



Influence of National Culture on Construction Safety Climate in Peshawar

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Abstract

One of the most important industries for the expansion of economies in emerging countries is the building industry. The company, on the other hand, is challenged with a myriad of challenges, including inadequate safety training, a lack of research and development, rising construction prices, and poor levels of customer satisfaction. This investigation focuses on the construction industry in Peshawar, a developing metropolis in Pakistan, to investigate the influence of national culture on the implementation of construction safety protocols at construction sites. Including surveys, interviews, and observations, the study design synthesizes quantitative and qualitative approaches. The results expose workers' preferred behaviors and views of dangers in different work environments. Site managers underline the need of following safety rules, doing regular inspections, and offering training. The results demonstrate the importance of a strong safety culture and offer ways to improve safety. Future construction safety research should focus on technology improvements, stakeholder engagement, continuous improvement, intervention programs, longitudinal and comparative studies. These recommendations should improve safety in Peshawar and beyond's building industry.

Keywords

Construction Safety, Developing Countries, Research and Development, National Culture, Safety Protocols

1. Introduction

The economic progress of governments worldwide is contingent upon the construction industry [1]. Despite its significance, this sector is confronted with significant challenges, including a high incidence of injuries and fatalities, despite its smaller size in comparison to other labour-intensive enterprises [2, 3]. In 2018, the European building sector was a significant employment provider, accounting for approximately 6.4% of the workforce. This sector is comprised of small and medium-sized enterprises [4, 5]. Developers, architects, engineers, contractors, and subcontractors are just a few of the many players in the construction sector, which makes adopting safety measures a particularly difficult task [6]. According to [6], safety behaviour and awareness are significantly impacted by the safety environment, which is a reflection of employees' perceptions of management's safety prioritisation efforts. There are many different sorts of hazardous activities that may be found on construction sites. Some examples of these activities include the operation of heavy

machines, the management of heavy materials, the use of poisonous substances, and working at enormous heights. These locations are difficult to navigate and present a diverse array of dangers. One of the challenges that the industry has is a high supervisor-to-worker ratio, which makes efficient management more difficult to achieve. However, positive connections between supervisors and employees promote safety performance [7]. Both industrialized and developing nations face challenges in the building sector, often exacerbated by societal restraints and low productivity. Insufficient research and development, inadequate trade and safety training, dissatisfied clients, and escalating construction costs are the challenges [7]. Some undeveloped countries lack safety precautions and training, hence employees pick knowledge from their own experiences [8]. This investigation is restricted to the construction sites of Peshawar city, which is one of its limitations.

2. Literature Review

The literature analysis highlights the paramount importance of safety management in the construction sector, emphasizing its impact on the industry's reputation, expenses, project schedules, and worker welfare. [5]. It shows how companies around the world are under more and more pressure to put safety first at work, no matter where they are located [8]. With an eye on accident prevention rather than reaction, the shift to proactive safety techniques is clear-cut [6]. Recognizing cultural differences as possible conflict causes in multinational construction projects highlights the necessity of understanding cultural impacts on conflicts [9]. The preferable method of conflict resolution is negotiation, with multitiered dispute resolution mechanisms and third-party mediation following in that order Pakistan, a developing nation with a growing construction sector, is concerned about safety due to its reliance on manual labour and conventional methods [10]. Leadership lack of safety knowledge, poor use of technology for safety, inaccurate operational procedures, project managers' lack of safety protocol understanding, and lack of task direction contribute to safety hazards [11]. He also stress the need to update safety laws for current building methods. Pakistan, a developing nation with a growing construction sector, is concerned about safety due to its reliance on manual labour and conventional methods [11]. Leadership lack of safety knowledge, poor use of technology for safety, inaccurate operational procedures, project managers' lack of safety protocol understanding, and lack of task direction contribute to safety hazards [12]. Mohammed also stress the need to update safety laws for current building methods [13]. To improve business practices and protect the well-being of workers, it is essential to integrate safety and health measures into the construction industry's management system. This research aims to assess the impact of national culture on safety conditions within the construction sector, emphasising the characteristics of employees and management and their effect on the safety atmosphere in workplaces [14]. The research will analyse management safety procedures and the perceptions, approaches, and behaviours of construction personnel about safety [15]. The objective is to ascertain substantial connections between management practices and employees' views, attitudes, and safe work behaviours, as well as to comprehend how certain cultural factors may influence these correlations [16].

