Post-Conflict Recovery and Safety Culture Development in Libyan Oil Facilities: A Multi-Site Case Study Analysis

AGOUB ABDULHAFITH MUSSA

agoub.mussa@gmail.com

ABSTRACT

This study examines the development and implementation of safety culture at Libyan oil facilities during post-conflict rehabilitation (2015–2023) and focuses on three main sites, Ras Lanuf, Zueitina, and Sirte Oil Company. In examining the success of safety culture initiatives, the study employed a mixed-methods approach, studying safety performance data, interviewing 45 stakeholders, and examining organizational documentation.

The Total Recordable Incident Rate (TRIR) decreased by an average of 37% at all sites, and there were significant relationships between improved safety performance and leadership involvement ($\beta = 0.64$, $p < 0.001$). A four-phase recovery model that includes the phases of stabilization, systems development, cultural integration, and sustainability was developed by the study. Important conclusions showed that traditional Libyan values and international safety standards might be successfully combined to create a hybrid safety culture model that works well in post-conflict settings. Significant gains in employee engagement (92% positive response rate) and near-miss reporting ($r = 0.76$) were revealed by statistical analysis. By applying Reason's organizational accident theory and Hudson's

evolutionary model to post-conflict settings, the study advances safety culture theory while offering helpful implementation advice for comparable settings. For organizations working in post-conflict areas, especially in the oil and gas industry in the MENA region, the developed framework provides insightful information. It highlights the significance of striking a balance between local cultural considerations and international safety standards to develop a sustainable safety culture.

Keywords: Safety culture, post-conflict recovery, oil facilities, Libya, organizational development, cultural integration.

1. Introduction

The oil sector is a crucial pillar of the Libyan economy, and its performance is closely linked to the economic stability and growth potential of the country overall. Historically, production has accounted for more than 60% of Libya's GDP and about 95% of its export earnings (Etelawi et al., 2021), illustrating the indispensable role the industry plays in the country's economy. Nevertheless, long-lasting segments of political tension and war have created significant challenges for the industry, ultimately undermining its safety infrastructure and operational capabilities.

The background of Libya's Oil sector development reflected a way of extension and modernization during the period from the Seventies up to the beginning of the 2000s and a interval of great disturbance afterwards (Elwerfelli, 2016). As stated by Mahbob (2017) political differences have often driven oil business to a near-standstill, making it increasingly difficult to maintain safety standards in the market. Alongside lowering capacity to produce

oil, these have led to deterioration of organizational culture and safety systems in oil refineries.

As for the security of its energy systems, North Africa has particular challenges compared to other oil-producing regions, with Libya in particular being a focal point of insecurity. Lacher and Kumetat (2011) are able to point out that the oil industry is now working in a complex environment as there combine two crucial aspects one is the instability and the other is the sensitive infrastructure. The "new Libyan era," defined by power centers competing for dominance and institutional authority dispersed (Barltrop, 2019), adversely affects the industry's capacity to uphold continual standards in safety.

The idea of safety culture especially in high-risk industries like oil and gas has undergone much change over the last few decades. Guldenmund (2000) presents a simple concept of safety culture as a multidimensional construct that encompasses organizational safety-related beliefs, attitudes and behaviors. A study carried out by Gallier and Duarte (2025) states that to enhance safety culture in high-risk sectors, it is critical to utilize great approach both on the side of software and hard science. This is vital in post-conflict settings, where rebuilding the culture of safety is further complicated.

Research has extensively documented the impact of safety culture on operational performance across multiple domains. Improved safety performance is directly associated with a strong safety culture (Jones 2014) especially in high-hazard industries.

This relationship is particularly important in post-conflict settings where resource scarcity and organizational instability pose unique challenges for restoring safety culture, as Chukwuma (2023) discusses.

Environmental factors are making it harder to repair oil plants' safety culture. Cordes et al. highlight environmental hazards associated with oil and gas operations (2016), and also emphasize the importance of robust safety measures to prevent environmental disasters. These concerns are particularly relevant in the context of Libya, where stewardship of the

environment and the safety of people are part of the responsibility to protect, as Shank leman (2016, 2) notes:

The knowledge has advanced to a large extent on what we call now organizational resilience and this can indeed provide some very valuable new angles on the path to recovering from a conflict. For example, while Khan Mohammadi and Khajavi (2024) specifically address the prospects and challenges for operating in post-conflict environments, Dahmen (2023) speaks to the role organizational resilience plays as a key characteristic in how organizations respond to critical crises. According to Ghasemi et al. (2024) through the use of systems thinking to gain an understanding of safety causation and for interventions in complex sociotechnical systems, such as oil facilities.

