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Evaluating HSE Culture in the Oil and Gas Industry: A Comprehensive Assessment

Abdulrahman Saleh Al Hashmi
Department of Management Science and Engineering
Khalifa University of Science and Technology, Abu Dhabi, UAE
100056793@ku.ac.ae

Mariam Ali Abdulla Alhammadi
Department of Management Science and Engineering
Khalifa University of Science and Technology, Abu Dhabi, UAE
100050174@ku.ac.ae

Dr. Saed Talib Amer
Department of Management Science and Engineering
Faculty of Engineering
Khalifa University of Science and Technology, Abu Dhabi, UAE
Saed.amer@ku.ac.ae

Abstract

This study investigates the dynamics of the Health, Safety, and Environment (HSE) culture within the oil and gas industry. Despite considerable investments in HSE initiatives, gaps in leadership, employee involvement, and regulatory adherence continue to hinder achieving a robust safety culture. Through qualitative and quantitative analyses, including interviews and cross- sectional surveys, this research identifies key factors influencing HSE culture, such as management commitment, communication, and worker engagement. Findings reveal the critical role of leadership and collaborative frameworks in enhancing safety compliance and participation. This study provides strategic recommendations for fostering a sustainable HSE culture, emphasizing continuous improvement and the integration of safety practices into organizational core values.

Keywords
HSE Culture, Oil and Gas Industry, Leadership Engagement, Employee Empowerment, Safety Practices.

1. Introduction
Health, Safety, and Environment (HSE) culture plays a pivotal role in mitigating risks and ensuring sustainable operations, particularly in high-stakes industries like oil and gas. The oil and gas industry plays a critical role in the economy of the UAE, representing about 30% of the nation's GDP and providing almost 94% of the country's oil reserves, concentrated in Abu Dhabi. However, with the sector's significance comes inherent risks related to safety, environmental hazards, and health impacts. Health, Safety, and Environmental (HSE) culture has become a focal point for ensuring the safety of workers, protecting the environment, and maintaining operational excellence. However, despite regulatory advancements and organizational commitments, significant challenges remain in embedding a proactive and consistent HSE culture across all levels of operations. This study explores HSE culture within the context of the oil and gas industries in UAE, analyzing the interplay of management commitment, employee

engagement, and operational practices to propose actionable frameworks for improvement.

1.1 Objectives

This study aims to conduct a comprehensive evaluation of the existing Health, Safety, and Environment (HSE) culture within the UAE's oil and gas industry. By analyzing current practices, policies, and organizational behaviors, the research seeks to identify critical challenges and barriers that hinder the effective integration of HSE culture, such as inconsistent leadership commitment, limited employee engagement, and complex procedural frameworks. Based on these findings, the study will propose actionable strategies and frameworks tailored to the industry's needs, emphasizing leadership involvement, employee empowerment, and streamlined processes to foster a proactive and sustainable HSE culture across all organizational levels.

2. Literature review

The UAE's oil and gas sector has substantially invested in HSE to address its concerns. The company promotes "100% HSE culture". Promoting proactive safety and employee participation at all levels is tough. Management's regulatory compliance and worker safety battles undermine HSE culture. Current techniques must be examined to address this gap, especially when global safety criteria incorporate newer technology and higher limits. UAE oil and gas companies struggle to comply with HSE rules and promote proactive safety. Lack of leadership, communication, and personnel dedication has prevented the company from meeting its high safety targets. Differences in safety attitudes between management and workers may hinder communication and safety process ownership (Zahiri Harsini et al., 2020).

This research impacts the UAE economy, environment, and reputation beyond operational efficiency. The oil and gas business contributes a third of GDP, thus poor HSE standards have serious effects. Global energy markets and local economies may be affected by industry risk reduction and adaptation. As HSE cultural drivers, leadership and engagement are stressed. Poor HSE practices affect the environment. Oil and gas spills can destroy ecosystems, cost money, and erode public confidence (Little et al., 2021).

