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Role and Impact of Safety Leadership Culture in Promoting Safety Practices in Construction Sector of Pakistan

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Abstract

The construction industry offers employment to about one hundred eighty million people worldwide. The construction sector has grown and evolved to meet the demands of urbanization and industrialization, which are the foundation of the modern economy. Construction is still seen as a risky and difficult industry, with the most hazardous and vulnerable work environment, even with the industry's notable improvements. Pakistan's construction industry is known for its high level of risk, which makes strict safety procedures necessary to protect the health and safety of its workforce. This research seeks to understand the impact of safety leadership on safety practices and identify key factors influencing safety culture. In order to provide comprehensive insights, the research uses a mixed-methods approach that combines quantitative surveys and qualitative interviews. The validity and reliability of the results are ensured by thorough experimentations of the statistical methods such as reliability test, relative importance index (RII), and descriptive analysis tests. In order to effectively promote safety practices, management commitment, employee involvement, safety training, and good communication are essential. An in-depth examination of the relationship between management commitment and safety performance reveals how effective leadership and proactive participation improve safety results. The results shows that safety leadership is crucial to encourage safety procedures in Pakistan's construction sector by 68.81%, success factor for safety management by 65.42%, safety management practices by 64.32%, safety performance by 63.35%, barriers to effective safety management 62.47% and safety culture by 61.46%. Strengthening frameworks for regulations, promoting a safety-first culture, investing more in safety equipment, improving worker safety training, improving monitoring and evaluation mechanisms, fostering communication and collaboration, and addressing cultural barriers are just a few of the recommendations.

Keywords

Relative Importance Index, Occupational Health and Safety, Safety Management Practice, Safety Leadership

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Introduction

Occupational safety and safety performance can provide companies with a competitive advantage and have become an important area of research over the past three decades. Inadequate safety management system is the root cause of most industrial disasters. Responsible leadership in safety management and performance is implicit as the main goal of most organizations is to ensure that the value of safety is incorporated in the minds of employees. The main goal of safety management is to prevent workplace injuries, illnesses, and deaths, as well as the suffering and financial hardships of the organizations (Pandit et al., 2019). The construction industry is known for its dynamic nature, making it difficult to manage and supervise occupational safety and health on job sites. Construction sites require complex work, which poses significant dangers to the health and safety of workers. Compared to other industries, the risk of injury in construction is 2.5 times higher (Bhattacharjee et al., 2024). In Pakistan, one of the major concerns in the construction industry is safety performance. According to the Pakistan Bureau of Statistics, workplace accidents in this sector are rising quickly. There are approximately 4.7 million construction workers in Pakistan, and 15.4% of all industrial injuries are caused by construction-related accidents, according to data from 2018–19 (Haq, 2023). Globally, the International Labor Organization (ILO) estimates that 374 million people suffer from non-fatal work-related illnesses and injuries each year, and 2.78 million people die due to workplace accidents or diseases. Construction sites account for at least 108,000 fatalities annually, which is about 30% of all occupational deaths (Chellappa, 2022). Despite the obvious requirement for proactive management, some firms do not prioritize health and safety. The study aims to identify key factors that impact safety behavior and propose strategies for improving safety practices through effective leadership. By examining these factors, the research seeks to contribute to the enhancement of safety standards and practices within the construction industry. The findings are expected to offer valuable implications for policymakers, construction managers, and safety professionals committed to creating safer working environments. This work presents a comprehensive analysis of how safety leadership culture can serve as a trigger for positive change, ultimately leading to a more sustainable and safe construction sector in Pakistan.

The construction industry is very risky, so having good safety management is crucial to reducing accidents and keeping workers safe. The decrease in accidents and increased productivity can result from a strong safety culture where everyone values and prioritizes safety. A lot of construction companies are not doing enough to enhance safety culture, particularly in developing nations like Pakistan. This is mainly due to leadership; leaders who motivate and encourage their employees work better than those who simply impose rules and assign incentives or penalties (Ur Rehman et al., 2023).

To improve safety, companies need to take a comprehensive approach, which includes building trust, properly allocating resources, and involving everyone in safety decisions. Safety performance depends on workers following safety rules and voluntarily participating in safety initiatives, which is often better in larger projects due to their greater resources. The behavior of workers and their perception of the company's safety culture are critical for reducing workplace injuries. Management needs to be committed to safety by evaluating and training leaders to motivate their teams effectively. In summary, improving safety in construction requires

overcoming challenges, building a positive safety culture, and having leaders who inspire their teams, all of which are essential to protecting workers and achieving better safety outcomes. (Umer et al., 2023). The critical review of current methodologies and research gaps are summarized in table 1.

