ORGANISATION OCCUPATIONAL SAFETY AND HEALTH PERFORMANCE ADAPTATION FOR LIBYA CONSTRUCTION COMPANY

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Abstract

The construction industry offers employment to about one hundred eighty million people worldwide. The modern economy is based on the evolution and development of the construction industry due to the demand for urbanisation and industrialisation. Despite the significant improvement in the construction industry, this sector is considered risky then challenging; and faces the most vulnerable and hazardous work environment. The launch of Occupational Safety and Health (OSH) of ISO 45001- 2018 International Standards is inevitable for construction organisations to provide safety, healthy and preventive environment on construction sites to the labours. OSH in construction is a globally important concern, the same goes for Libya. There are several issues ranging from the lack of attention to OSH from the construction company, plus, the increasing cost and time for safety equipment and maintaining safety culture, thus leading to poor workers' performance. These factors lead to low-quality construction work. Resolving problems of OSH practices requires enhancing the requisite knowledge, skills, attributes, and a wealth of experience to lead and manage projects successfully. A study was carried out for adapting the Organisational OSH Performance Practice in Libya Construction Companies. This paper highlights a quantitative research approach to the adaptation of OSH measurement performance in a construction company. The data was collected from 75 respondents of construction practitioners in Libya using structured questionnaires. The study revealed the factors between the OSH regulation in ISO 45001-2018 and OSH organisational performance, subsequently, the intricacies of the relationship will nurture the development of a valid model and recommendations regarding the success of construction projects in Libya. In conclusion, implementing OSH can better manage and measure construction projects and improve the organisational OSH performance.

Keywords: *OSH, ISO 45001-2018, Organisational Occupational Safety and Health performance, construction safety management, international standard, Libya*

1. INTRODUCTION

Globally, the construction industry plays a vital role in contributing to the countries' development and economic growth. It is reported that the construction sector provides about 3-5% of the Gross Domestic Product (GPD) (Alaloul et al., 2021; Musarat et al., 2021; Shurrab et al., 2019). Furthermore, the construction division has a crucial positive effect on society by employing about 180 million people worldwide and providing jobs to around 7% of the world's workforce (Alhanouti & Farrell, 2021; Shaikh et al., 2020). The modern economy depends on the building industry's evolution and growth due to urbanisation and industrialization demands. Despite the substantial development in the construction business, this sector is regarded as unsafe and difficult, and it faces the most vulnerable and hazardous work environments compared to other industries. Inadequacies in safety are a worldwide issue that led to expensive losses. According to (Collaborators, 2020), inadequate safety management accounts for around 1.53 million deaths worldwide. This high number of workplace accidents is estimated to have generated $2.88 trillion in global gross domestic product (GDP) losses (Adei et al., 2021).

The construction industry's appalling health and safety record is still a worldwide problem affecting both developed and developing countries where are employment in the construction industry accounts for about 7% of global employment, and more than 100,000 workers are killed at construction sites yearly, accounting for around 35% of the world's occupational fatalities (Boadu et al., 2020; IEA, 2022; Mohd et al., 2020). Researchers have demonstrated that a high percentage of work-related injuries in developed countries are attributed to construction work. Developed countries like the USA, the UK, the European Union (EU), and Japan still suffer from high fatality rates in the construction sector ranging from 10% to 30% (HSE, 2021; Mohd et al., 2020; Shim et al., 2022). On the other side, the occupational safety condition at construction sites in developing countries is worse compared to those in developed countries. The ILO in 2014, stated that construction workers in developed countries face a 3– 4 times higher risk of a fatal accident, while this factor increases to 6 for fatal accidents in developing countries. For instance, the fatal injury and accident rates for Sub-Saharan African countries are estimated to be 21 per 100,000 workers and 16,012 per 100,000 workers, respectively (Capobianco, 2020; Cynthia et al., 2023a, 2023b; Djientcheu et al., 2016). At the same time, in Tanzania, the construction industry is ranked second and third in South Africa as the most significant contributor to occupational accidents (Chiang et al., 2018; J. Choi et al., 2020). Nawaz et al. (2013) determined in their study that around 255 Australian construction workers sustained severe injuries during a two-year period. The survey also revealed a fatality rate of 10.45 per 100,000 construction workers. This large figure demonstrates the absence of occupational safety and health management in this context (Ahmed et al., 2018; Nawaz, 2013). The majority of construction workers face physical concerns and sustain moderate or serious injuries on construction sites (Duan et al., 2023; Jiang et al., 2020). Similarly, (Cao et al., 2021; Sun et al., 2021; Swuste et al., 2020) reported that over 3,000 construction workers die in China due to workplace accidents.