2.1 Existing HSE Culture

Leadership influences HSE culture. Top management commitment is key to HSE culture. Leaders must encourage safety, model good conduct, and sponsor HSE programs. Due to competing goals like operational efficiency and financial success above safety, UAE oil and gas leadership fluctuates. Inconsistency reduces HSE concentration and generates reactive safety, according to Adeoye Taofik Aderamo et al. (2024) [7]. Research found 63% of workers considered leadership's safety commitment lacking. Another key HSE culture feature is employee involvement. Workers must disclose hazards and take precautions. Employee participation in HSE programs is usually limited to safety training and procedure compliance. The transactional model doesn't empower workers to make safe choices. HSE committees and hazard reporting systems boost worker safety and participation as argued by Argyropoulos et al., (2024). UAE oil and gas companies lack proactive participation incentives and feedback channels.

Management-employee communication gaps suggest HSE culture concerns. Open communication creates trust, conveys safety information, and answers concerns. Underutilized safety briefings, feedback sessions, and communication technologies provide room for improvement in this vital sector. The industry's inconsistent adoption of advanced safety technologies reflects HSE culture. Real-time data and insights from predictive analytics, wearable safety devices, and IoT-enabled monitoring systems may increase safety as discussed by Gaur et al. (2019). Economic constraints, ignorance, and change resistance make their integration uneven.

2.2 Comprehensive Evaluation of HSE Culture in UAE Oil and Gas Companies

The evaluation of HSE culture in UAE oil and gas companies emphasizes the importance of integrating safety practices into organizational operations. The UAE's industry has made progress in developing a Health, Safety, and Environment (HSE) culture, driven by the sector's economic significance and inherent risks. UAE oil and gas sector accounts for 30% of GDP and holds 94% of oil reserves. The company's "100% HSE culture" initiative exemplifies efforts to enhance safety and environmental standards [1]. The company aims for "100% HSE culture" to ensure worker and societal safety. However, challenges persist, including regulatory complexities, issues and fostering a proactive safety culture remain difficulties. management-worker priority misalignment, and the need for stronger employee engagement. Employee involvement is crucial for a strong HSE culture, including hazard reporting and suggestions for safety improvements. Comprehensive strategies focusing on leadership commitment, hazard

reporting, and fostering a proactive safety mindset are essential for achieving sustainable HSE integration.

2.3 Primary Challenges and Barriers to Preventing Effective HSE Culture

A strong HSE culture in the UAE's oil and gas industry is essential yet challenging to achieve. Organizations struggle to establish proactive and sustainable safety policies due to cultural and structural issues. To overcome these obstacles and develop a strong HSE culture, understand their effects. Leadership inconsistency hinders HSE endurance and effectiveness. Safety leaders must exemplify and promote safety. The safety message is weakened by shifting objectives, management apathy, and inconsistent policy implementation. Leaders often prioritize financial and operational goals above HSE, informing employees, according to Payne (2023). The Contingency Theory of Leadership stresses this challenge by stating that leadership style should reflect situational conditions.

Conflicting safety priorities between management and workers produce communication issues. Workers focus on acute safety issues, whereas management prioritizes regulatory compliance and long-term safety planning. This division damages HSE culture and neglects safety. About 65% of oil and gas workers think management undervalues their safety concerns, according to a 2019 study. Misalignment hampers risk reporting and employee trust, which prevents accidents. Complex and rigorous safety standards hinder HSE culture assimilation. Many organizations have extensive safety procedures to satisfy international standards, but workers may struggle to understand and implement them under pressure. Finally, poor technology and innovation hinder industrial HSE progress. Predictive analytics, wearable safety gadgets, and real-time monitoring systems may improve oil and gas safety, but UAE implementation has been patchy as suggested by Nguyen et al. (2020). Budget constraints, technical inexperience, and technological resistance produce this gap.

