' attitude and recognition and encouragement in a tie ( $RSI = 0.93$ ) respectively, as fourth most significant factors. While, penalty for non-compliance ( $RSI = 0.92$ ) was ranked sixth amid several other factors.

**Table 2.** Factors Influencing the Implementation of Safety Protocols on Construction Sites

Influencing Factors	Built Industry Professionals				Site Operatives			
	N	RII	R	Remark	N	RII	R	Remark
Regulatory requirements	68	0.94	1	MS	24	0.78	24	MS
Safety awareness	68	0.94	1	MS	24	0.94	2	MS
Management support	68	0.92	3	MS	24	0.96	1	MS
Employee training and education	68	0.92	3	MS	24	0.94	2	MS
Recognition and encouragement	68	0.91	5	MS	24	0.93	4	MS
Penalty for non-compliance	68	0.90	6	MS	24	0.92	6	MS
Leadership commitment	68	0.89	7	MS	24	0.88	11	MS
Demonstration of impact	68	0.89	7	MS	24	0.89	9	MS
Communication	68	0.89	7	MS	24	0.79	23	MS
Organisation culture	68	0.89	7	MS	24	0.83	19	MS
Public perception	68	0.88	11	MS	24	0.88	11	MS
Peer or social influence	68	0.88	11	MS	24	0.90	8	MS
Manager's competence	68	0.87	13	MS	24	0.81	21	MS
Pre-qualification criteria	68	0.87	13	MS	24	0.75	26	S
Workers' attitude	68	0.87	13	MS	24	0.93	4	MS
Resource availability	68	0.86	16	MS	24	0.85	17	MS
Market competition	68	0.86	16	MS	24	0.84	18	MS
Workplace environment	68	0.86	16	MS	24	0.88	11	MS
Pressure from client	68	0.85	19	MS	24	0.77	25	MS
User friendly documentation	68	0.83	20	MS	24	0.86	16	MS
Relevance of protocol to task	68	0.83	20	MS	24	0.87	15	MS
Workers' perception	68	0.82	22	MS	24	0.82	20	MS
Feedback mechanisms	68	0.79	23	MS	24	0.88	11	MS
Technological advancements	68	0.76	24	MS	24	0.80	22	MS
Company size	68	0.74	25	S	24	0.91	7	MS
Personal or past experience	68	0.73	26	S	24	0.89	9	MS
Creditworthiness	68	0.72	27	S	24	0.71	27	S

Note: N signifies Frequency; RSI signifies Relative Significant Index; R signifies Rank; S signifies Significant; and NS signifies Not Significant.



### 4.3 Test of Hypothesis

This study formulated a hypothesis to analyse the dominant factors influencing the implementation of safety protocols in building project sites, and it is stated as follows:

Ho: There is no significant difference in the perception of built environment professionals and site operatives on the dominant factors influencing the implementation of safety protocols in building project sites.

This hypothesis was tested using the Mann-Whitney U Test. The Mann-Whitney U test results are displayed in Table 3. Table 3 indicates that there is no significant difference in the perception of 20 out of the 27 hypothesized factors influencing the implementation of safety protocols with p-values greater than 0.05 ( $p > 0.05$ ). The factors for which there is no significance and for which the null hypothesis was accepted for each of the factors include; organization culture, recognition and encouragement, leadership commitment, employee training and education, technological advancements, workplace environment, workers' perception, public perception, penalty for non-compliance, peer or social influence, market competition, resource availability, relevance of protocol to task, safety awareness, demonstration of impact, management support, and creditworthiness. This implies that there is no statistical difference in the perception of built professionals and site operatives on the factors influencing the implementation of safety protocols in building project sites in the 20 factors. Whereas, the factors for which there is significant difference between the two categories of participants with a p-value less than or equal to 0.05 ( $p \leq 0.05$ ), and for which the null hypothesis was rejected include; regulatory requirements, communication, feedback mechanisms, personal or past experience, prequalification criteria, company size, and manager's competence. This implies that there is a significant difference in the perception of built professionals and site operatives on the factors influencing the implementation of safety protocols in building project sites in the seven factors.