3. Research Methodology

3.1. Data Collection Methods

The research study employed the following data collection methods:

3.1.1 Questionnaire Survey:

A structured questionnaire was developed based on the literature review to collect quantitative data on workers' perceptions, attitudes, and behaviors related to construction safety climate. The surveysform was directed to construction workers in Peshawar using an appropriate sampling technique.

3.1.2 Interviews:

Interviews were conducted with construction managers, supervisors, and safety officers to collect qualitative data on safety management methods, cultural factors, and their influence on the construction safety atmosphere. With the interviewer's approval, the interviews were videotaped and then transcribed for analysis.

3.1.3 Observation:

Direct observations were made at construction sites to gain firsthand insights into safety practices, workers' behavior, and the overall safety climate. The observations were documented and supplemented the quantitative and qualitative data collected through questionnaires and interviews.

3.1.4 Techniques used for Data Analysis

The data collected was analyzed using the following techniques:

3.1.5 Quantitative Data Analysis:

Utilizing descriptive statistics e.g., frequencies, means, and different types of Graph to visualize the data obtained form questionnaire survey, the quantitative data was analyzed.

3.1.6 Qualitative Data Analysis:

By means of thematic analysis, Examination of the qualitative data obtained from interviews and observations was done. Careful review of the transcripts and field notes was done, coded, and themes and sub-themes categorization was done. The emerging themes were interpreted and used to support or complement the quantitative findings.

3.1.7 Ethical Considerations

By obtaining informed consent from all participantalong with their confidentiality and discretion, ethical considerations were ensured during the entire research. Ethical guidelines and protocols about data collection, storage, and usage were ensured during this study.

Flow chart of methodology is as follows

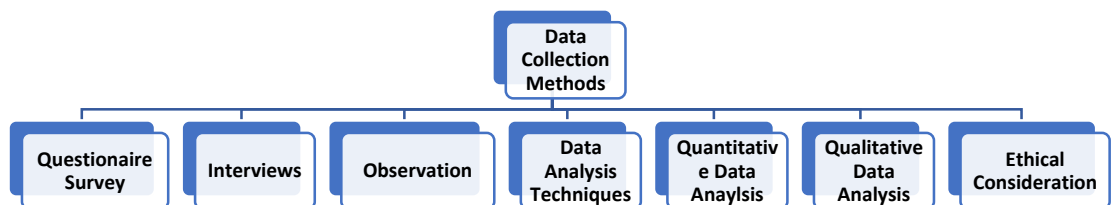


Fig. 1. Research Methodology

4. Results and Discussion

Results from the analyzed data composed from the surveys conducted with the workers emphasizes on the statistical analysis procedures. A total of 44 workers from the six most prevalent trades exposed to dangerous site conditions were selected for interviews. The interviews involved the administration of three distinct questionnaires. From Peshawar city, total 132 survey responses were collected from 44 different large construction projects.

Results and analysis (Graphs) of the data collected from workers through surveys and interviews, providing valuable intuitions into construction industry's safety environment in Peshawar.

According to the perception and behavior survey mostly worker was aware of construction safety procedure however they haven't personal protective equipment to used at site.

A risk of level for worker at site were moderate, the risk level depends on situation whether it on the higher platform level at site, as a result it is inversely proportion to the available Goods of the contractor. After careful analysis, it was determined that the behavior of workers in Peshawar towards risky situations involving ladders, fragile roofs, and scaffolding is as follows: approximately 27% is classified as High risk, around 46% as medium risk, and approximately 24% as Low risk.