2.4 Strategies to Enhance HSE Culture

Leadership and safety commitment must be visible. Leaders must promote HSE as a core value and model it. Perform safety audits, fix issues immediately, and include safety in performance reviews. The International Association of Oil & Gas Producers (IOGP) found that safety leadership visibility decreased workplace incidents by 50% globally. These results stress the need for HSE leadership. Safety-focused leadership training on decision-making and communication may help encourage this change. Empowering workers to protect themselves is another option. HSE committees let workers debate and solve safety concerns, according to James & Walters (2019) [11]. Encourage workers to report risks without punishments to promote trust and accountability. Staff may be motivated by hazard detection and safety concept incentives. HSE commitment and engagement increase via feedback loops that evaluate and act on employee input. Standardizing and simplifying safety practices play a crucial role in strengthening HSE culture, as overly complex or vague procedures can hinder compliance and increase the risk of errors. The study emphasizes a multifaceted approach to driving cultural change, beginning with management involvement, where trust in leadership, especially upper management, significantly correlates with reduced injury rates. Employee behavior and empowerment are also vital, as fostering a sense of ownership and responsibility for safety encourages proactive practices. Ensuring competence through continuous training equips employees with the necessary skills to manage risks effectively. A collaborative and communicative environment further enhances safety by promoting open dialogue and shared responsibility. Lastly, maintaining clear, regularly updated procedures and systems provides employees with reliable guidance and reinforces a culture of continuous improvement. Together, these elements form a comprehensive strategy for cultivating a resilient and sustainable safety culture.

2.5 Literature Gap

HSE culture suggests oil and gas safety, leadership, and employee participation have improved. Most studies focus on global or Western contexts, leaving the UAE, with its own legislative frameworks, cultural dynamics, and oil and gas dependency, unexplored. Compliance and technical solutions dominate HSE research, but cultural and behavioral factors are neglected. Leadership in supporting proactive safety and aligning management and worker safety viewpoints is understudied. This research examines UAE oil and gas HSE culture to address these issues. Leadership, engagement, and culture impact safety and compliance, according to the study.

To protect people, the environment, and operational excellence in the UAE oil and gas industry, an effective HSE culture is needed. Leadership inconsistencies, limited staff participation, communication gaps, and compliance-driven practices are important difficulties, according to this study. These obstacles demand region-specific solutions, including HSE committee empowerment, advanced safety technologies, and simpler safety legislation. Leadership and training must improve over time for sustainability. The research highlights behavioral and cultural transformation

to transition from reactive to proactive safety practices.

3. Methodology

This study examines the health, safety, and environmental (HSE) culture within the UAE oil and gas industry, focusing on the perceptions and experiences of employees at different organizational levels. A qualitative research approach was adopted, utilizing semi-structured interviews to provide a deep understanding of the prevailing HSE culture. The research employed a qualitative exploratory design to capture the nuanced perspectives of employees regarding HSE culture. This approach allowed for an in-depth exploration of themes such as leadership commitment, employee engagement, and systemic barriers.

3.1 Data Collection

The study employed semi-structured interviews to facilitate open dialogue while maintaining consistency across participants, focusing on themes such as the conceptualization of HSE culture, the perceived effectiveness of existing policies, barriers to proactive safety practices, and suggestions for improvement. A purposive sampling strategy ensured diverse representation from operational staff, supervisors, and managers within the UAE oil and gas sector. Interviews were conducted both in-person and virtually during October and November 2024, each lasting approximately 45 minutes, with recordings made to ensure accurate transcription and analysis.

3.2 Sample Size

Initially, the study aimed to interview 30 participants. However, due to unforeseen challenges such as scheduling conflicts and operational priorities within the industry, 14 interviews were successfully completed. This sample still provided sufficient diversity to identify recurring themes and patterns. The Table 1 below shows the distribution of the sample:

Table 1. Sample Size

Positions	Numbers
HSE Managers	3
Managers	4
Safety Professionals	4
Employees	3

3.3 Ethical Considerations

The study adhered to strict ethical guidelines:

- Informed consent was obtained from all participants.
- Confidentiality was ensured by anonymizing all data and storing it securely.