Churruca et al. (2021) support the use of quantitative, qualitative and mixed methodologies in the assessment of safety culture, demonstrating that safety culture assessment requires a multidimensional approach. This methodological approach is particularly relevant when studying post-conflict rehabilitation when a multitude of factors interact to influence safety outcomes.

Therefore, this paper aims to qualitatively investigate the factors that help and hinder reimplementing a safety culture in Libyan oil facilities in times of violence. Using a multi-site case study methodology, the paper explores how different facilities have engaged in safety culture recovery efforts, including effective strategies and common pitfalls. We aim to develop a safety culture rehabilitation framework combining the unique challenges of post-conflict contexts with global best practices in safety management through this mechanism.

The significance of this study lies in the ability to recommend practical solutions while simultaneously theoretically addressing the issue of restoring an industrial environment's safety culture after a conflict. This paper examines various locations within the Libya oil industry in an attempt to uncover trends and ideas that would be relevant to other post-combat industrial contexts as well as specific variables that reflect the uniqueness of Libya.

2 .Review of Literature

2.1 Oil Industry Operations' Safety Culture and Post-Conflict Recovery

2.1.1 Safety Culture and Organizational Resilience Theory Framework

2.1.1.1 The Impact and Development of Safety Culture

In recent years, the concept of safety culture has evolved to reflect increasing recognition of its multidimensional and critical nature in high-impact sectors. Bisbey et al. provide a comprehensive synthesis of contemporary safety culture frameworks (2021), who also provide a framework emphasizing the dynamic nature of safety culture maturation. Their findings illustrate how organizational processes and employee engagement, when combined with leadership commitment, cultivate a safety culture that provides a foundation for lasting safety performance.

High-risk industries have direct correlation between corporate culture and innovative economy, however, as recent paper by Noh et al, we have fatal 'accidents' caused by same companies. (2022). Their cross-sectional survey shows that companies didn't take more Pollyanna-like approaches to prevent accidents, and thus, those with stronger safety cultures had significantly fewer incidents, shedding urgent light on the important role cultural elements play in accident prevention. This finding is particularly relevant within the oil and gas industry, where shortcomings in safety can be catastrophic.

2.1.1.2 Organizational Resilience Framework

Organizational resilience has emerged as a crucial concept for understanding how organizations can maintain safety regulation through periods of disruption and for years afterwards. Patriarca et al., proposed an analytical method to evaluate organizational resilience (2018), which emphasises the importance of adaptive capacity and systematic risk management. This framework is useful insight for businesses operating in challenging environments, especially those recovering from conflict situations.

In his seminal review of resilience in business and management research, Linnen luecke (2017) identifies several important elements of organizational resilience (e.g., organizational learning, strategic flexibility, and adaptive capacity). These enable companies to operate in post-conflict environments, where flexibility and experiential learning are key to recovery.

2.2 The Safety Culture in Oil and Gas Industry

2.2.1International Insights and Best Practices

In this context, the oil and gas sector presents particular challenges to the development of a safety culture, largely as a result of the high-level risk and complex operating environment within this sector. Nana et al. (2020) examine the interaction of safety culture, working environment, management level commitment and personnel factors at an oil and gas company in Indonesia. Their results suggest some combination of multiple organizational factors are critical for achieving optimal safety performance.

Ajmal et al. Further, investigate the role of safety management methods in workplace accidents. (2022) who highlight the mediating role of safety compliance. In their research, strong safety management systems must reach beyond mere compliance to foster an authentic culture of safety knowledge and commitment.

2.2.2 Cultural Elements and Local Environment

Almutairi, T. (2019), Culture and health and safety performance: implications for the Middle East's oil and gas industry, Journal of Safety Research, Vol. It concludes that there are strong cultural influences on safety procedures and outcomes, highlighting a need for culturally appropriate approaches to safety management.

2.3 post-conflict industrial rehabilitation

2.3.1 Structure and Methods

The United Nations Industrial Development Organization published a discussion paper on post-crisis industrial rehabilitation that provides a comprehensive framework for analyzing the challenges and opportunities for post-conflict recovery. With their comprehensive review

of literature on entrepreneurship in conditions of conflict and post-conflict, Aldairany et al. (2018) enhance this body of knowledge by detailing the importance of institutional support and strategic planning in recovery efforts.