From national culture survey we conclude that the management and workers both are aware to the construction safety. However, at site mostly workers and management were not updated with a latest safety procedure and implementation used widely for mega project.

The results highlight the workers' perception of risks associated with different work scenarios and their preferred behavior in such situations. The workers identified working on incomplete scaffolds, using insecure ladders, and working on fragile roofs as the riskiest situations.

The research findings have highlighted the significance of safety awareness and the impact of local safety management practices on workers' behaviors and risk perceptions. By understanding these factors, we can identify potential areas for improvement and implement targeted intervention programs to enhance safety practices in the industry.

The analysis also includes comments and suggestions from site managers regarding safety measures. They emphasize the importance of following safety protocols, providing proper training and safety equipment to employees, conducting regular inspections, and involving workers in safety practices. For improvising safety practices and policies in the construction industry, the results showed vital implications. Ensuring the application of the suggested measures and addressing the identified risks, the industry can enhance safety conditions, reduce accidents, and protect the well-being of workers. Each project contributed three survey responses, resulting in a cumulative total of 132 completed surveys.

1. Attitude and Perception Survey (WAS)
2. Behavioural Survey (WBS)
3. National Culture Survey (NC)

It provides a comprehensive overview of the results obtained, including relevant tables and graphs as follows.

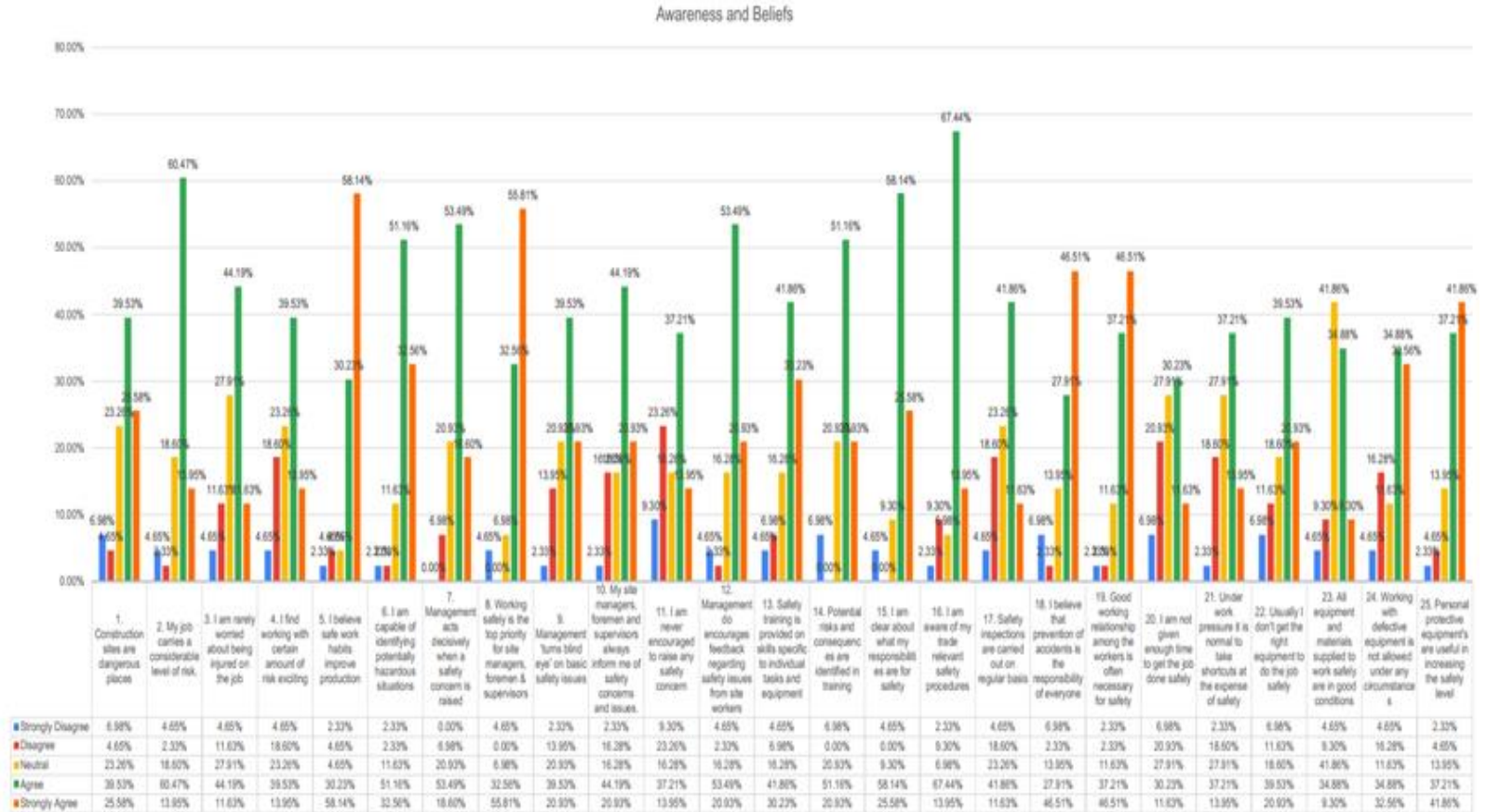


Fig. 2. Attitudes and Behaviour (Questions asked and percentage achieved shown on X and Y axis respectively)