The situation in the Middle East is far worse, where trips and falls are other common causes of construction accidents middle east (Adhikary et al., 2019; Al Amri & Marey-Perez, 2020; Moosa et al., 2020; Umar & Umeokafor, 2021). (Eldash & Mahdi, 2021; M. Elsebaei et al., 2022; M. A. Elsebaei et al., 2020) conducted a study on the Egyptian construction industry and determined that construction employees failed to adopt or observed inadequate safety measures. Interestingly, the cost of insurance against accidents was the same regardless of the contractors' security measures (Abu Aisheh et al., 2021; Aisheh et al., 2021; Nyabioge et al., 2022). In addition, Smulders demonstrated that the most common cause of injuries and fatalities in the construction business is the fall of workers from a height (Halim et al., 2022; Kang et al., 2017). Similarly, (Abas et al., 2020; Chan et al., 2022) assert that the leading causes of construction accidents are working on scaffolding or platforms without sentinel rails, cracked roofs, and weak ladders that are not held firmly and are unsafe and unstable. Trips and falls are other common causes of construction accidents (Dong et al., 2017; Sinyai & Choi, 2020; Zhang et al., 2019). According to the preceding debate, the most important factor or explanation for the dangerous character of construction work is the absence of safety precautions, which results in injuries and deaths.

The contingency on the social cost of accidents has risen as a result of the expansion of business in the late 20th century and a corresponding rise in public concern for health and safety (Lee et al., 2020). The construction project's success is assessed by achieving its main conventional objectives, namely quality, time, and cost, which are affected by labour and personnel performance. Proper project and site management is crucial to improve performance and prevent and minimise site hazards or incidents. As top management began to prioritise health and safety concerns, health and safety departments expanded. Using a system management approach, systematic and strategic approaches for managing health and safety issues were established with the fundamental premise of efficiency, effectiveness, and accountability (Wachter & Yorio, 2014; Zhong et al., 2021).

Health and Safety Management Systems (HSMS) are intended to predict and avoid health and safety issues that can occur in an organisation through plan-do-check-act processes and ultimately contribute to the enterprise risk management of an organisation (Lee et al., 2020). Companies use occupational Health and Safety Management Systems (OHSMS) to set goals for the maintenance and promotion of the health and safety of employees, subcontractors, and visitors with the participation of all members and stakeholders in order to prevent industrial accidents and create pleasant working environments (Heras-saizarbitoria et al., 2019; Letícia & Gonçalves, 2019). This system supports the administration

of an organisation's material and human resources by defining and documenting the organisation, responsibilities, and processes utilised to manage such resources (Widhiastuti et al., 2019).

The Occupational Safety and Health (OSH) using ISO 45001-2018 and the international standards for OSH in the construction industry is inevitable, particularly for labours in order to provide them with safety and comfort on construction sites; this concern may lead to improve organisational safety performance (Kawiana et al., 2018; Mardiana Yusuf et al., 2012). OSH aims to improve workplace health and safety standards by studying and analysing work incidents and injuries. The OSH provides regulations and guidelines to mitigate risks and hazards and eventually protect the personnel and improve productivity. OSH and ISO 45001-2018 have implemented several regulations and guidelines for construction site safety that help improve the construction industry's appalling health and safety record. This paper further discusses the acceptance of OSH and ISO 45001-2018 among the Libya construction company.