**Table 3.** Mann-Whitney U test on the perception of built environment professional and site operatives

Influencing factors	Construction professionals		Site operatives		U	P-value	Decision
	N	MS	N	MS			
	Regulatory requirements	68	52.65	24			
Organisation culture	68	48.81	24	39.96	659.000	.120	<b>NS</b>
Recognition and encouragement	68	44.72	24	51.44	695.000	.206	<b>NS</b>
Leadership commitment	68	46.96	24	45.21	785.000	.755	<b>NS</b>
Employee training and education	68	45.49	24	49.38	747.000	.459	<b>NS</b>
Technological advancements	68	44.63	24	51.81	688.500	.213	<b>NS</b>
Workplace environment	68	45.70	24	48.77	761.500	.591	<b>NS</b>
Workers' perception	68	46.97	24	45.17	784.000	.760	<b>NS</b>
Public perception	68	46.51	24	46.46	815.000	.992	<b>NS</b>
Penalty for non-compliance	68	45.71	24	48.73	762.500	.584	<b>NS</b>
Communication	68	50.91	24	34.00	516.000	.004	<b>S</b>
Feedback mechanisms	68	42.87	24	56.79	569.000	.017	<b>S</b>
Peer or social influence	68	44.96	24	50.88	711.000	.298	<b>NS</b>
Market competition	68	47.38	24	44.00	756.000	.556	<b>NS</b>
Resource availability	68	47.44	24	43.83	752.000	.533	<b>NS</b>
Personal or past experience	68	40.05	24	64.77	377.500	.000	<b>S</b>
Relevance of protocol to task	68	44.54	24	52.06	682.500	.191	<b>NS</b>
Safety awareness	68	46.24	24	47.23	798.500	.846	<b>NS</b>
Demonstration of impact	68	46.55	24	46.35	812.500	.971	<b>NS</b>
Pre-qualification criteria	68	51.40	24	32.63	483.000	.001	<b>S</b>
Management support	68	45.05	24	50.60	717.500	.224	<b>NS</b>
Creditworthiness	68	46.90	24	45.38	789.000	.801	<b>NS</b>
Company size	68	40.74	24	62.83	424.000	.000	<b>S</b>
User friendly documentation	68	46.10	24	47.65	788.500	.793	<b>NS</b>
Pressure from client	68	49.68	24	37.50	600.000	.038	<b>NS</b>
Manager's competence	68	48.01	24	42.23	713.500	.318	<b>S</b>
Workers' attitude	68	44.12	24	53.25	654.000	.098	<b>NS</b>

Note: P is significant at  $P \leq 0.05$ , U is Mann-Whitney, S signifies Significant, NS signifies Not Significant.

#### 4.4 Discussion of Findings

The results showed that the factors with the most significant influence on the implementation of safety protocols on building project sites as perceived by the professionals and site operatives include: safety awareness, regulatory requirements, management support, employee training and education, recognition and encouragement, workers attitudes, and penalty for non-compliance.

Safety awareness is a significant factor influencing the implementation of safety protocol in building sites. Employees in the construction sector are more likely to implement and follow safety protocols when they are aware of the risks and hazards that might arise from their activity. Safety awareness connotes being proactive in reducing risks, seeing possible hazards, and appreciating the significance of safety procedures. This result aligns with the findings of Yiu et al. (2019) who assert that companies which demonstrates a robust dedication to safety, tends to have a heightened level of safety awareness among project team members. The high level of safety awareness among the two categories of respondents can be attributed to their companies' substantial investments in safety promotion and comprehensive training initiatives.

Furthermore, the construction industry's safety protocols are significantly influenced by regulatory requirements. Adhering to these standards is a critical determinant of safety implementation. These safety protocols are mandatory to be put in place to reduce accidents, fatalities and injuries, thereby boosting employee morale, enhancing output, and saving expenditures related to mishaps and injuries. The result of the study on regulatory requirements corroborates the assertions of Al-Otaibi and Kineber (2023) who opine that a critical factor influencing safety implementation is the absence of requisite safety standards, guidelines, and designated safety personnel. The perceived ineffectiveness of government enforcement in health and safety regulations leads contractors to consider these mandates as an unwarranted financial burden, particularly in the potential requirement to hire dedicated health and safety personnel (Amoah & Simpoh, 2021).

Besides, management support is a critical factor influencing safety adoption in construction. Effective safety management requires commitment and active support from top-level management within an organization. When management prioritizes and promotes a culture of safety, it significantly increases the likelihood that safety practices and protocols will be adopted throughout the construction process. Famakin et al. (2020) substantiate that the attitude and actions of management play a pivotal role in shaping safety outcome. Besides, the result further aligns with the findings of Othman et al. (2020) and Aksorn and Hadikusumo (2008) that top management's support and allocation of proper resources are the most significant factors in safety program implementation. Moreover, the implementation of safety protocols in the built sector is significantly influenced by employee training and education. Construction firms may enhance overall production and efficiency, lower the potential of accidents, and create safer workplaces by providing funding for continuous training programs. This findings corroborate the assertions of Williams et al. (2018) that employee training assumes paramount importance, as studies have identified a deficiency of training as a leading cause of accidents on construction sites. Also, Kukoyi and Adebowale (2021) reckoned that the lack of adequate health and safety trainings among construction professionals constitute a significant barrier to achieving optimal safety performance.