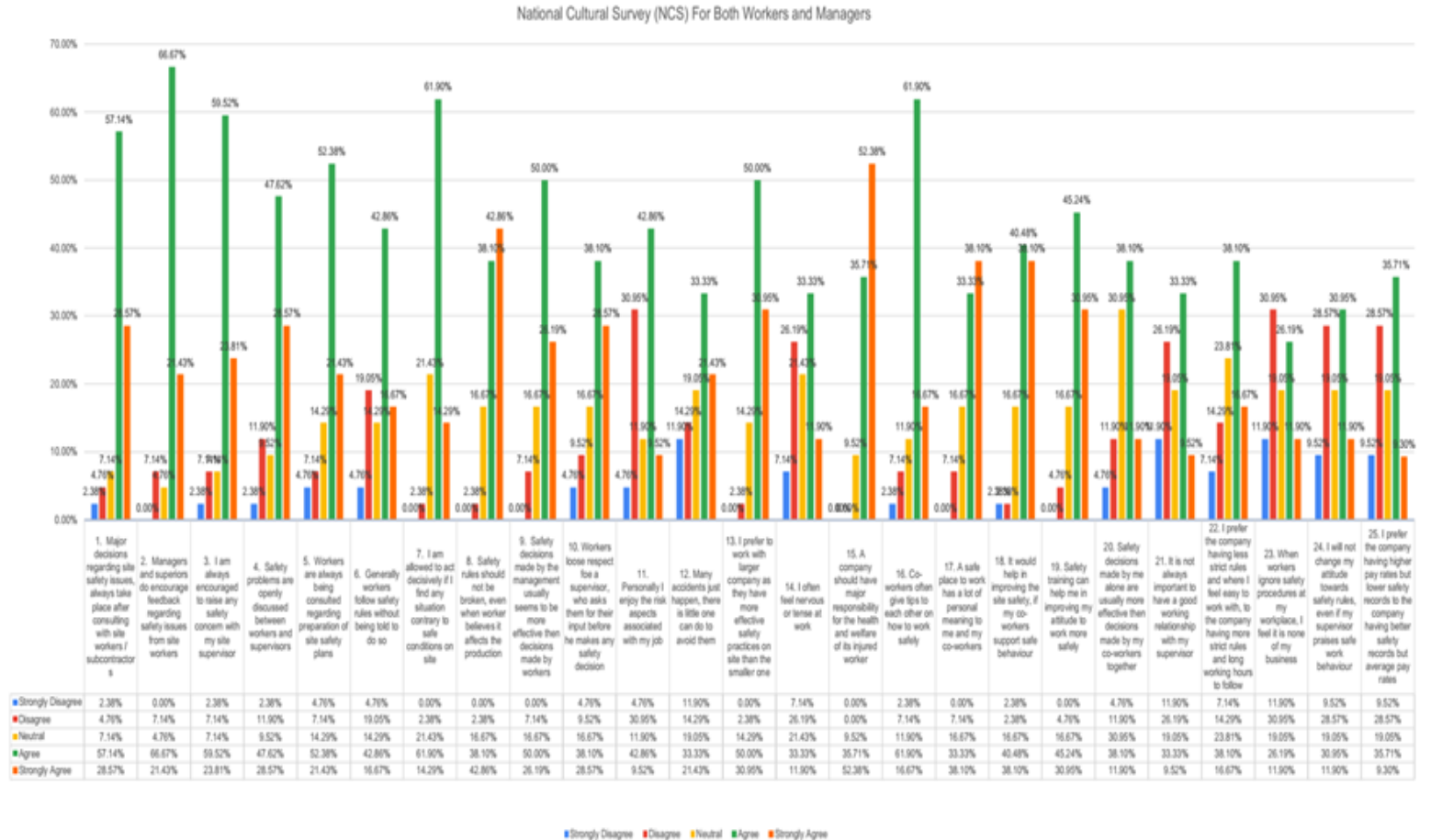


Fig. 3. Workers and Managers Survey (Questions asked and percentage achieved shown on X and Yaxis respectively)

4.1 Perception of Risks

The employees were requested to evaluate the levels of risk associated with nine specific work scenarios, as well as express their intentional (preferred) behavior when faced with each situation. Apart from one instance, all the other scenarios involving scaffold work, ladder usage, and roof work were generally considered to be of medium or high risk. The workers identified three situations as the most precarious among the presented.