Table 1. Critical review of current methodologies and research gaps

Author	Methodology	Advantages	Shortcomings
(Garba & Audu, 2024)	-Case Study -Systematic review of past literature	- Literature review of past papers -Identifications of key factors to improve safety	- Lack of methodological details of data collection methods, sample size & statistical analysis techniques
(Qaddoori & Breesam, 2024)	- Literature review of safety factors & subfactors using likert scale	- Comprehensive approach of safety factors & subfactors	- Limited scope focusing on specific cities in Iraq
(Elkaseh et al., 2023)	-Focused research objective on implementation of ISO standards	- Structured framework for assessing OSH practices	- Limited sample size of only 75 respondents
(Abdirahman Mohamed Ali et al., 2024)	-Conceptual framework development	-Evidence based insight for research findings	-Limited scope focusing on peer reviewed papers
(Hamdan et al., 2023)	-Adopts quantitative approach using cross sectional survey	- Utilization of Smart PLS4 for data analysis	- Self-reported survey questionnaire
(Bhattacharjee et al., 2024)	- Sample size estimation using Cochran's formula	- Cross validation of different data types	- The purposive and snowball sampling methods
(Zakari Mustapha et al., 2023)	- Sample size determined using Yamane formula	-Comprehensive data collection	- Depending on existing works for secondary data may restrict the depth of analysis
(Neupane & Hamzeh, 2023)	- Data analysis using SPSS software and MS-Excel	- Mixed method approach both quantitative and qualitative	- Limited sample size of 44 respondents
(Prasetyo & Lestari, 2023)	- Data collection from government reports, academic papers and interviews with construction industry stakeholders	-Policy implication guiding future policy decisions to enhance construction safety	- Data limitations: rely on secondary data sources, which could be outdated or incomplete

Methodology

This study uses a cross-sectional approach with a survey tool, which is a quantitative method using the five-point Likert scale. When the research began, it was found that the role of leadership in promoting safety management in Pakistan's construction sector was understudied, leading to workplace accidents. Addressing these issues is crucial to improving safety standards.

The first step in this research was to review previous studies to fully understand the challenges facing Pakistan's construction industry regarding safety implementation as mentioned in table 1. An extensiveliterature review was conducted to learn more about the factors impacting the application of healthand safety protocols in the construction industry. After gathering relevant research articles, publications, and scholarly journals, factors related to health and safety were identified. These factors were then carefully sorted and grouped into several categories. To collect thorough data about the respondent, the questionnaire was broken up into seven separate sections. Expert surveys were conducted to improve the quality of the questionnaire responses. The presurvey of 16 experts helped refine the questionnaire, ensuring it would be effective in collecting the necessary data.

After incorporating the expert feedback, the questionnaire was adjusted and then uploaded to Google Forms for distribution to the target audience for the primary survey. Distributed 550 questionnaire through WhatsApp and Email with a Google Form link and received 306 responses ensuring 55.64% response rate. The final stage of the research involved analyzing the data collected from survey respondents. Statistical analysis was performed i.e. Descriptive Analysis, Reliability and Validity Analysis and Relative Importance Index using SPSS and Microsoft Excel to interpret the results.