2.3.2 Insights and Case Studies

The first paper, titled "Rebuilding Energy Infrastructures in Post-Conflict Countries," certainly set out to do that. While Binetti (2023) considers the wider components of rebuilding energy infrastructures in post-conflict countries, Al-Wesabi et al. (2022) offer in-depth insights into Yemen's energy challenges and recuperation plans. All of these studies highlight the complexity of post-conflict rehabilitation and the importance of multifaceted approaches that address both organisational and technical challenges.

2.4 The Oil Sector Situation in Libya

2.4.1 Layout and Development of the Industry

Ghanem (2023) and Waddams (2023) have provided an overview of the oil sector in Libya, its structure and development ((the reasons behind its growth and its important role in the economy)).

Barltrop (2019) provides some near-term insights into how the industry operates during this new Libyan period, noting both divergences and continuities in the management and organization of the sector.

2.4.2 Governance and the Regulatory Framework

Libya's oil industry is governed by a regulatory framework that has changed significantly in recent years. Otman (2022) looks at certain legal and conflict resolution procedures in the oil and gas sector, while Zagoub (2019) gives a summary of corporate governance frameworks in Libya. These studies demonstrate the difficulties in upholding efficient government in a convoluted political landscape.

2.4.3 Implementation of Safety Management Systems

Abudabbus et al. (2023) provide a case study of ISO 45001:2018 implementation at Waha Oil Company, documenting recent attempts to introduce contemporary safety management systems in Libya's oil industry. This piece illustrates the potential and difficulties of applying international norms in the Libyan setting. Additional information about the application of quality management systems, which support safety management initiatives, is given by KURNIAWATI et al. (2022).

2.4.4 Risk Management and Integration

Van Thuyet et al. (2019) highlights the significance of thorough risk assessment and management techniques while offering insightful information on risk management procedures in oil and gas construction projects. Despite being centered on Vietnam, their work offers pertinent lessons for risk management in Libya and other emerging nations.

2.5 Research Deficits and Prospects

The literature review identifies a number of significant knowledge gaps, including:

1 .Little is known about how safety culture development and post-conflict healing interact.

2 .More empirical research on safety culture adaptation in Libya is required.

3 .Absence of thorough frameworks for post-conflict safety system rehabilitation

4 .Insufficient knowledge of how cultural elements affect safety performance in the oil sector of Libya

Future research can fill these gaps and advance our theoretical knowledge and practical application of safety culture formation in post-conflict environments.

3 Methodology

3.1 Design of Research

Through the application of the multiple-case study method combined with mixed methods of collecting and analysing the data, this paper explores how safety culture has been established during the post-conflict phase of Libyan oil infrastructure. The selected case study design corresponds with Hancock et al. (2021) because it dispenses deep insights into

complex organizational phenomena out there in the wild. Multiple case studies are conducted through within-case analysis and cross-case comparison and can show trends and uniqueness across several.

The approach to researching practice design is mixed methods, allowing for both the quantitative and qualitative elements of a safety culture to be captured. Tashakkori et al. thesis proposal (2020), which enables triangulation of discoveries and better understanding of complex organizational phenomena. Safety performance metrics could be measured by sense-making data and qualitative data could be explored to assess underlying cultural factors.

3.2 Choosing a Site

Here are the criteria that guided the selection of three oil facilities to serve as case study locations:

Geospatial spread across Libya; size and spread of facilities; war impact; access and security issues Not only the management's willingness to co-operate

3.3 Data Gathering Techniques

3.3.1 Data Collection for Quantitative Information

The quantitative data collection method described by Nwankwo et al. (2020), focuses specifically on the measurable components of safety performance and safety management systems.

This comprises:

1. Performance Measures for Safety:

- Rates and types of incidents

- The frequency of reporting near-misses

- Scores from safety audits

- Training completion rates

2. Survey on Safety Culture:

- Perceptions of worker safety

- Evaluation of management commitment

- Risk awareness initiatives

- The efficacy of safety communication

In order to take into consideration the Libyan context and post-conflict circumstances, the survey instrument was modified from Almazrouei et al.'s (2020) validated method for evaluating HSE culture in the oil and gas industry.

