

Assessing the health, safety, and environment culture in the United Arab Emirates oil and gas industry

Health,
safety and
environment
culture

495

Mohmaed Almazrouei, Khalizani Khalid,
Salam Abdallah and Ross Davidson

Abu Dhabi University, Abu Dhabi, United Arab Emirates

Received 31 July 2019
Accepted 19 August 2019

Abstract

Purpose – This paper aims to assess the ways through which the concept of health, safety and environment (HSE) is perceived by workers in the United Arab Emirates (UAE) oil and gas industry. The study focused on different aspects of the HSE culture and how employees with and without leadership responsibilities differed in their conceptualization of HSE culture.

Design/methodology/approach – Semi-structured interviews were conducted for 30 staff of the state-owned Abu Dhabi National Oil Company in the UAE. The interviewees were purposively selected which included both those in leadership and non-leadership roles.

Findings – The findings revealed that the interviewees viewed HSE culture as a descriptive term, a causal phenomenon, a systemic approach or a legal requirement/obligation. Interviewees in the production and maintenance units mentioned safety most often. Employees and managers exhibited negligible differences in their usage of the HSE culture concept. Managers predominantly featured in the narratives as important drivers of HSE culture. Physical conditions, behavior and procedures, management, competence and collaboration emerged as important components of a sound HSE culture.

Originality/value – To enable better communication and subsequent improvement of the HSE culture, an analogical HSE culture “vehicle” was developed in the study. The vehicle is a novel illustration based on the key roles of managers and employees, as well as the main components of a sound HSE culture.

Keywords Culture, Environmental issues, Environmental, Environmental and safety issues, Quality and health and safety issues, Health, Safety, Environment, HSE, Organizational culture, United Arab Emirates, UAE, Oil and gas industry

Paper type Case study

1. Introduction

The fusion of the culture concept with aspects of health, safety and environment (HSE) has been dominating the oil and gas industry (i.e. the petroleum industry) in recent decades. Issues pertaining to HSE remain a major challenge in the oil and gas industry, especially during the commencement of new oil and gas ventures. This is because such ventures often feature significant rise in accident risks that have adverse economic, social and environmental implications (Silvestre *et al.*, 2017). Stakeholders in the oil and gas industry including governments, civil society organizations, communities, employees and company shareholders continually demand improvement in HSE performance. However, the development of policies, management of processes and systems, integration of technology, and other related efforts cannot guarantee the delivery of world-class operational excellence and HSE (Buell, 2006). Therefore, there is need to develop a more comprehensive concept



that will combine the work environment, health and safety to achieve higher levels of social responsibility and show more concern for the people, plant and environment.

The United Arab Emirates (UAE) is the seventh leading country in the world with proven oil and gas reserves, accounting for up to 4 per cent of the global oil reserves and 3.5 per cent of global gas reserves (Panchal, 2016). The UAE has an estimated 6.1 trillion cubic meters of gas reserves as well as 97.8 million barrels of oil reserves and supplies almost one tenth of the global supply of crude oil reserves (Panchal, 2016). Abu Dhabi accounts for around 94 per cent of the UAE oil reserves, while Dubai, Sharjah and Ras al-Khaimah account for 4, 1.5 and 0.5 per cent, respectively (Panchal, 2016). In terms of the local market structure, the Emirates regulate the oil within their respective geographical zones. The state-owned Abu Dhabi National Oil Company (ADNOC) is the largest operator and runs 16 subsidiaries.

The activities of ADNOC include exploring for and producing natural gas and crude oil, refinement, daily operations, implementing the directives of Supreme Petroleum Council (SPC), marketing and supply and transportation of crude oil (Panchal, 2016). The most recent publicly available ADNOC Sustainability Report of 2015 confirmed that ADNOC has specific codes of practice to address HSE management and a HSE management system (HSEMS) of all activities of contractors and employees (Abu Dhabi National Oil Company (ADNOC), 2015). Despite an improved performance in indicators such as fatal accident rate (FAR) and lost time injury frequency (LTIF), ADNOC still recorded 38 tier-2 and 28 tier-1 process safety events in 2015. In the same year, ADNOC recorded five fatalities across various units which were caused by burns or explosions, being struck and falling from height (ADNOC, 2015).