Additionally, the implementation of safety protocols in the built sector is significantly influenced by recognition and encouragement. Employees are more likely to adhere to safe practices and support the implementation of safety protocols when they feel appreciated for their efforts in maintaining their well-being and those of the workplace environment. These findings align with the results of Yiu et al. (2019) who noted that the challenge of a lack of motivation by project teams or sub-contractors indicates a deficiency in incentives and support from authorities, clients, and senior management within organizations. This discontent among employees stems from a perceived lack of encouragement and recognition from management for those who prioritize safety in their work (Al-Mawli et al., 2021).

Also, workers attitude significantly influences the implementation of safety protocols on building project sites. While a negative or complacent attitude toward safety may raise the likelihood of accidents and injuries, a good attitude toward safety among employees can help create a safer work environment. The result confirms the findings of Khosravi et al. (2014), and Kukoyi and Adebowale (2021) that sufficient training is required in eliminating the negative work attitudes that contribute to construction site accidents.

The findings further revealed that the penalty for non-compliance significantly influence the implementation of safety protocols on building project sites. Financial penalties, lawsuits, as well as the revocation of building projects are some examples of the consequences of non-compliance. Construction firms are often highly motivated to prioritize safety protocols and implement sustainable practices due to the threat of incurring these fines. This finding

is supported by the results of Yiu et al. (2019) that organizations aim to prevent legal repercussions and associated penalties, while also striving to fulfil contractual SMS requirements to avert contractual liabilities and their ensuing penalties. This includes the implementation of stringent penalties for violations of labour laws and the provision of insurance coverage for workers (Famakin et al., 2020).

## 5.0 CONCLUSION AND RECOMMENDATIONS

The dominant factors influencing the implementation of safety protocols in building sites have been identified in this study. It comprises regulatory requirements, organization culture, leadership commitment, employee training and commitment, resource availability, technological advancements, workplace environment, workers perceptions, recognition and encouragement, penalty for non-compliance, communication, feedback mechanisms, peer or social influence, market competition, public perception, personal of past experience, relevance of protocol to task, user friendly documentation, prequalification criteria, demonstration of impact, management support, company size, safety awareness, creditworthiness, pressure from client, workers' attitude, managers' competence, and education and training.

The study draws the conclusion that regulatory requirement has a profound influence on how safety protocols are being implemented in building project sites. This implies that stringent adherence to regulatory requirements reduces risks and promotes a safety culture, which sustains the safety of building project sites. Also, there is an overall improvement in safety compliance and a decrease in the probability of accidents when management actively supports safety measures and cultivates an awareness mindset. Implying that it is important to concentrate on both increasing management commitment and raising employee's awareness of safety. Besides, this study emphasized the value of continuing education and training measures since a knowledgeable staff promotes a proactive safety culture by being better able to recognize and address any risks. Moreover, the study also concludes that it is necessary for construction organizations to invest in personnel education and training. This indicates that a thorough safety program will provide employees with the know-how needed to overcome safety obstacles, which will eventually improve the overall performance and sustainability of building projects.

Based on the conclusions drawn, the study recommends that management of construction organizations keep employees abreast of local safety requirements and provide guidelines for its implementation in order for compliance to be easily incorporated into building site operations. This may be accomplished by maintaining up-to-date information by performing frequent audits and putting in place robust mechanisms aimed at guaranteeing compliance. Furthermore, the study recommends that construction organizations should encourage a proactive safety culture by making sure that top management is clearly committed to safety and actively participates in safety activities. This may be accomplished by participating in safety-related activities, and conveying safety principles on a regular basis, as well as making safety a clear priority when taking decisions. Besides, construction organizations and the members of the site management team should facilitate continuous safety to raise consciousness and provide employees the ability to put safety first in all they do. This may be achieved by organizing periodic safety briefings and providing safety notices, as well as encouraging a culture of reporting accidents and close calls. Moreover, the study also recommends that top management should invest in thorough training programs for safety to provide employees with the abilities and information required to recognize and mitigate hazards. This may be achieved by providing both theoretical and practical training, scheduling frequent skill refreshers, and making readily available resources to promote continuous improvement.

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