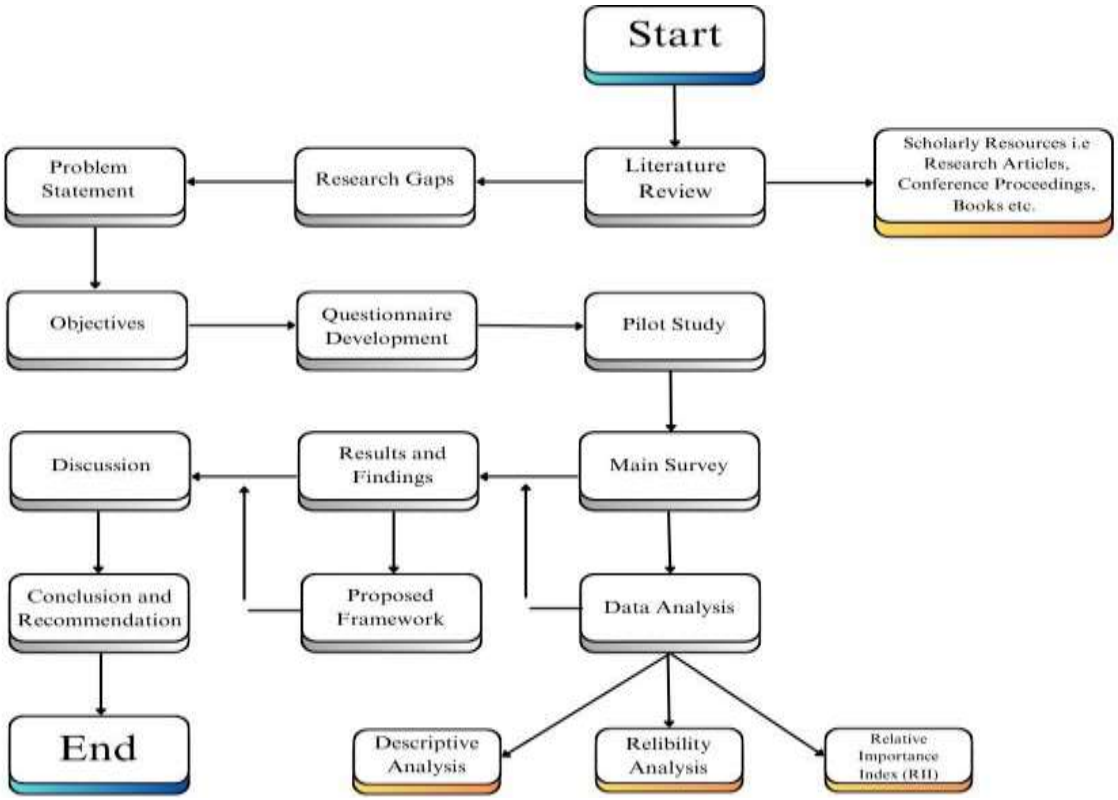

Figure 1. Flowchart of methodology

Results and Discussion

Descriptive Analysis

The descriptive statistics technique (Mean, Median, Mode, Standard Variation and range of variables) was applied in the study to provide an overview of the data characteristics. The descriptive statistics reveal a moderate level of safety leadership (2.91 %), culture (2.82%), and management practices within the organization (2.95%), with specific areas identified for improvement. The data underscores the need for enhanced leadership commitment, improved communication, and more robust training programs to overcome barriers to safety. It also highlights the critical role of a strong safety culture, effective leadership, and continuous improvement in achieving successfulsafety outcomes.

Reliability and Validity Analysis

The reliability of the questionnaire was assessed using Cronbach's alpha as shown in table 2. Typically, a Cronbach'sAlpha value above 0.70 is considered acceptable, with values above 0.90 indicating excellent reliability. The overall Cronbach's alpha value was found to be 0.961, indicating a high level of internal consistency among the survey items.

Table 2. Reliability and validity test

Reliability Statistics		
Cronbach's Alpha	**Cronbach's Alpha Based on Standardized Items**	**N of Items**
0.961	0.961	30

Relative Importance Index

The RII analysis provides an important understanding of the factors that affect safety leadership culture within the construction industry of Pakistan. Safety leadership is the most critical factor, the safety leadership along with the adoption of other factors can create safe work environment in an organization. The analysis focuses on the importance of a safety culture, effective management practices, and continuous improvement in achieving safety performance is depicted in figure 2.

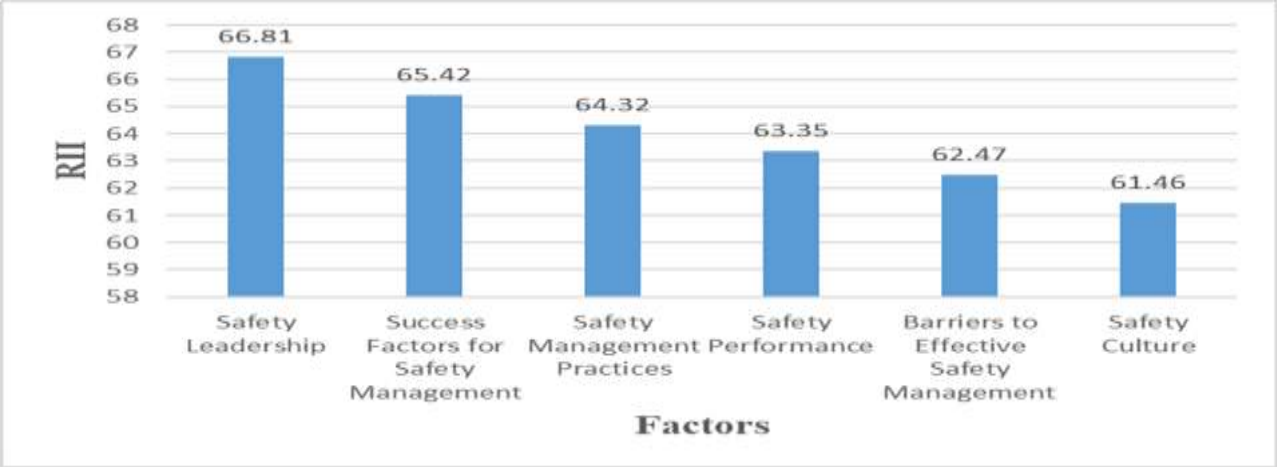

Figure 2. RII of factors and their rankings

The study reveals a moderate level of safety leadership, culture, and management practices within the organization, with specific areas identified for enhancement. Safety leadership had reasonable support, but consistency was lacking. The safety culture was weak, and safety management practices, though positive in some areas like accident reporting, varied in execution. Safety performance was moderate overall, and obstacles such as limited resources and inadequate communication posed challenges to effective safety management. The survey instrument was reliable, and key factors like leadership commitment and continuous improvement were identified as crucial for enhancing safety.