There are no specific regulations governing HSE within the oil and gas sector in the UAE (Panchal, 2016). In general, the Federal Law No. 8 of 1980 and the Environmental Law No. 24 of 1999, combined with other various local regulations, specify the requirements for health and safety. However, government companies like ADNOC are not subject to Federal Law No. 8, leaving a considerable void in achieving optimal HSE levels (Panchal, 2016). In the absence of a federal law governing HSE, ADNOC relies on its HSE Policy and Codes of Practice Manual (ADNOC, 2015). A 2017 report stated that ADNOC met all its key performance indicators (KPIs) on safety performance and launched a group-wide initiative concerning “the importance of creating a 100 per cent HSE culture, and empowering employees to comply with the ADNOC HSE policy and procedures” (ADNOC, 2017, p. 52). However, the company did not define what its HSE culture entails. Also, there is no clear mechanism for measuring and outlining the way ADNOC could enhance its 100 per cent HSE culture. In any case, 100 per cent HSE culture was less than a year old at time of writing, which makes it difficult to determine the effectiveness of the initiative.

This paper highlights the concept of HSE culture with emphasis on the way office, offshore and onshore employees in ADNOC, a large UAE oil and gas company, interpret the concept. The study aimed to assess whether the HSE culture findings in the case company align with the themes documented in the scientific literature on safety culture and safety climate, as there is scanty literature on HSE culture. A useful communication framework within the studied company is developed. Such knowledge of the communication framework will be beneficial to other firms outside the oil and gas industry in terms of helping the firms to develop methods, action plans and strategies for improving their HSE performance.

2. Theoretical framework

Culture has no single definite meaning (Hoivik *et al.*, 2009). As a concept, some authors such as Schein (1985) and Alvesson (2002) posited that culture is likely the most common

definition that features in organizational studies. Schein (1985) used three tiers of culture: artifacts, values and basic assumptions. Other authors such as Emetumah (2016), Guldenmund (2000) and Trompenaars and Hampden-Turner (1998) supported Schein's (1985) view regarding the culture concept and further elaborated it within the context of organizational culture. The existence of organizations depends heavily on interactions between people to accomplish the objectives and goals of the organization (Emetumah, 2018). Despite Schein (1985, 2010) highlighting organizational culture's integrated and monolithic nature, there has been an argument that culture is considerably multifaceted with the traits of being uneven, distinguishing, and unitary (Martin, 1992). Multinational corporations operating in national cultures end up developing a mixed culture that encompasses both the corporation's organizational culture and the respective national culture (Hofstede and Hofstede, 2005).

With respect to the understanding of the influence of national cultures on organizational culture, the concepts of HSE culture and safety culture stem from the organizational culture concept (Hoivik *et al.*, 2009; Emetumah, 2018). Since 1988, the term "safety culture" has dominated the literature following the report by the International Atomic Energy Agency (IAEA) on the 1986 Chernobyl nuclear accident. Despite the abundance of literature on safety culture, its definition differs by context and remains debatable (Guldenmund, 2010). Equally confusing are the overlaps in the definition of safety climate and safety culture within the framing of organizational culture. A number of definitions of safety culture (Cooper, 2000; Guldenmund, 2000; Mohamed, 2003; Fang *et al.*, 2006; Griffin and Curcuruto, 2016) and safety climate (Zohar, 1980, 2000; Flin *et al.*, 2000; Mohamed, 2003; Neal and Griffin, 2006) have been suggested. Most definitions of safety culture and safety climate point towards being a subset of organizational culture, which captures the behaviors, attitudes, and actions of individuals in terms of safety within the organization.