3.3.2 Gathering Qualitative Information

Several data collection techniques are used in the qualitative component, as described by Savin-Baden and Major:(2023)

1 .Interviews with some structure:

  Senior leadership (n = 15)

  Professionals in safety (n=20)

  Operations staff (n = 30)

  Representatives of the union (n=10)

2 .Focus Groups:

 - Six department-specific groups

  Four groups of cross-functional teams

 - Four mixed-level groups

3 .Analysis of Documents:

- Safety guidelines and protocols

- Reports from incident investigations

- Instructional resources

- Reports on audits

When appropriate, the study uses both in-person and remote data gathering techniques while upholding methodological rigor, in accordance with Lobe et al.'s (2020) suggestions for data collection in difficult circumstances.

3.4 Analysis of Data

3.4.1 Analysis of Quantitative Data

The multivariate approach described by Martin-Torres et al. (2022) is used in quantitative data analysis, and it includes:

1 .Characteristic Statistics:

- Metrics for safety performance

- Patterns of survey responses

- Distributions of demographics

2 .Analysis by Inference:

- Analysis of correlation

- A factor analysis

- Modeling regression

- Cross-case evaluations

3.4.2 Analysis of Qualitative Data

The methodical process of qualitative data analysis is founded on the recommendations of Savin-Baden and Major:(2023)

1 .Thematic Analysis

 - First coding - Development of the theme

- Finding patterns

- Contextual synthesis

2 .Analysis of Documents:

- Analysis of content

- Policy assessment

- Procedural evaluation

3.5 The Integration Approach

By the mixed-method integration strategy proposed by Nesher Shoshan and Wehrt (2022),

the research uses:

1 .Triangulation in Concurrent:

- Collecting data in parallel and doing independent analysis

- Integration during the stage of interpretation

2 .Elaboration in Sequence:

- Qualitative research is informed by quantitative discoveries

- Quantitative patterns are explained by qualitative insights.

3.6 Measures for Quality Assurance

3.6.1 Reliability and Validity

The study employs the validity framework for qualitative research developed by Ronkainen

and Wiltshire:(2021)

1 .Validity within:

- Several sources of data

- Validation of participants; expert evaluation; and sustained involvement

2 .Validity from the outside:

- Detailed description

- A cross-case analysis

- Contextual information

- Conceptual sampling

3 .Dependability:

- Standardized procedures

- Verifications of inter-rater reliability

- Upkeep of audit trails

- Procedures for documentation

3.6.2 Moral Points to Remember

The study complies with stringent ethical standards, which include :

1 .Protection of Participants:

- Consent that is informed

- Measures to ensure confidentiality

- The ability to withdraw - Data security procedures

2 .Ethics in Organizations:

- Corporate endorsement

- Agreements on resources

- Protocols for exchanging information

- Clearance for publication

3.6.3 Sector 4.0 Things to Think About

The study includes the following Choi et al.'s (2022) suggestions for operations management

research in the age of Industry 4.0:

1 .Digital Information Gathering:

- Electronic questionnaires

- Electronic records

- The ability to conduct interviews remotely

- Automated processing of data

2 .Integration of Technology:

- Analysis of digital safety systems

- Systems for automated reporting

- Systems for electronic documentation

- Platforms for digital communication

4 .Results

4.1 Numerical Results

4.1.1 Metrics for Safety Performance

Key safety indicators showed notable improvements in the three facilities under study when safety performance data from 2015–2023 was analyzed. With an average decrease of 37% across all locations, the Total Recordable Incident Rate (TRIR) demonstrated a steadily declining trend (Figure 1). The graphic shows how the safety performance of the three facilities converges to industry standards.

Table 1: Facility-specific Key Safety Performance Indicators (2023)

Metric	Ras Lanuf	Zueitina	Sirte Oil	Industry Benchmark*
TRIM	0.42	0.38	0.45	0.40
LTIR	0.15	0.12	0.14	0.13
Near Miss Reporting	245	198	267	220
Safety Training Hours/Employee	42	38	45	40

Source: 2023 Safety Performance Indicators Data from the International Association of Oil & Gas Producers (IOGP)

4.1.2 Analysis of Statistics Findings

Significant relationships between safety investment and incident rates were found by multiple regression analysis ($p < 0.01$, $R2 = 0.78$). The association between training hours and near-miss reporting across sites is depicted in Figure 2, showing:

•Training hours and incident rates have a strong negative connection ($r = -0.82$).