4. Results

4.1 Conceptualization of Health, Safety, and Environment (HSE) Culture

The interviewees, including managers, safety professionals, and workers, collectively described HSE culture as the integration of shared beliefs, values, and practices that prioritize safety, health, and environmental stewardship. Several recurring characteristics emerged, such as proactive leadership, accountability, employee engagement, effective communication, and continual improvement. Many participants emphasized that strong HSE culture transcends workplace boundaries and influences behaviors outside work, reflecting holistic integration of safety into daily life.

4.2 Key Components for a Positive HSE Culture

Interviewees consistently highlighted leadership commitment, robust communication channels, systematic training, and a culture of mutual trust as essential elements for fostering a positive HSE culture. Managers played a pivotal role as both enablers and role models, actively demonstrating best practices and setting clear expectations for safety and environmental responsibility.

4.3 Importance of HSE in the UAE Oil and Gas Sector

Given the high-risk nature of the industry, there was consensus across interviews about the heightened emphasis on HSE in the UAE's oil and gas sector. Participants attributed this focus to the sector's critical contribution to the national economy and the need to safeguard human life, protect the environment, and maintain operational continuity.

4.4 Manager–Employee Perspectives on HSE Culture

Managerial Roles and Influence

Managers consistently viewed their role as pivotal in shaping and sustaining HSE culture. They emphasized their responsibility to lead by example, communicate safety priorities, and ensure resources are available for compliance and training. Managers also highlighted their dual role in promoting employee welfare while maintaining strict adherence to HSE policies.

Employee Perceptions

Employees associated HSE culture with tangible practices such as adherence to safety protocols, provision of personal protective equipment (PPE), and workplace ergonomics. They praised initiatives like the "10 Life-Saving Rules" and the use of Behavioral-Based Safety (BBS) programs. However, some raised concerns about inconsistent enforcement of rules and gaps in communication, especially in multicultural settings.

4.5 Behavior, Procedures, and Collaboration

Behavioral Challenges and Opportunities

Behavioral inconsistencies, such as complacency and resistance to change, were cited as ongoing challenges. Participants noted that while many employees understood the importance of safety, habitual disregard for procedures persisted among a minority. Training and consistent enforcement were seen as remedies for this issue.

Collaborative Efforts

Collaboration was identified as a cornerstone of the company's HSE culture. Managers and employees emphasized the importance of horizontal and vertical cooperation within the organization and with external stakeholders. Regular safety meetings, cross-departmental audits, and employee feedback mechanisms were cited as examples of successful collaborative practices.

5. Discussion

5.1 Alignment with HSE Theories and Frameworks

The findings from this study strongly align with established safety and HSE culture theories, particularly those emphasizing leadership's critical role and the interplay between behavior, procedures, and organizational structure. Schein's model (1985) highlights that culture is built on artifacts, values, and underlying assumptions, which resonate with the behavioral and procedural emphasis observed in the HSE framework. Managers' roles in promoting and modeling safety culture were consistent with the idea that leadership behaviors heavily influence organizational safety climates, as proposed by Zohar (1980) and Guldenmund (2000).

The recurring emphasis on leadership commitment and proactive engagement aligns with Hudson's (2007) HSE culture ladder, suggesting that achieving the highest safety standards requires moving beyond technology and procedural compliance to focus on human factors. Participants' recognition of cultural diversity and employee behavior underscores the complexity of managing safety in a multinational workforce, reinforcing the need for adaptive and inclusive safety strategies.

5.2 Manager–Employee Dynamics in HSE Culture

A key finding was the divergence in how managers and employees prioritize aspects of HSE culture. While managers emphasized strategic oversight, accountability, and policy enforcement, employees focused on immediate, practical safety measures such as PPE usage, clear communication, and accessible reporting systems. This dichotomy may stem from the different pressures faced by these groups: managers operate under strategic goals and organizational benchmarks, while employees interact directly with operational risks.