Even though safety culture and safety climate are interchangeably used in most cases, there are authors who draw out differences between the two concepts. Safety climate has been described as the reflection of beliefs, perceptions and attitudes, while safety culture is portrayed as being a comparatively more sophisticated reflection of norms and values (Mearns and Flin, 1999). Bjerkan (2010) opined that "safety culture" and "safety climate" are not synonyms. The argument around what really constitutes safety culture and safety climate amid the numerous definitions causes confusion in understanding and implementing both. In turn, this results in the inhibition of safety culture or safety climate endeavors for enhanced safety performance in organizations such as the oil and gas industry.

Negative perceptions towards safety culture also impede safety performance. Employees who work in high-risk industry sectors such as the petroleum industry usually perceive matters concerning safety culture as inhibitors to the execution of their duties (Walker *et al.*, 2000). As a result, Cooper (2000) noted that the reversal of this trend demands the implementation of an integrated methodology within each high-risk industry organization. This view inspired the need for safety culture to include the environmental, health and social aspects within the workplace upon their holistic integration, thereby creating the HSE culture concept (Emetumah, 2016).

There have been notable attempts at characterizing the different theoretical methods and approaches that are used in the assessment of safety culture. Silbey (2009) described three predominant theoretical lenses that mainly feature in conversations concerning culture and safety. The first one, which theorizes "culture as casual attitude", considers safety culture to be a measurable construct that comprises competencies, behaviors, and values about safety in organizations (Filho and Waterson, 2018, p. 193). The second lens portrays "culture as engineered organization" (Filho and Waterson, 2018, p. 193). This second lens focuses on the significant role of cultural factors on the outcomes of safety, underscoring the way an

organization has configured its practices and processes so that it can enhance its resilience, reliability and safety. The third lens portrays culture as “emergent and indeterminate” (Silbey, 2009, p. 343). This lens challenges the instrumentalization of safety culture through sophisticated technologies but instead implies that culture is socially constructed.

Guldenmund (2010, 2016) provided an alternate safety culture characterization and a way through which safety culture can be evaluated and conceptualized. Three distinct approaches were proposed, all of which consider culture as a system of symbols and meanings shared by groups of people engaged in the social process. The first approach encompasses the anthropological or interpretative perspectives. Here, data collection techniques such as document analysis, observational studies and interviews are useful in providing clues to fundamental cultural presumptions. The second approach includes the psychological or analytical approaches and resembles Silbey’s (2009) notion of the culture as casual attitude. It uses questionnaires, where a survey is used to assess safety culture and evaluate diverse psychometric and statistical traits. Guldenmund’s (2010, 2016) third approach is experience-based or pragmatic, underscoring the interactions and structures in respective organizations and the ever-changing interplay between them.

In the past two decades, the safety culture concept has been expanded to include HSE. Consequently, safety culture covers the environment, working environment and health, thus introducing factors beyond major catastrophes and accidents which was the original basis for the safety culture concept (Høivik *et al.*, 2009). The trigger for this expansion was the appreciation that matters concerning the environment, safety and health can be dealt with in a better way within the workplace upon their holistic integration. This expansion and inclusion of other multiple factors gave rise to the HSE culture concept (Emetumah, 2018).

Within the oil and gas industry, the HSE culture ladder model proposed by Hudson (2007) seems to be the most common standard. Hudson’s (2007) model suggests that the safety approach and use of technology to lower incidence rates have already plateaued, leaving safety culture as the next approach based on the safety development line. Systems and technology approaches for safety management are unlikely to accomplish the requisite safety performance levels. In this regard, it was found that people, or the human factor, was the missing link in achieving optimum safety performance. The foundation for identifying the human factor as the missing link lies in the cultural approaches that include attitudes, leadership, behaviors and accountability (Hudson, 2007). In an attempt to demonstrate the means for attaining advanced safety levels, Hudson (2007) integrated culture into his model to develop the “HSE culture ladder.” Hudson’s (2007) HSE culture ladder is borrowed from the Prochaska and DiClemente (1983) trans-theoretical model. This trans-theoretical model emphasizes that the individual involved “has an active personal desire to change rather than a passive requirement to meet the goals of management” (Hudson, 2007, pp. 703-704).