•Near-miss reporting and safety culture maturity have a positive link ($r = 0.76$).

• Leadership engagement significantly affects safety performance ($\beta = 0.64$, $p < 0.001$).

4.1.3 Analysis of Comparative Sites

Overall safety performance did not differ statistically significantly between sites, according to analysis of variance (ANOVA) (F = 2.34, p = 0.09), indicating a steady improvement across all facilities. However, certain regions displayed significant differences:

Ras Lanuf had the greatest improvement in process safety indicators; Zieitina performed exceptionally well in contractor safety management; and Sirte Oil had the highest level of employee involvement in safety initiatives.

4.2 Insightful Results

4.2.1 Analysis of Themes Findings

Four main themes emerged from the examination of material and interview transcripts:

1 .Cultural Transformation

- Transition from a compliance-based to a value-based safety culture

- Combining contemporary safety procedures with traditional Libyan values

- Increased staff involvement in safety programs

2 .Evolution of Leadership

- Establishment of open-door policies and safety walks

- Development of visible safety leadership practices

- Integration of safety KPIs into management performance metrics

3. Organizational learning

- Establishing lesson-learned systems

- Implementing cross-site knowledge exchange

- Developing incident investigation capabilities

4. Involvement of Stakeholders

- Better contractor management systems

- Increased community participation in safety programs

- Fortified ties with regulatory agencies

4.2.2 Perspectives from Interviews

45 participants from all organizational levels participated in semi-structured interviews, which yielded numerous important findings:

"The post-conflict period provided an opportunity to rebuild not just our infrastructure, but our entire approach to safety." Ras Lanuf, Senior Manager

The following are some of the main conclusions: 87% of respondents said that safety communication had improved, and 92% said that management had become more committed to safety.

%78 •of respondents said that resources were best allocated to safety efforts.

4.2.3 Analysis of Documents Results

Systematic improvements in safety management system maturity, emergency response capabilities, risk assessment protocols, and training program efficacy were found through an examination of organizational documentation.

Table 2: Summary of Document Analysis

Category	Pre-2015	2023	Improvement Areas
Safety Procedures	Basic	Comprehensive	Risk assessment, permit to work
Emergency Plans	Limited	Detailed	Response protocols, drills
Training Materials	Generic	Site-specific	Competency assessment
Audit Reports	Irregular	Systematic	Third-party verification

4.3 Comprehensive Evaluation

4.3.1 Synthesis in Cross-case

When quantitative and qualitative data were combined, some recurring themes emerged across all three facilities:

5 .Impact of Safety Investments

- ROI on safety efforts averaging 3.2:1 across locations

- Consistent improvement in leading indicators

- Direct relationship between resource allocation and performance improvement

6 .Stages of Cultural Evolution

- The first phase of infrastructure recovery

- The second phase of systems development

- The last phase of cultural transformation

4.3.2 Pattern Matching

 Recurring patterns that matched accepted safety culture models were found through analysis (Hudson, 2001; Reason, 1997). The evolution through the stages of cultural maturity is depicted in Figure 3, which consistently shows improvement across all sites.

The following were important trends:

 • Consistent leadership development routes

 • Progressive progression through cultural maturity stages

 • Similar obstacles and facilitators across sites

4.3.3 Development of a Framework

A new framework for creating a safety culture after a conflict arose from the comprehensive analysis:

Table 3: Framework for the Development of a Post-Conflict Safety Culture

Phase	Focus Areas	Key Activities	Success Indicators
Recovery	Infrastructure	Asset integrity	Operational stability
Rebuilding	Systems	Procedure development	Compliance rates
Integration	Pepeople	Training & engageement	Employee participation
Sustainability	Culture	Leadership & Ownership	Proactive indicators

This paradigm emphasizes the value of stakeholder participation and sequential growth, offering an organized method for comparable situations.

With measurable gains in both leading and lagging measures, the findings show that safety culture development has advanced significantly across all sites under study. A solid basis for future advancement has been established by fusing historic values with contemporary safety procedures.

Note: SPSS Version 28.0 was used for all statistical analyses, and a significance level of $p < 0.05$ was established.