1. Working on scaffolds that were not completely lodged;

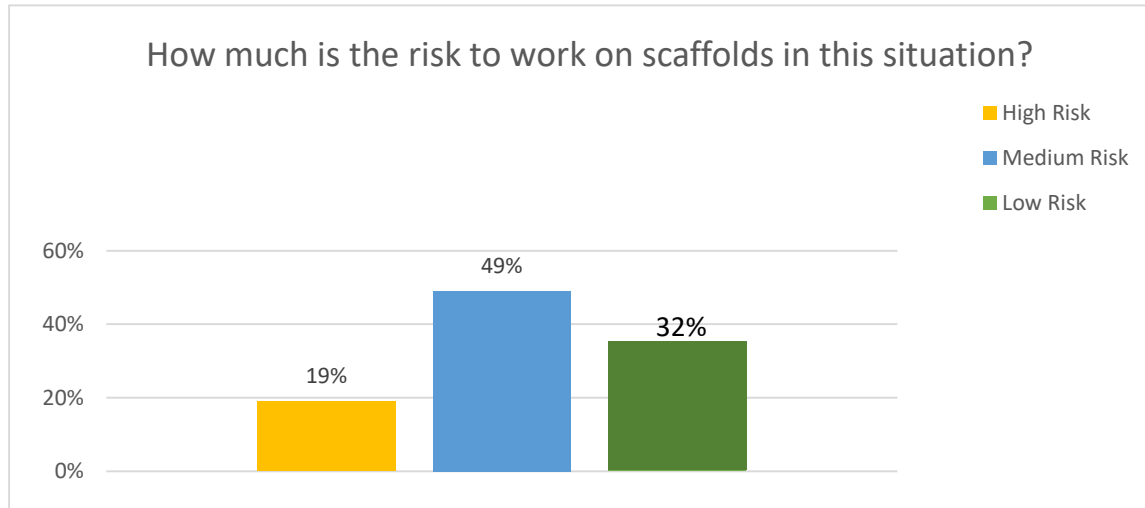


Fig. 4. Perception of worker about scaffolds

2. Using ladders that were not adequately secured or tied down.

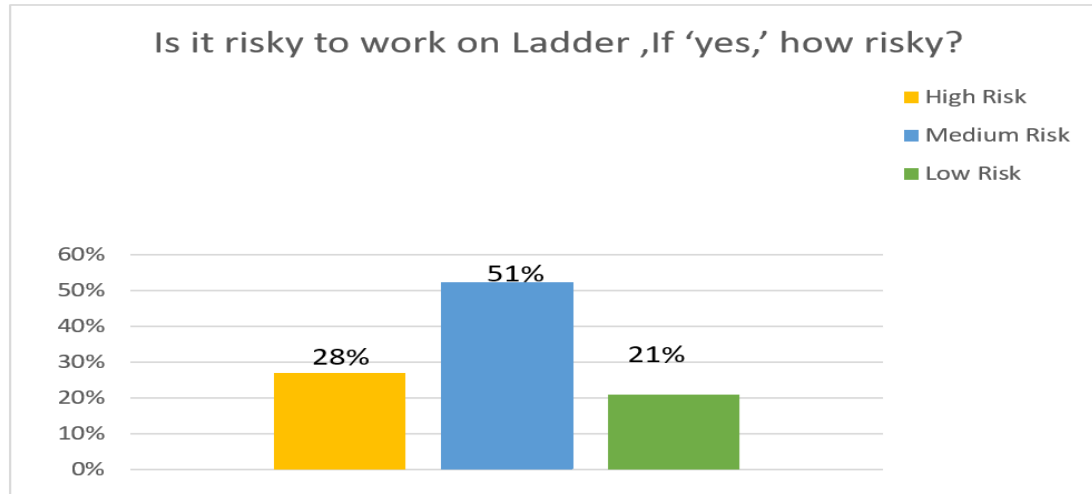


Fig. 5. Perception of worker about the ladders not properly tied

3. Working on fragile roofs.

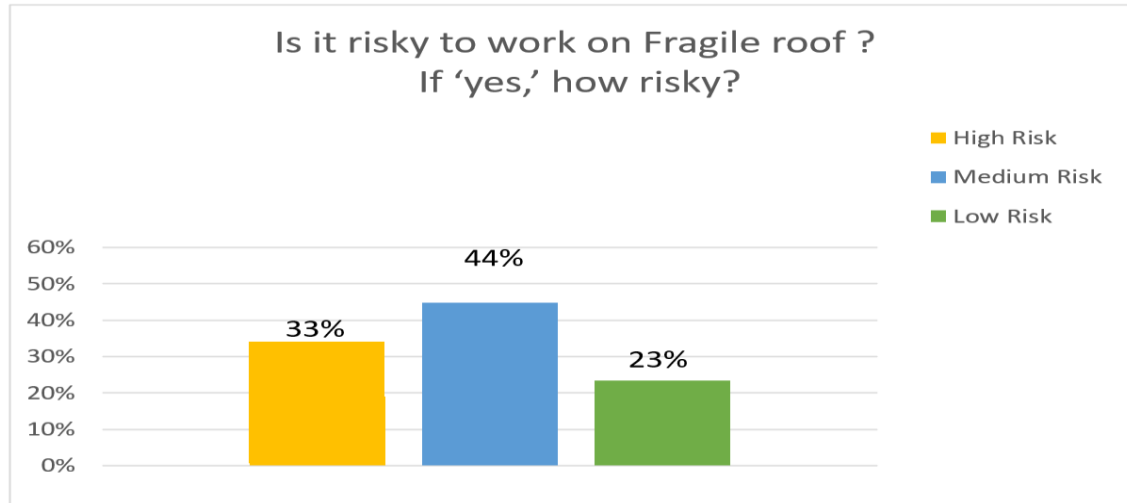


Fig. 6. Perception of worker about the ladders not properly tied

Even though workers only visited the location on occasion, they still perceived medium to high danger levels in relation to the three scenarios. The fact that over 50% of employees choose to keep working under these conditions is notable. Overall, the findings provide light on how construction workers in Peshawar city perceive, approach, and act in relation to safety. The research shows where things are lacking and offers suggestions on how to fix them so everyone is safer. These findings add to our knowledge of the problem and have practical applications for making construction sites safer.

5. Conclusion

The results and analysis presented in the study gives several recommendations for future research and practical implementation.

5.1 Longitudinal Studies

Conducting longitudinal studies to observe the changes in construction safety climate over time can deliver useful insights into the efficiency of safety interventions and the sustainability of safety practices. This will help in identifying long-term trends and understanding the factors that contribute to the improvement or deterioration of safety climates.

5.2 Comparative Studies

A diverse array of insights into the differences in the building safety atmosphere and the influence of national culture can be obtained through comparative research conducted across other locations or nations. A lot of different situations can be used to compare safety practices, attitudes, and behaviours so that scholars and professionals can find the best answers and learn from what works in safety management..

5.3 Intervention Programs

The creation and execution of tailored intervention programs to improve safety and promote safe behaviours will greatly benefit the construction industry. Training, safety awareness, and leadership development initiatives may promote a strong safety culture. These programs emphasise workplace safety. Comparative research across nations can help explain building safety