2. ISO 45001-2018

The OHS system assists businesses in enhancing their performance by: 1) Establishing and implementing an OHS policy and OHS objectives; 2) Ensuring that top management demonstrates leadership and commitment to the OHS management system; 3) Establishing a set of processes that consider its setting (see A.4.1) as well as its risks and opportunities; 4) Identifying the hazards and OHS risks associated with its activities and implementing controls to avoid or mitigate their possible consequences; 5) Implementing operational procedures to avoid or reduce its occupational health and safety concerns; 6) Using information, communication, and training to raise understanding of its OHS hazards, risks, and associated operational controls; 7) Assessing and attempting to enhance its OHS performance; 8) Building and strengthening the essential skills; 9) Fostering and promoting a culture of occupational health and safety within the organisation; and 10) Ensuring that employees and, if they have them, their representatives are informed, consulted, and given the opportunity to participate.

In addition, ISO 45001 has defined several success factors to assist organisations in evaluating and enhancing their performance. The effectiveness of the OHS management system depends on the leadership, dedication, and participation of all organisational levels and functions. The adoption and long-term viability of an OHS management system, as well as its effectiveness and ability to achieve its goals, are contingent on a number of critical elements, which can include: (a) The initiative and leadership of upper management; (b) The organization's upper management is building, leading, and promoting culture; (c) Participation of workers; (d) Communication and consultation procedures; (e) Allocation of required resources to ensure its survival; (f) Clear OHS regulations; (g) The integration of the OHS management system with the business processes of the organization; (h) Continuous evaluation and monitoring of the OHS management system; and (i) OHS goals that are consistent with OHS policies.

This International Standard's OHS management system approach is centred on the concept of Plan-Do-Check-Act (PDCA), which demands the leadership, commitment, and engagement of workers, and, where they exist, workers' representatives, from all levels and functions of the organization (ISO 45001, 2018). Organizations employ the PDCA model's iterative process to achieve continuous improvement. It can be applied to a management system and each of its components in the following ways:

• Plan: create the objectives, programmes, and procedures required to provide results consistent with the organization's OHS policy;

• Perform: Carry out the processes as planned;

• Verify: monitor and assess actions and processes relative to the OHS policy and objectives, and report the results; and

• Act: Take steps to continuously enhance the OHS performance in order to attain the desired results.

In accordance with the PDCA model (ISO 45001, 2018; Parsons, 2018) has suggested several factors that affect the organisational safety performance of the construction industry. Such factors had been designated to each cluster based on the international standard used in ISO 45001 (ISO 45001, 2018).

3. OCCUPATIONAL SAFETY AND HEALTH IN LIBYA

After the civil war in Libya, the construction industry in Libya has been severely impacted by political instability and ongoing conflicts, leading to extensive destruction of infrastructure (Alharary Aboub, 2020; Shoaib, 2016). However, despite challenges such as security concerns and political divisions, there have been positive developments (Alfakhri & Ismail, 2017; Allen et al., 2019). International organizations and countries have expressed support and offered financial assistance, technical expertise, and capacity building to aid in the reconstruction and revitalization of the construction sector (Shoaib, 2016). While obstacles remain, there is hope for the industry's recovery and the rebuilding of essential infrastructure in Libya. So that it shows the demand for more buildings and infrastructures evolves (Abuzbida et al., 2022; Ghadar, 2017; Zekri et al., 2022).

The construction industry, one of the most prominent sectors of the Libyan economy, employs a big labour force and contributes significantly to the economy. Yet, the industry is also one of the most hazardous, with a high rate of accidents and injuries (Hashem et al., 2013). In order to protect workers from injury, it is vital that Occupational Safety and Health (OSH) are promoted to be effectively implemented in the Libyan construction industry (Amel Dakhil, 2013).

Due to rising awareness of the significance of occupational health and safety, there has been a growing interest in HSMS and OHSMS in Libya in recent years. Yet, the adoption of HSMS and OHSMS in Libya has been difficult due to a lack of rules, limited resources, and insufficient training and teaching programmes (Amslak & Aminudin, 2022; Pfaffel et al., 2019).

The data shown in Figure 1 is an approximate number of workplace accidents that occurred in Libyan businesses concerning their level of economic activity in terms of occupational health, environmental protection, and administrative safety. It is therefore portrayed that the construction industry in Libya has a significantly higher accident rate than other types of Libyan firms. Data on accidents are used as the primary yardstick for measuring performance in the areas of public health, safety, and the environment. (Bureau of Statistics and Census, 2018; LPHA, 2020; Winge et al., 2019).