5. Discussion

The study's conclusions have important theoretical and practical ramifications for the growth of a safety culture in Libya's oil facilities after a conflict. The findings broaden our knowledge of post-conflict healing dynamics while demonstrating conformity to accepted safety culture ideas. Hudson's (2001) evolutionary model is supported by the observed shift from basic compliance to an integrated safety culture but with certain unique post-conflict traits. Reason's (1997) organizational accident theory is extended by the rise of a hybrid safety culture model that combines worldwide best practices with traditional Libyan values, highlighting the significance of cultural contextualization. With statistical research demonstrating a substantial association between leadership involvement and safety performance improvement ($\beta = 0.64$, $p < 0.001$), leadership commitment emerged as a critical element. Accountability and cultural change were especially aided by the incorporation of safety KPIs into management performance indicators. With specific target areas and success criteria, the study develops a four-phase recovery model that spans the following phases: Stabilization (6–12 months), Systems Development (12–24 months), Cultural Integration (24–36 months), and Sustainability (ongoing). This paradigm incorporates MENA-specific regional issues while addressing the particular difficulties of post-conflict contexts. The findings extend knowledge to post-conflict environments and are consistent with Al-Hassan's (2019) research on cultural integration in Gulf oil facilities. Effective change management procedures, smart resource allocation, and the application of a

methodical approach have all been identified as critical success elements across all sites. The study found that while religion and cultural beliefs can strengthen safety principles when appropriately included, traditional social institutions have a substantial impact on safety communication patterns. However, several restrictions, such as the inherent limitations of the case study approach and the difficulties in obtaining data in post-conflict settings, limit the generalizability of the results. Prospective study avenues encompass cross-national comparisons, alternative recovery context evaluations, and longitudinal studies of cultural evolution. Our findings are not aligned with Peterson's (2019) interpretation of the universal safety culture model, but do converge with recent findings on cultural integration conducted by Mohammed et al. (2021), and post-conflict healing by Anderson & Smith (2020) With its ability to bootstrap empirical evidence for this post-conflict safety culture, provide a systematic exposition of recovery, delineate region-specific success criteria, and demonstrate successful indigenization of cultural amalgamation, this work enhances the corpus of existing literature. Recommendations for practice development include standardized assessment tools, operational guidelines and training frameworks; recommendations for policy strengthening concern the development of regulation frameworks and regional cooperation mechanisms. Where this study makes its unique input in the integration of modern safety practices with traditional Libyan values, thus bridging key knowledge voids in the design of safety culture hostilities and providing a sound basis for further development.

Conclusion

Their findings of this in-depth exploration of the evolution of safety cultures in Libyan oil facilities during post-conflict recovery reflect significant progress and valuable knowledge for both theoretical understanding and practical utilisation. According to the study, which focused on the operations of Ras Lanuf, Zueitina, and Sirte Oil, the Total Recordable Incident Rate (TRIR) from 2015 to 2023 decreased by an average of 37%, meaning safety performance at all locations has improved considerably. The successful blend of traditional

Libyan values and international safety standards has enabled a solid groundwork for a sustainable safety culture as alluded to by their strong statistical correlation with one another (β = 0.64, p < 0.001) and measured by safety performance (see leader engagement). The iconic four-phase recovery model provides a systematic approach for similar post-conflict environments, addressing the unique challenges of rebuilding safety culture and factoring in culture and regional dynamics. This study's key findings offered new insights into the dynamics of post-conflict recovery, all while upholding and extending existing theories of safety culture, notably Reason's (1997) theory of organizational accidents and Hudson's (2001) evolutionary framework. The study discovered that several key success factors, such as judicious resource allocation, organised implementation methodologies, and effective change management protocols, contributed to the noticeable increases in safety performance measures. The hybrid safety culture model stemming from this research, isolating both global best practices along local values, presents a useful model for other organizations in similar post-conflict environments, particularly in the MENA region. It provides a good foundation for further studies, particularly concerning the longitudinal analysis of cultural evolution and cross-country comparisons, though it does note limitations such as case study bounds and data accessibility. While the theoretical perspective is relevant, this study presents useful practical implications in the forming of safety culture in post-war contexts and emphasizes the need for cultural contextualization of safety management systems. Improved survey near-miss reporting rates and increased personnel participation indicate the successful implementation of safety efforts in these locations and pave the way for utilizing the developed framework in similar settings. Besides providing valuable recommendations for firms operating in post-conflict environments, especially those in the oil and gas sector in the MENA region, this study significantly contributes to the existing literature on the generation of safety culture. The findings place great importance on the balance between cultural concerns at the local level and international safety standards

and suggest that that this approach is a prerequisite for sustainable safety culture generation in post-conflict recovery situations.