Bridging this gap requires targeted interventions. Managers should engage more actively with frontline employees to understand their challenges, and employees should be encouraged to participate in shaping policies to ensure practicality and relevance. Joint training programs, where managers and employees collaborate on safety drills and

problem-solving, could foster mutual understanding and alignment.

5.3 Strengths and Challenges in HSE Culture

Strengths

The HSE culture showcases notable strengths that establish it as a leader in the UAE's oil and gas sector. Strong leadership commitment is evident through the integration of safety goals into key performance indicators and the implementation of the "10 Life-Saving Rules," setting a clear safety-first tone. The adoption of digital tools for safety reporting and analytics, along with sustainability initiatives like the Zero Flaring Initiative, reflects a forward-thinking approach. Regular and comprehensive safety training ensures employees are well-prepared to manage risks, while a collaborative culture—promoted through employee-led safety audits and workshops—fosters shared responsibility and engagement across all organizational levels.

Challenges

Despite significant progress, fully embedding a cohesive Health, Safety, and Environment (HSE) culture continues to face challenges, including cultural and linguistic barriers that complicate communication and consistent policy adherence across a diverse workforce, necessitating multilingual and culturally sensitive training programs. Inconsistencies in rule enforcement also persist, with employees observing uneven application of safety protocols. Additionally, the pressure to meet operational targets can create tension between productivity and safety, especially in high-stakes areas like drilling and maintenance. Furthermore, while the company has advanced in digitalizing safety practices, the rapid pace of technological change demands ongoing adaptation and training to ensure effective integration.

HSE Assurance Program

The main objective of this Program is to ensure consistent implementation of Specific, Measurable, Achievable, Realistic and Time Bound (SMART) proactive measures to prevent incidents and achieve continuous improvement in HSE performance. The program outlines key focus areas and critical HSE requirements, which should be implemented across business activities. These requirements have been identified to ensure that all operational risks are mitigated effectively and any events affecting the company's People, Environment, Assets, and Reputation are prevented and eliminated proactively, eventually enhancing the overall HSE culture within the organization.

The performance against the HSE Assurance Program will be recorded as a part of the company's KPIs across the concerned divisions. There are 7 KPIs. To ensure smooth measurement of the tangible performance across all KPIs within the HSE Assurance Program, the fixed scores are assigned to each expectation (KPI), with a total of 10 points equal to 100%. During the implementation verification, assessors shall evaluate evidence and will accordingly mark scores on a range from 0 to 10 (Table 2).

Score Interpretation:

- 9.5 to 10: Outstanding Performance
- 8.5 to 9.4: Exceeding Expectation
- 7.5 to 8.4: Solid Performer
- < 7.4: Improvement Required

The following are the identified KPIs of the HSE Assurance Program:

- Visible Leadership Commitment
  - HSE Leadership Site Walkthroughs (VPs & Managers)
  - HSE & PS Assurance Program Performance Self-review
- HSE Recognition and Accountability for Employees & Contractors
  - HSE Observation and Intervention
  - HSE Observation and Intervention
  - Theme-based HSE Awareness Campaigns
- Occupational Health and Industrial Hygiene
  - Develop and implement a Health Surveillance Program for the employees and contractors
- Incident Reporting, Investigation and Learning from Incidents (LFI)
  - Report and investigate Incidents and HIPO Near Miss cases in line with the Standard's requirements

- Communication and Implementation of Learning from Incidents (LFI)
- HSE Training
- HSE Critical Role Competence
- Environmental Management
- Environmental Monitoring and Reporting
- Implementation of Waste Management Procedure and Initiatives

Table 2. Roles & Responsibilities:

Role	Responsibilities
CEO	• Approves and signs the HSE Assurance Program on annual basis. • Approves and signs HSE Assurance Program bi-annual verification reports.
SVPs (Asset & Function)	• Monitor monthly HSE performance of respective asset / function. • Approve the monthly self-assessment reports received from the respective VPs. • Review and approve respective HSE program status and recovery plans. • Discuss the results of HSE verification and status of respective corrective action plan during the Quarterly Performance Review Meetings.
VPs	• Accountable for allocation of necessary manpower and resources to implement the approved HSE Assurance Program. • Ensure availability of evidence for the KPIs in their jurisdiction during corporate verification audits. • Conduct monthly self-reviews and submits monthly progress reports to respective SVP.
VP HSE	• Develops HSE Assurance Program and Implementation/Verification guideline. • Ensures functional HSE SMEs provide necessary advice and guidance. • Ensures verifications of HSE implementation and prepares progress reports to Executive Management.
Business Line HSE	• Support line management's implementation of the HSE Assurance Program. • Ensure availability of evidence for the corporate verification audits. • Responsible for performance monitoring & participation in the accomplishment of activities.
Corporate HSE	• Conduct HSE program verification. • On-site verification of HSE closure status against evidence. • Prepares reports of HSE results to line management and VPHSE.

The guidelines below are to be adhered to by the respective parties responsible:
To ensure effective line ownership and accountability within the HSE Program, Business Line (BL) VPs and Managers are required to conduct monthly self-reviews and submit status reports, along with supporting evidence, to their respective SVPs by the 10th of each month. These reports are then consolidated quarterly into a Business Line Self-Assessment Report using the SVP Reporting template. Corporate HSE will conduct quarterly verification exercises, reviewing the submitted reports and verifying evidence to validate scores, with schedules and criteria communicated two weeks in advance. The verification process includes document reviews, employee interviews, and physical checks, with only evidence presented on the day considered for scoring. Participation of Auditee Management is mandatory during opening and closing sessions, where findings and improvement areas are discussed, and the closing session minutes must be endorsed by the Auditee VP or Senior Manager. The final bi-annual performance report, signed electronically by the respective Group Company CEO, is included in the biannual submission. SVPs are expected to review HSE performance during their half-yearly reviews, while Business Line focal points are responsible for tracking actions and providing regular updates with closure evidence through the action tracking system.

HSE Assurance Program Reporting Template:
HSE Assurance Program is presented in Table 3.

Table 3. HSE Assurance Program

No.	Element	Operations Planned Weight (%)
1	**Visible Leadership Commitment**	**25.00%**
1.1	HSE Leadership Site Walkthroughs (VPs & Managers)	**10.00%**
	1.1.1 - Site Visits	
	1.1.2 - Action Tracking & Closure (BL HSE)	
1.2	HSE Assurance Program Performance Self-review	**15.00%**
	1.2.1 - Self-Review Reports (All VPs)	
2	**HSE Recognition and Accountability**	**15.00%**
	2.1.1 - Recognition Status (All SVPs & VPs)	
3	**HSE Observation and Intervention**	**15.00%**
3.1	HSE Observation and Intervention	**G.00%**
	3.1.1 - HSE O&I Committee Meetings	
3.2	Theme based HSE Awareness Campaigns	**6.00%**
	3.2.1 - Execution of Campaign / Program	
4	**Develop and Implement Health Surveillance Program for employees and contractors**	**15.00%**
	4.1.1 - Health Surveillance Status for Direct Hire Employees	
5	**Incident Reporting, Investigation and Learning from Incidents (LFI)**	**10.00%**
5.1	Report and investigate Incidents and HIPO Near Miss cases in line with company Standard's requirements	**5.00%**
	5.1.1- Status of Low Severity Incident Investigations	
	5.1.2 - Status of Serious Incident Investigations & HIPOs	
	5.1.3 - Action Tracking & Closure	
5.2	Communication and Implementation of Learning from Incidents (LFI)	**5.00%**
	5.2.1 - LFI Communication	
	5.2.2 - Action Tracking & Closure	
6	**HSE Training**	**10.00%**
6.1	HSE Critical Role Competence	**10.00%**
	6.1.1 - Ensure HSE Critical Role Competence	
7	**Environmental Management**	**10.00%**
7.1	Environmental Monitoring and Reporting	**10.00%**
	6.1.1 - Environmental Monitoring Reports including GHG emissions report	
	6.1.2 - Non-compliance action	
7.2	Implementation of Waste Management Procedure and Initiatives	**10.00%**
	6.2.1 - Increase percentage of total treated Non-Hazardous Waste	
	6.2.2 - Increase percentage of total recycled Non-Hazardous Waste	
	6.2.3 - Action Tracking & Closure	
SCORE		**100.00%**