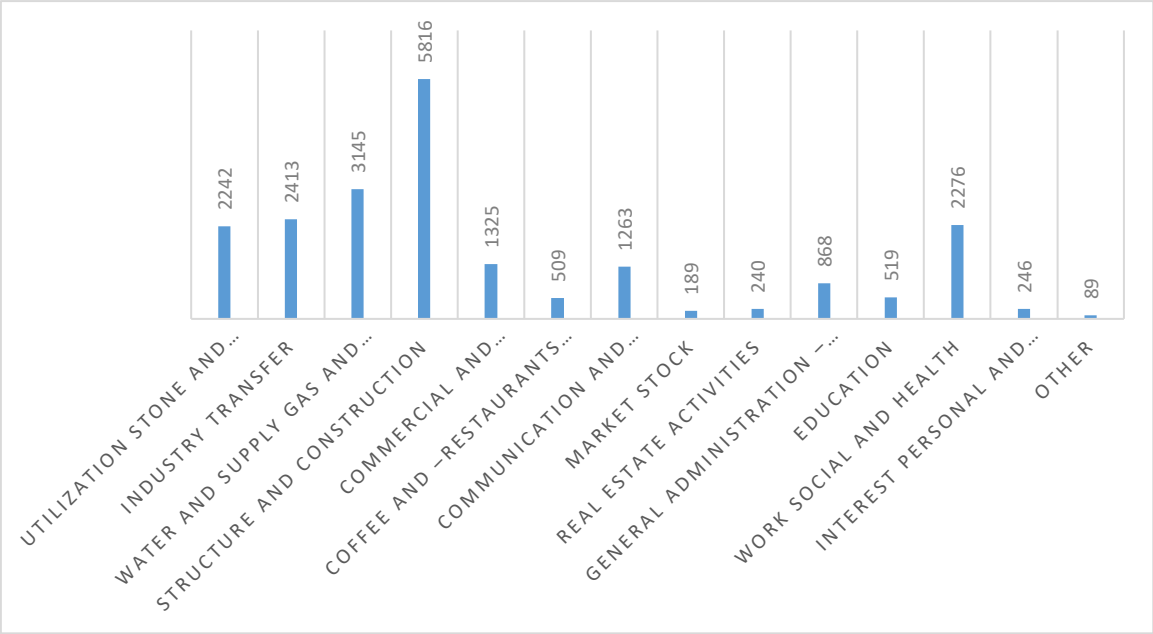

Fig. 1. Work accidents according to the economic activity

Despite these barriers, Libya has taken steps to improve occupational health and safety in the country. In 2013, the Libyan government issued a new labour law that emphasized the importance of maintaining safe and healthy working conditions for all employees (Shafighi, 2021). The law stipulates that employers provide appropriate training and safety equipment to their employees to prevent accidents and injuries. In addition, the government has issued a decision to establish the Libyan Center for Occupational Health and Safety (LCOHS) to provide organizations with training and guidance about occupational health and safety (Amslak & Aminudin, 2022; Foad Mohamed Al-kilani, 2011; Mustafa Elmontsri, 2014).

In order to improve OSH in Libyan building projects, the survey's findings will be used to create a model for organisational safety performance practices. By highlighting areas that need improvement, this model hopes to assist in enhancing safety performance standards in Libya's construction sector. This study is crucial since the construction sector is a high-risk one that significantly affects employees' health and safety (Basheer et al., 2019). The ISO 45001 standard offers a thorough and systematic method for detecting and controlling workplace risks and hazards, which are common in the construction industry. It is well acknowledged as a foundation for enhancing occupational health and safety management systems in the workplace (Licence, 2022; Uzun & Mahcicek, 2018).

4. RESEARCH OUTLOOK AND METHODOLOGY

4.1. Research objective

This study aims to assess the significance of OSH procedures in the Libyan construction sector. What is the level of importance of organization OSH performance based on ISO 45001-2018 in the Libya construction company safety practices? The aspects measured by ISO 45001:2018, which include organizational context, leadership and worker participation, planning, support, operation, evaluation, and improvement, were used to build a survey design in order to accomplish this goal (ISO 45001, 2018). This study analysed the relationship between OHS and ISO 45001-2018 evaluation methods from Libya construction company perspective.