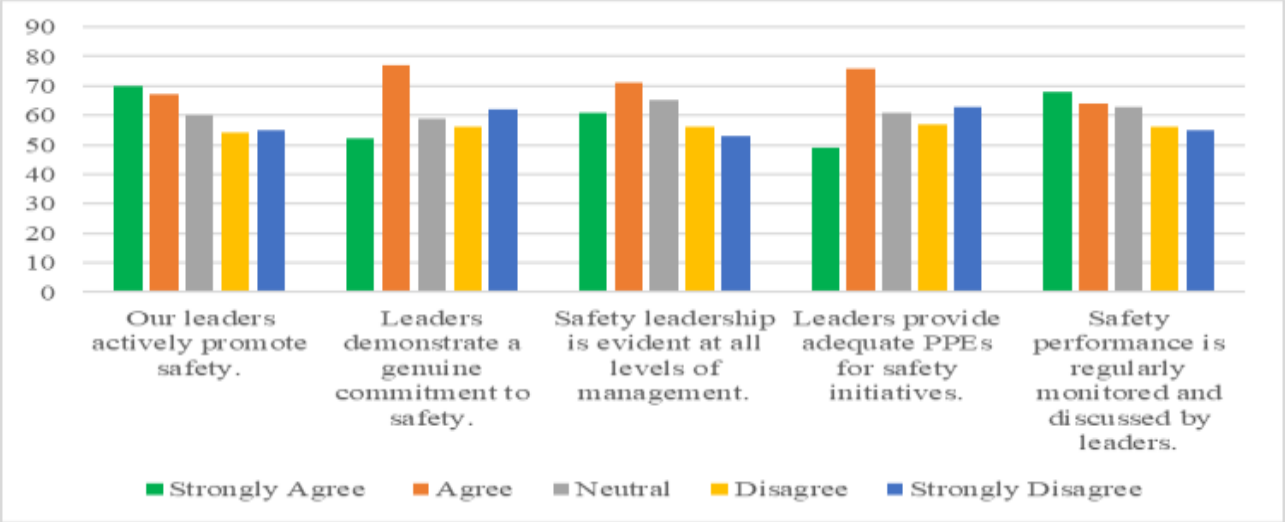

Figure 3. Selections made by participants based on safety leadership

Based on responses from 306 respondents as shown in figure 3, participants agreed that leaders must assure safety leadership at all management levels, aggressively promote safety, and show a sincere commitment to safety. There is generally a broad consensus that leaders should routinely assess safety performance and supply appropriate personal protective equipment (PPE) as mentioned in table 1. Most participants agree that safety is a fundamental organizational value, and they strongly agree that all staff members receive regular safety training and are encouraged to report any safety concerns.

Promoting safety as a core value and integrating safety culture into organizational culture are advised. Analyzing the use of predictive modelling and advanced data analytics to anticipate and reduce potential risks is a novel strategy. An examination of human factors and safety behaviour indicates that more training is required. An examination of the economic effects of safetymanagement shows how effective procedures increase productivity and profitability. The researchpromotes comprehensive safety management programs tailored for construction projects that ensure risk reduction throughout the entire operation process. These new insights greatly aid in theadvancement of construction safety management techniques.

Conclusion

The purpose of the study was to investigate how Pakistan's construction industry promotes safety practices and what effect safety leadership culture has in this regard. The study provided significant knowledge into the several aspects of safety culture and its implementation in the construction industry through extensive investigation. The main conclusions show that safety leadership has a critical role in influencing construction workers' safety practices and behaviour. Better safety

outcomes are the result of effective safety leadership, which is characterized by open communication, constant safety policy enforcement, and active worker engagement. Companies with excellent safety leadership cultures report greater levels of compliance with safety requirements and fewer accidents, according to the data study. The study also outlined a number of issues that Pakistan's construction industry must deal with, such as a lack of proper safety training, a failure to implement safety laws, and cultural perceptions of safety. These difficulties are made worse by the lack of a regulatory framework designed with the construction sector in mind. The significance of incorporating safety leadership into organizational culture was also emphasized by the study. Companies that put safety first as a fundamental principle rather than just as a legal necessity typically have stronger safety management systems and higher levels of safety performance.

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