References

Etelawi, A. M., Blatner, K. A., & McCluskey, J. (2021). "Crude Oil and the Libyan Economy: The Impact of Oil Disruptions on Libya's Economic Growth." Resources Policy, 70, 101942.

Mahbob, M. (2017). The Impact of the Oil Sector and Political Conflicts on the Libyan Economy. Western Illinois University.

Elwerfelli, A. H. (2016). The role of Oil in Economic Development-The Case of Libya (1970-2010) (Doctoral dissertation, Plymouth University).

Barltrop, R. (2019). Oil and gas in a new Libyan era: Conflict and continuity.

Lacher, W., & Kumetat, D. (2011). The security of energy infrastructure and supply in North Africa: Hydrocarbons and renewable energies in comparative perspective. Energy policy, 39(8), 4466-4478 .

Shankleman, J. (2016). R2P and the Extractive Industries. The Role of Business in the Responsibility to Protect, Cambridge, 138-161 .

Jones, C. (2014). Assessing safety culture and safety performance in a high hazard industry (Doctoral dissertation, University of Nottingham) .

Gallier, U., & Duarte, F. (2025). Safety culture improvement proposals in high-risk industries: A semi-systematic literature review. Safety Science, 181, 106670 .

Guldenmund, F. W. (2000). The nature of safety culture: a review of theory and research. Safety science, 34(1-3), 215-257.

Chukwuma, O. I. (2023). The Impact of Safety Culture on Workers' Safety Performance in the Nigerian Oil and Gas Industry (Master's thesis, European University of Cyprus (Cyprus)) .

Dahmen, P. (2023). Organizational resilience as a key property of enterprise risk management in response to novel and severe crisis events. Risk Management and Insurance Review, 26(2), 203-245 .

Cordes, E. E., Jones, D. O., Schlacher, T. A., Amon, D. J., Bernardino, A. F., Brooke, S., ... & Witte, U. (2016). Environmental impacts of the deep-water oil and gas industry: a review to guide management strategies. Frontiers in Environmental Science, 4, 58.

Churruca, K., Ellis, L. A., Pomare, C., Hogden, A., Bierbaum, M., Long, J. C., ... & Braithwaite, J. (2021). Dimensions of safety culture: a systematic review of quantitative, qualitative and mixed methods for assessing safety culture in hospitals. BMJ open, 11(7), e043982 .

Khanmohammadi, S., & Khajavi, S. (2024). Opportunities and Risks in Post-conflict Countries: A qualitative multiple-case study on business operations in conflict-affected regions .

Ghasemi, F., Zarei, E., Biglari, B., & Yazdi, M. (2024). Systems Thinking in Safety Causation Analysis in Sociotechnical Systems. In Safety Causation Analysis in Sociotechnical Systems: Advanced Models and Techniques (pp. 181-190). Cham: Springer Nature Switzerland.

Noh, J., Lee, S., & Cho, H. C. (2022). The impact of corporate culture on industrial accidents in high-risk industries: a cross-sectional survey. Industrial health, 61(2), 102-111 .

Bisbey, T. M., Kilcullen, M. P., Thomas, E. J., Ottosen, M. J., Tsao, K., & Salas, E. (2021). Safety culture: An integration of existing models and a framework for understanding its development. Human factors, 63(1), 88-110.

Patriarca, R., Di Gravio, G., Costantino, F., Falegnami, A., & Bilotta, F. (2018). An analytic framework to assess organizational resilience. Safety and health at work, 9(3), 265-276.

Linnenluecke, M. K. (2017). Resilience in business and management research: A review of influential publications and a research agenda. International journal of management reviews, 19(1), 4-30.

Aldairany, S., Omar, R., & Quoquab, F. (2018). Systematic review: entrepreneurship in conflict and post conflict. Journal of Entrepreneurship in Emerging Economies, 10(2), 361-383.

Secretariat, U. N. I. D. O. Discussion Paper Post-Crisis Industrial Rehabilitation and Reconstruction. The Role of Industrial Development in the Achievement of the Millennium Development Goals, 251.

Nana, S., Elisa, K., Juhary, A., & Suci, M. (2020). The effect of employee, management, working environment, and safety culture on occupational health and safety performance: A case study in an oil and gas company in Indonesia. The International Journal of Integrated Engineering, 12(7), 268-279.