differences and the effect of national culture. By comparing safety practices, attitudes, and behaviours in different contexts, researchers and practitioners may learn best practices and successful safety management techniques. Academics and practitioners may find optimal solutions and learn from effective safety management techniques by comparing safety practices, attitudes, and behaviours in various settings.

5.4 Technological Innovations

BIM, IoT, and wearable devices are used to analyse the technological innovation integration system in construction safety management, which might increase safety. These technologies provide real-time monitoring, danger identification, and risk assessment for proactive safety and rapid actions. .

5.5 Stakeholder Collaboration:

Encouragement of cooperation among stakeholders including legislators, managers, employees, and industry groups would help to improve the construction safety atmosphere. Involving all the stakeholders in safety projects, exchanging best practices, and encouraging honest communication will help to fulfil the shared duty and commitment to create a safe workplace.

5.6 Continuous Improvement:

It is imperative to prioritize a culture of perpetual improvement in safety management. Regular evaluation and assessment of safety practices, monitoring of safety climate indicators, and feedback mechanisms can assist in the identification of areas for improvement and the ongoing pursuit of ensuring the safety of construction industry workers on site. The construction industry in Peshawar can make substantial progress in the areas of safety, accident prevention, and worker welfare by implementing these prospective recommendations. Additionally, these recommendations have the potential to enhance the global safety practices by contributing to the general knowledge and comprehension of this subject.

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A contrite expression of my appreciation and appreciation to my colleagues who have assisted me in the conclusion of this research paper. My institution's assistance and the resources it provided were indispensable in the completion of this project. prevention of catastrophes and safeguarding the health and safety of employees. In addition, these recommendations have the potential to enhance the global safety practices by contributing to the general knowledge and comprehension of this subject.