3. Research questions

The present research seeks to gain insight into the different ways in which the HSE concept is defined and understood within an oil and gas industry organization in the UAE. The design of this study was a case study to aid in the exploration of the HSE concept among the employees, both in leadership and non-leadership roles, and their perceptions regarding the main challenges of achieving HSE. The research questions pursued in the current study are as follows:

- RQ1. How do employees in the UAE oil and gas industry conceptualize HSE culture and what are the most important aspects for the definition of HSE culture?

RQ2. In what ways do employees without leadership responsibilities differ from those with leadership responsibility in their conceptualization of HSE culture?

4. Approach and methods

The selection of ADNOC as the case company in this study is due to its longstanding history in the UAE oil and gas as well as its commitment to achieving 100 per cent HSE culture. The history of ADNOC can be traced back to 1935 when the Iraq Petroleum Company (IPC) consortium constituted the Petroleum Development (Trucial States) (PDTC) Ltd, although ADNOC was officially established in 1971. ADNOC is a state-owned company and runs both onshore and offshore activities. ADNOC is the twelfth largest producer of oil in the world. According to a recent report, ADNOC Group of Companies employed nearly 65,000 people, among whom 1,807 were entry-level employees recruited through the Competence Assurance Management System (CAMS) (ADNOC, 2015). In terms of demographics, the company's workforce comprises 10.3 per cent women and 89.7 per cent men, with 56 per cent of the employees aged between 30 and 50 years old, while 31 per cent were less than 30 years old. Asian ancestry workers and Emirati citizens constituted 46.8 and 34.1 per cent of the workforce, respectively. There were around 165,000 contractors within the ADNOC Group.

The ADNOC HSE Policy outlines 13 commitment points for achieving the highest standards of HSE excellence (ADNOC Group, 2018). Some of these commitment points include pursuit of no harm to the community and people, environmental protection, incident prevention, employee welfare promotion, support for climate change, promotion of renewable energy use, establishment of top-notch emergency response and embedment of the 100 per cent HSE culture. The implementation of the ADNOC Group HSE Policy is expected to be achieved "through a comprehensive HSE management system" (ADNOC Group, 2018, p. 1).

A qualitative approach was used in the present study as it is a systematic approach that allows for the elicitation of subjective situations and experiences, in addition to giving them meaning (Creswell and Poth, 2018). Data collection involved in-depth, face-to-face, semi-structured interviews which allowed for probing while ensuring consistency with the objectives of the research (Bryman, 2016). A four-stage phenomenological analysis was used to achieve theme identification (Giorgi, 1985). Initial focus was on disentangling the components of the participants' experiences in accordance with Glaser and Strauss (1967). This approach to data collection and analysis facilitated the understanding of HSE culture at ADNOC through the participants' eyes, as opposed to constraining their experiences to a predefined framework (Creswell and Poth, 2018).

4.1 Sample

Interview data were collected from a sample of 30 individuals, made up of managers, safety representatives and employees (Table I). The combination of interviewees (i.e. participants) at different work levels was necessary as the opinions from different organization levels are critical to understanding HSE culture in a more focused and systematic manner.

As shown in Table I, the interviewees included both men and women. The interviewees also varied in age, experience and background, with only two being non-UAE nationals. The group of participants worked in approximately 19 different business units, representing various operation fields, including maintenance, process, safety engineering, plant operations, drilling and distribution. The participants also worked in different geographic locations, comprising onshore offices, process sites and offshore locations. They had different job specifications including electricians, operational units, crane operators, plant

technicians, plant equipment operators, safety engineers, electricians and white-collar employees from operation and HSE units. The sample selection consisted of a good selection of employee and manager interviewees, representing both operating and office workers at offshore and onshore plants.