6. Conclusion

This study underscores the progress in cultivating a robust Health, Safety, and Environment (HSE) culture that aligns with global best practices in the oil and gas sector. The findings demonstrate that the company has successfully integrated leadership commitment, employee engagement, and innovative practices into its HSE strategy, creating a foundation for operational safety and environmental stewardship. However, challenges persist, including cultural diversity, enforcement consistency, and balancing productivity with safety priorities.

To address these gaps and achieve its goal of a 100% HSE culture, the company must adopt a proactive, structured, and dynamic approach. The proposed **HSE Assurance Program** provides a roadmap for embedding Specific, Measurable, Achievable, Realistic, and Time-Bound (SMART) measures into the operational framework, ensuring continuous improvement and consistent implementation of HSE initiatives.

6.1 Limitations and directions for future research

This study provides valuable insights into the HSE culture but has some limitations. The analysis relied on 14 pre-designed interview guides tailored to specific positions, which limited the opportunity to ask follow-up questions or explore ideas in depth. Since the data was based on written responses, details like non-verbal cues or spontaneous thoughts that could enrich understanding were not captured. Additionally, the guides focused on specific roles, which might have left some perspectives or challenges faced by other groups underrepresented.

The research was also limited to a single organization within the UAE's oil and gas sector, which may reduce how easily the findings can apply to other companies or industries. The data reflects a snapshot in time, and changes in policies, technologies, or external conditions may affect the relevance of these results. To build on this study, future research should aim to include more participants, conduct live interviews, and track changes over time to capture the evolving nature of HSE culture. Such efforts can provide a more comprehensive understanding of how to enhance HSE performance effectively.

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Efua Ehiaguina, Brendan Chukwudi Nnadi & Haruna Musa Moda, Department of Environmental Health and Safety, University of Doha for Science and Technology, P. O. Box 24449, Doha, Qatar

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Biographies

Saed Talib Amer is an assistant professor who earned his Doctor of Philosophy in Computer and Information Systems Engineering in August 2012 from Tennessee State University, USA. Dr. Amer is currently a faculty member in the Department of Industrial and Systems Engineering at Khalifa University and leads research endeavors on the advances in Health, Safety, and Environment engineering, training, and HSE education. Other research fields that Dr. Amer is involved in Human Factors simulation and validation, Seat comfort analyses, and the assimilation of the human into Industry 4.0. Earlier work includes sustainability assessments, systematic measures to enforce engineering sustainability education, and autonomous solutions for Unexploded Ordnance (UXO) remediation. Finally, Dr. Amer worked on simulation solutions for hybrid renewable energy research.

Abdulrahman Saleh Alhashmi is a master's student in Khalifa University in Health, Safety, and Environmental Engineering in the Industrial Engineering Department and a full-time Senior HSE Engineer in ADNOC Sour Gas since 2018. He obtained his Bachelor of Science degree from the petroleum institute in Chemical Engineering in 2017.

Mariam Ali Alhammadi is a master's student in Khalifa University in Health, Safety, and Environmental Engineering in the Industrial Engineering Department and working as a civil engineer in maintenance department at ADNOC FERTILIZER (Al Ruwais) since 2023. She obtained her Bachelor of Science degree from United Arab Emirates University in Civil Engineering from in 2021.