4.2. Methods

The data for this study were collected using a structured questionnaire. The questionnaire obtained demographic information from 75 respondents as shown in Figure 2, as well as sought the perspectives of respondents regarding the effecting of OSH and ISO 45001 on organizational safety performance. A 5-point Likert scale was chosen due to its high reliability and successful adaptation in measuring different types of affective characteristics (Norman, 2010). Construction companies in Libya were selected based on their size and location using a stratified random selection technique. Survey participants included project managers, supervisors, organizational managers, safety officers, and civil engineers. The questionnaire was designed to collect data on the level of importance of OSH practices.

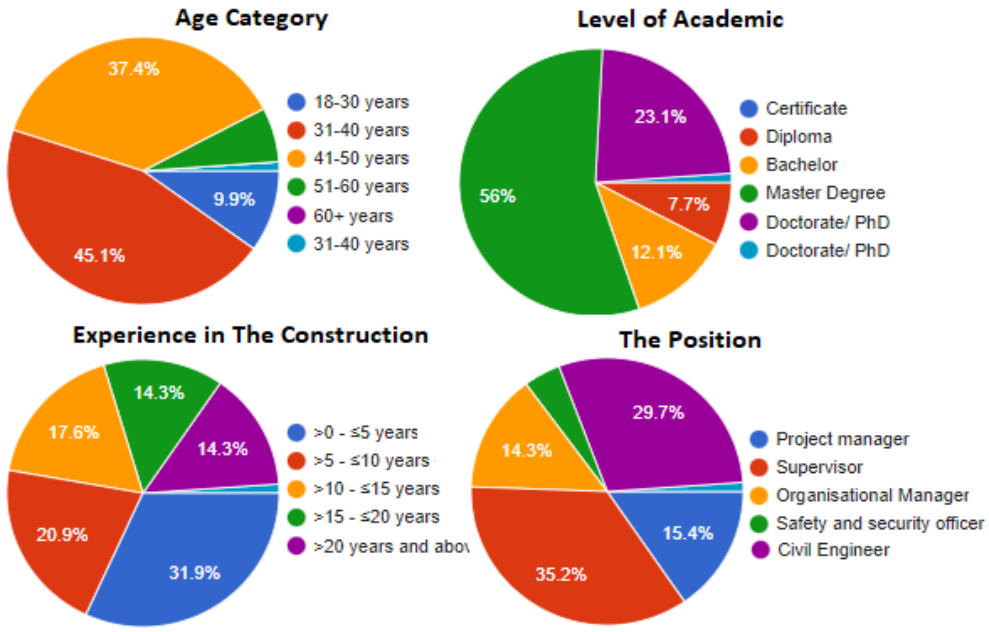

Fig. 2. Respondent Demographic Statistics

The responses received from the survey were analysed using statistical tools. In order to determine the coefficients of the equations, a factor analysis was conducted using the SPSS program. Using factor analysis is an effective method for reducing the data's complexity by detecting any possible underlying patterns or constructions (Chen, 2022; Latief et al., 2017). To confirm the correctness and dependability of the data, the researchers employed the Kaiser-Meyer-Olkin (KMO) method to test the sample's adequacy and the Cronbach's alpha model to evaluate the study's reliability. A KMO score of at least 0.7 is deemed appropriate for factor analysis (Peterson, 1994; Schrepp, 2020; Mohtasham et al., 2022; Shrestha, 2021). Descriptive statistics and factor analysis were performed. Descriptive statistics were employed to offer an overview of the data and to assist in identifying any patterns or trends (Lawless et al., 2010; Mishra et al., 2019) using factor analysis, the fundamental components that explain the variance in the data were identified.