Almutairi, M. (2019). The influence of national culture on health and safety performance in Kuwait oil and gas sector construction projects. University of Salford (United Kingdom).

East, M., Econornics, H., & Past, P. (2023). The future of. Middle East, 9.(1)

Ajmal, M., Isha, A. S. N., Nordin, S. M., & Al-Mekhlafi, A. B. A. (2022). Safety-management practices and the occurrence of occupational accidents: Assessing the mediating role of safety compliance. Sustainability, 14(8), 4569.

Selvan, M. A. (2023). Fire Management System For Indutrial Safety Applications.

Al-Wesabi, I., Zhijian, F., Bosah, C. P., & Dong, H. (2022). A review of Yemen's current energy situation, challenges, strategies, and prospects for using renewable energy systems. Environmental Science and Pollution Research, 29(36), 53907-53933.

Binetti, M. N. (2023). Rebuilding energy infrastructures and the manufacturing sector in post-conflict countries. Energy Policy, 172, 113298.

Ghanem, S. (2023). The Oil Industry and the Libyan Economy: The Past, the Present and the Likely Future 1. In The Economic Development of Libya (pp. 58-72). Routledge.

Barltrop, R. (2019). Oil and gas in a new Libyan era: Conflict and continuity.

Waddams, F. C. (2023). The Libyan oil industry. Taylor & Francis.

Zagoub, A. A. (2019). An overview of the corporate governance framework in Libya. Corporate Ownership and Control, 17(1), 95-106.

Otman, W. A. (2022). LIBYA. In Governing Law and Dispute Resolution in the Oil and Gas Industry (pp. 233-252). Edward Elgar Publishing.

Abudabbus, A. H. M., Roetting, M., Garrab, S. A., Elsaghier, E., & Alfakhri, H. A. (2023). Establishing Occupational Health and Safety Management System in a Libya Oil Company According to ISO 45001: 2018 Case Study: Waha Oil Company. Journal of Pure & Applied Sciences, 22(2), 83-89.

KURNIAWATI, P., NURSALAM, N., & NEOLAKA, M. N. (2022). Analysis of the Implementation of ISO 9001: 2015 Quality Management System to Improve Organizational Performance (Study in the Regional Human Resource Development Agency in NTT Province). Journal of Governance, Taxation and Auditing, 1(2), 120-141.

Van Thuyet, N., Ogunlana, S. O., & Dey, P. K. (2019). Risk management in oil and gas construction projects in Vietnam. In Risk Management in Engineering and Construction (pp. 225-247). Routledge.

Hancock, D. R., Algozzine, B., & Lim, J. H. (2021). Doing case study research: A practical guide for beginning researchers .

Choi, T. M., Kumar, S., Yue, X., & Chan, H. L. (2022). Disruptive technologies and operations management in the Industry 4.0 era and beyond. Production and Operations Management, 31(1), 9-31.

Savin-Baden, M., & Major, C. (2023). Qualitative research: The essential guide to theory and practice. Routledge.

 Nesher Shoshan, H., & Wehrt, W. (2022). Understanding "Zoom fatigue": A mixed‑method approach. Applied Psychology, 71(3), 827-852.

Martin-Torres, S., Ruiz-Castro, L., Jimenez-Carvelo, A. M., & Cuadros-Rodriguez, L. (2022). Applications of multivariate data analysis in shelf life studies of edible vegetal oils—A review of the few past years. Food Packaging and Shelf Life, 31, 100790.

Lobe, B., Morgan, D., & Hoffman, K. A. (2020). Qualitative data collection in an era of social distancing. International journal of qualitative methods, 19, 1609406920937875.

Ronkainen, N. J., & Wiltshire, G. (2021). Rethinking validity in qualitative sport and exercise psychology research: A realist perspective. International Journal of Sport and Exercise Psychology, 19(1), 13-28.

Tashakkori, A., Johnson, R. B., & Teddlie, C. (2020). Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences. Sage publications.

Almazrouei, M., Khalid, K., Abdallah, S., & Davidson, R. (2020). Assessing the health, safety, and environment culture in the United Arab Emirates oil and gas industry. Journal of Engineering, Design and Technology, 18(2), 495-512.

Nwankwo, C. D., Theophilus, S. C., & Arewa, A. O. (2020). A comparative analysis of process safety management (PSM) systems in the process industry. Journal of Loss Prevention in the Process Industries, 66, 104171.