References

- [1] U. Amjad and M. W. A. Khawaja, "Influence of National Culture on Construction Safety Climate in Peshawar," *University of Wah Journal of Science and Technology (UWJST)*, vol. 8, pp. 1-12, 2024.
- [2] E. Soliman and H. Altabtai, "Employee motivation in construction companies in Kuwait," *Int. J. Constr. Manage.*, vol. 23, pp. 1665–1674, 2023.
- [3] M. Bayram, B. Arpat, and Y. Ozkan, "Safety priority, safety rules, safety participation and safety behaviour: The mediating role of safety training," *Int. J. Occup. Saf. Ergon.*, vol. 28, pp. 2138–2148, 2022.
- [4] H. Chen, H. Li, and Y. M. Goh, "A review of construction safety climate: Definitions, factors, relationship with safety behaviour and research agenda," *Saf. Sci.*, vol. 142, 2021.
- [5] M. N. González García, M. Segarra Cañamares, B. M. Villena Escribano, and A. Romero Barriuso, "Construction's health and safety plan: The leading role of the main preventive management document on construction sites," *Saf. Sci.*, vol. 143, 2021.
- [6] M. Datta, "Challenges facing the construction industry in developing countries construction industry and national economy," *Proc.*, 2019.
- [7] Y. Lu, P. Gong, Y. Tang, S. Sun, and Q. Li, "BIM-integrated construction safety risk assessment at the design stage of building projects," *Autom. Constr.*, vol. 124, 2021.
- [8] R. Masood, R. M. Choudhry, Z. Riaz, S. Azhar, and J. Hinze, "Role of managers in establishment of construction safety culture," *Proc.*, 2011.
- [9] A. H. Memon, M. A. Soomro, N. A. Memon, and M. N. Abassi, "Factors causing health and safety hazards in construction projects in Pakistan," *Mehran Univ. Res. J. Eng. Technol.*, vol. 36, no. 3, pp. 559–568, 2017.
- [10] S. Lyu, C. K. H. Hon, A. P. C. Chan, F. K. W. Wong, and A. A. Javed, "Relationships among safety climate, safety behaviour, and safety outcomes for ethnic minority construction workers," *Int. J. Environ. Res. Public Health*, vol. 15, no. 3, p. 484, 2018.
- [11] K. Hu, J. Chen, and D. Wang, "Shear Stress Analysis and Crack Prevention Measures for a Concrete-Face Rockfill Dam, Advanced Construction of a First-Stage Face Slab, and a First-Stage Face Slab in Advanced Reservoir Water Storage," *Advances in Civil Engineering*, vol. 2018, p. 2951962, 2018.
- [12] M. Wang, J. Sun, H. Du, and C. Wang, "Relations between safety climate, awareness, and behavior in the Chinese construction industry: a hierarchical linear investigation," *Advances in Civil Engineering*, vol. 2018, p. 6580375, 2018.

- [13] T. K. M. Wong, S. S. Man, and A. H. S. Chan, "Exploring the acceptance of PPE by construction workers: An extension of the technology acceptance model with safety management practices and safety consciousness," *Saf. Sci.*, vol. 139, 2021.
- [14] N. J. Kalantjakos, "Assessing organizational project management maturity," in *Proc. 32nd Annu. Project Manage. Inst. Seminar Symp.*, Nashville, TN, USA, 2001.
- [15] H. Kerzner, *Strategic Planning for Project Management Using a Project Management Maturity Model*. New York, NY, USA: Wiley, 2001.
- [16] T. J. Kloppenborg and S. M. Smith, "Identify improvement opportunities by assessing your project management maturity," in *Proc. 30th Annu. Project Manage. Inst. Seminar Symp.*, Philadelphia, PA, USA, 1999.
- [17] Y. H. Kwak and C. W. Ibbs, "Calculating project management's return on investment," *Proj. Manage. J.*, vol. 31, no. 2, pp. 38–47, 2000.
- [18] R. J. Levene, A. E. Bentley, and G. S. Jarvis, "The scale of project management," in *Proc. 26th Annu. Project Manage. Inst. Seminar Symp.*, New Orleans, LA, USA, 1995, pp. 500–507.
- [19] P. Shay Lubianiker and D. Ginger Levin, "Using the web for next generation project management assessments," in *Proceedings of the Project Management Institute Annual Seminars & Symposium*, 2001.
- [20] M. McCauley, "Developing a project-driven organization," *PM Netw.*, vol. 7, no. 9, pp. 26–30, 1993.