5. RESULTS

Embarking on the data analysis journey, thorough testing was conducted using KMO and Bartlett's Test to ensure the adequacy of sampling. These tests examined correlations and patterns within the data, determining the suitability of factor analysis. Table 1 reveals encouraging results, with a KMO test result of 0.884, surpassing the recommended threshold of 0.7. Furthermore, Bartlett's test demonstrated significance, evident in the Approx. Chi-Square value of [X2(465) = 2154.986] and a p-value of 0.000, reinforcing the appropriateness of factor analysis for this dataset. Moreover, Table 1 highlights the internal consistency of the construct items, with all Cronbach's alpha values exceeding 0.7. This suggests that the scale of these items aligns cohesively, granting the researcher the green light to embark on a comprehensive full-length study.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.884
Bartlett's Test of Sphericity	Approx. Chi-Square	2154.986
	df	465
	Sig.	.000

Cronbach's Alpha Measure				
CODE	**Constructs**	**Items**	**Cronbach's Alpha Values**	**Acceptance Range**
O	**Context of the organisation**	4	.769	0.7 - 1
L	**Leadership**	4	.897	0.7 - 1
P	**Planning**	7	.901	0.7 - 1
S	**Support**	5	.921	0.7 - 1
OP	**Operation**	7	.931	0.7 - 1
PE	**Performance evaluation**	5	.925	0.7 - 1
I	**Improvement**	3	.893	0.7 - 1

Table 1. Assessment of Data Suitability and Reliability: KMO and Bartlett's Test, and Cronbach's Alpha

The values of each factor after rotation are shown in the Rotation Sums of Squared Loading column. This analysis extracted four components with a total initial eigenvalue of 16.30 for the first component and explained 40.54 percent of the variance, while the second component has 2.79 eigenvalues and 8.99 percent. Furthermore, the third component has a 1.47 eigenvalue and 9.72% of the variance and the last component has a 1.29 eigenvalue and explained 4.16 percent of the variance.

The Varimax rotated component matrix was used to determine the coefficients of the equations in the third stage. As indicated in Table 2, only 12 of them have an impact on the study model. According to the investigation, eleven factors were relevant, and five factors had a substantial impact on the safety practices of construction companies in Libya. They are the organization's context: leadership, planning, and support. Recommendations pertaining to the influencing elements are presented since organizations must focus their efforts on developing these factors. It is proposed that organizations employ planning and leadership to enhance the operation of applying ISO 45001 in construction regions in Libya.

According to the insightful findings of (Bandalos & Finney, 2018; Friend & Kohn, 2018; Watkins, 2018), the fourth step in the factor analysis involves assessing the loading factors of each construct. These loading factors indicate the strength of the relationship between each item and its corresponding construct, reflecting the indicator's reliability. Notably, higher outer loadings indicate a robust association between the items and the construct, signifying adequate indicator reliability. As suggested by (Chaw & Tang, 2019; Habibi et al., 2018; Lo et al., 2021), standardized outer loadings above 0.708 serve as a benchmark for satisfactory indicator reliability.

Rotated Component Matrix									
	Component					Component			
	1	2	3	4		1	2	3	4
O1	.247	.169	.803	.139	**S4**	.335	.077	.200	.845
O2	.130	.330	.711	.157	**S5**	.463	.625	.275	.293
O3	.145	.595	.241	.246	**OP1**	.508	.328	.414	.194
O4	.235	.231	.463	.525	**OP2**	.521	.534	.329	.220
L1	.186	.824	.174	.123	**OP3**	.554	.369	.254	.157
L2	.217	.715	.310	.050	**OP4**	.584	.218	.564	.162
L3	.367	.617	.404	.191	**OP5**	.530	.337	.272	.143
L4	.229	.668	.370	.233	**OP6**	.665	.194	.396	.259
P1	.266	.697	.488	.295	**OP7**	.533	.261	.414	.135
P2	.055	.326	.693	.183	**PE1**	.778	.124	.338	.100
P3	.249	.345	.702	.209	**PE2**	.791	.169	.212	.100
P4	.303	.348	.687	-.001	**PE3**	.758	.268	.123	.324
P5	.268	.662	.392	-.014	**PE4**	.755	.283	.227	.283
P6	.139	.647	.394	.123	**PE5**	.800	.337	.087	.169
P7	.204	.714	.250	-.004	**I1**	.810	.271	.147	.234
S1	.473	.143	.073	.683	**I2**	.774	.235	.135	.269
S2	.289	.191	.181	.815	**I3**	.772	.256	.237	.109
S3	.335	.077	.200	.845					

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

Table 2. Rotated Component Matrix

However, it is important to note that indicators with outer loadings below 0.50 should be considered for exclusion from the scale, as stated by (Maskey et al., 2018; Shrestha, 2021). This strategic decision can be made if removing these indicators significantly enhances the composite reliability and Average Variance Extracted (AVE) of the measurement model. The meticulous evaluation of such indicators is crucial, as it can substantially influence the overall reliability and validity of the scale employed in the analysis.

Interestingly, in the current study, all items were found to meet the established criteria, resulting in none of them being excluded from the scale. This outcome emphasizes the significance of all items, aligning with the initial expectations and underscoring their relevance in capturing the constructs under investigation.

Rotated Component Matrix				
	Component			
	1	2	3	4
O1	.803			
O2	.711			
O3	.595			
O4	.525			
L1	.824			
L2	.715			
L3	.617			
L4	.668			
P1	.697			
P2	.693			
P3	.702			
P4	.687			
P5	.662			
P6	.647			
P7	.714			
S1		.683		
S2		.815		
S3		.845		
S4		.845		
S5		.625		
OP1		.508		
OP2		.534		
OP3		.554		
OP4		.584		
OP5		.530		
OP6		.665		
OP7		.533		
PE1			.778	
PE2			.791	
PE3			.758	
PE4			.755	
PE5			.800	

I1				.810
I2				.774
I3				.772

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 8 iterations.

Table 3. Results of factor loading.

	The Factors based on ISO 45001:2018		**Exclude**	**Reason for Excluding**
Context of the organization	**O1**	Understanding the organization and its context	NO	-
	O2	Understanding the needs and expectations of workers and other interested parties	NO	-
	O3	Determining the scope of the OH&S management system	NO	-
	O4	OH&S management system	NO	-
Leadership and worker participation	**L1**	Leadership and commitment	NO	-
	L2	OH&S policy	NO	-
	L3	Organizational roles, responsibilities, accountabilities, and authorities	NO	-
	L4	Participation and consultation	NO	-
Planning	**P1**	Actions to address risks and opportunities	NO	-
	P2	Hazard identification and assessment of OH&S risks	NO	-
	P3	Hazard identification	NO	-
	P4	Assessment of OHS risks and other risks to the OHSMS	NO	-
	P5	Determination of legal requirements and other requirements	NO	-
	P6	Planning to take action	NO	-
	P7	OHS objectives and planning to achieve them	NO	-
Support	**S1**	Resources	NO	-
	S2	Competence	NO	-
	S3	Awareness	NO	-
	S4	Information and communication	NO	-

	S5	Documented information	NO	-
Operation	**OP1**	Operational planning and control	NO	-
	OP2	Hierarchy of controls	NO	-
	OP3	Management of change	NO	-
	OP4	Outsourcing	NO	-
	OP5	Procurement	NO	-
	OP6	Contractors	NO	-
	OP7	Emergency preparedness and response	NO	-
Performance evaluation	**PE1**	Monitoring, measurement, analysis, and evaluation	NO	-
	PE2	Evaluation of compliance with legal requirements	NO	-
	PE3	Internal audit objectives	NO	-
	PE4	Internal audit process	NO	-
	PE5	Management review	NO	-
Improvement	**I1**	Incident, nonconformity, and corrective action	NO	-
	I2	Continual improvement objectives	NO	-
	I3	Continual improvement process	NO	-

Table 4. Factors Analysis

Based on these findings, the study recommends that construction companies in Libya focus their efforts on developing the identified factors to enhance the implementation of ISO 45001 in the construction regions in Libya. The study also provides recommendations on the influencing elements that should be considered to improve the safety performance of construction companies in Libya. This study's findings will assist Libyan construction organisations in creating and enhancing their OSH practices and will contribute to the expanding body of information regarding OSH practices in the construction industry.

Overall, the research findings provide valuable insights into the factors that affect the safety performance of construction companies in Libya, which can be used to develop effective safety strategies and policies.

6. DISCUSSION

The ISO 45001:2018 standard was used to evaluate the Plan-Do-Check-Act (PDCA) cycle's constructs, which include organizational context, leadership, worker participation, planning, support, operation, evaluation, and improvement (ISO 45001, 2018; Uzun & Mahcicek, 2018). Our investigation indicated that four factors significantly impacted the safety standards of Libyan construction firms. These components were leadership, planning, support, and organizational context. The overall variance explained by the four factors was 63.41 %, showing that the four factors were mostly responsible for the variance in the data.

The factor analysis demonstrates that performance evaluation and improvement clues have the greatest impact on organizational safety performance, with factor loadings ranging from 0.800-0.755. In addition, leadership is the second most influential element in organisational safety performance, with

values ranging from 0.824-0.617. Yet, the planning phase has a low factor loading, indicating that it has a lesser impact on organizational safety performance 0.714–0.647. Information, communication, and understanding the organization and its context have the greatest factor loadings of 0.845 and 0.803, respectively, but action planning and outsourcing have the lowest factor loadings of all indicators at 0.647 and 0.584, respectively.

The aforementioned findings indicate that Libyan construction industry stakeholders paid greater attention to the evaluation, improvement, and leadership phases than to other phases. In addition, the data indicate that Libyan construction professionals value site safety work over office and planning work. Examining the comprehensive results, the indicators of information and communication and understanding the organization and its context reveal the industry's focus on assistance and operation in the region. Both results indicate that the industry is moving in the same direction with respect to site safety requirements and operations, which reflects the current state of occupational health and safety in Libya.

The findings of this study are congruent with those of a previous study (Beatriz Fernández-Muñiz, 2017) that likewise demonstrated the considerable influence of leadership, support, and operation on safety performance in the construction business. Martínez-Córcoles & Stephanou, (2017); Skeepers & Mbohwa, (2015) reported that performance review and enhancement had a significant effect on safety performance. Its consistency in outcomes lends support to the validity and dependability of this study's conclusions. The uniformity of results across research can improve the generalizability of findings and further contribute to the creation of effective interventions to improve safety standards in the construction sector.

In conclusion, the study offers significant insight into the elements that affect organizational safety performance in the Libyan construction industry. The findings can be used to inform policy decisions and to develop initiatives to enhance industry safety procedures. It is crucial to highlight, however, that this study has limitations. For example, the study was done in the Libyan construction industry and may not be applicable to other industries or nations. Examining the elements influencing organizational safety effectiveness in other industries and countries requires additional research.

7. CONCLUSIONS

In conclusion, this study provides useful insights into the necessity of Occupational Safety and Health (OSH) procedures in the Libyan construction business. The utilization of the ISO 45001:2018 standard as a framework for data gathering and analysis enabled a thorough and structured approach to comprehend OSH practices in the industry. The survey data factor analysis gave insight into the underlying elements that contribute to safety performance in Libyan construction firms. The findings of this study indicate that organizational context, management commitment, employee participation, and risk assessment are significant contributors to the safety procedures of Libyan construction firms. By concentrating on these criteria, construction businesses in Libya may enhance their OSHA procedures and provide better safety outcomes for workers in the industry. Previous research has demonstrated that good safety management systems are crucial for enhancing safety outcomes in the construction industry, which is supported by the findings of this study. The findings of this study imply that construction companies in Libya should concentrate on designing and implementing effective safety management systems that encompass the four primary study factors.

Further study in this field might investigate the application of occupational safety and health practices in the Libyan construction industry and the efficacy of various techniques for enhancing safety results. In addition, research might concentrate on the obstacles to implementing efficient OSH practices in the industry and the means of overcoming these obstacles. Future studies should also investigate the connection between safety performance and other organizational outcomes, such as productivity and profitability. Past research has demonstrated that there is a positive association between safety performance and organizational outcomes; however, additional study is necessary to determine the nature of this relationship and the underlying mechanisms. In addition, qualitative studies should be done to provide a deeper understanding of the experiences of employees in the Libyan construction

industry and the influence of OSH practices on their health and safety. This could provide a more detailed knowledge of the elements that contribute to safety outcomes and guide the development of tailored interventions to improve occupational safety and health practices in the industry. The findings of this study have significant ramifications for construction organizations in Libya and can inform the creation of measures to improve Occupational Safety and Health (OSH) procedures and ensure improved safety outcomes for industry workers.

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