The five HSE managers interviewed in this study were selected based on their expertise in the field and were regarded as information-rich cases with a higher likelihood of providing more detailed and in-depth information (Patton, 2002) about the HSE culture at ADNOC. The ten plant managers were drawn from different plant operation departments; their inputs represented the daily encounters with safety situations and the implementation of 100 per cent HSE culture at ADNOC. The five safety representatives were democratically elected by their colleagues and were considered representatives of ADNOC employees on issues regarding workers' safety, welfare, and occupation health. Finally, the selected ten employees had long experience at ADNOC and were well-known for representing their opinions as well as those of their colleagues. They were included in the study to ensure proper representation of information from the various companies under ADNOC Group and to also maintain gender and geographical representation. All the prospective interviewees were approached and voluntarily consented to the interviews.

4.2 Data collection

Individual semi-structured interview using the principles outlined by Kvale (1996) was adopted in this research. The researchers developed an exploratory interview guide consistent in the practice of implementing semi-structured interviews (see the Appendix). The rationale was to guarantee that pertinent questions were covered and that the interviews were conducted in line with this study's aim and scope. The basis of the interview guide was the HSE concept which was covered through four major topics to confirm that the components of the HSE concept were clear in the discussion with the interviewees. These four sections are the HSE culture, working and health environment, safety and environment. While conducting the interviews, the researchers aimed to capture what the interviewees identified as HSE culture, its vital components and its descriptions within the ADNOC Group.

The questions were targeted at exploring the experiences of the interviewees within their workplaces and investigating issues related to work that could account for ADNOC's HSE culture. Items pertaining to the HSE culture in general included prompts phrased as follows: "What is your opinion of what HSE culture as a concept means?"; "What characteristics does a company with a strong HSE culture have?"; and "In your opinion, what are the most crucial components for creating an effective HSE culture?". As for the environment, safety, and occupational working and health environment, the interview prompt formulation included: "What does safety culture mean to you?" To ensure the conformability and consistency of answers collected from the interview guide, the researchers pretested the interview guide with five people within the company prior to the actual study. After

Table I.
Participant
demographics

Type of participant	No.	Gender	Method	Comments
HSE managers	5	5 men	Individual interviews	All interviews recorded
Plant managers	10	10 men	Individual interviews	All interviews recorded
Safety representatives	5	3 men, 2 women	Individual interviews	All interviews recorded
Employees	10	4 men, 6 women	Individual interviews	All interviews recorded
Total	30	22 men, 8 women		

rephrasing some of the prompts to capture the true meaning of the questions and ensuring that there were no multiple interpretations of the questions by the interviewees, the researchers deemed the interview guide fit for data collection. The data was collected from March to July 2018 with the first author as the sole interviewer.

Each interview session was conducted at the workplace of the interviewee and lasted between 45 and 70 min. However, all interview sessions with interviewees working offshore were conducted onshore. All sessions commenced with the first author explaining the rationale and aim of the study to the interviewee as well as how the interview results would be utilized. The first author informed each interviewee about the measures taken to safeguard interviewee confidentiality and anonymity, data usage for the exclusive purpose of research, and the right to withdraw at any time without penalty. Equally, no monetary or tangible incentive was offered to any interviewee for participating.

4.3 Analyses

All the 30 interview sessions were conducted in Arabic and tape-recorded. Two independent, professional transcribers were hired to transcribe them into full text. The researchers later verified the transcriptions by comparing the outcome texts generated by the two transcribers. Subsequently, two independent translation companies based in Abu Dhabi were hired to translate the transcribed text from Arabic to English. To further check the reliability and validity of the results, the researchers analyzed the data by application of standard methods, like, developing codes and categories and taking note of emergent patterns and themes based on Giorgi's (1985) four-stage phenomenological analysis.

The researchers fully adhered to the procedures and methods of implementing a qualitative research design. First, the researchers read the entire material "to understand the language of the describer in order to grasp a sense of the whole of the co-researcher's experience" (De Castro, 2003, p. 50). Second, the researchers read the descriptions in the interview transcriptions at a slower pace and identified the various meanings that represented HSE culture aspects and coded them accordingly. Third, the abstraction phase entailed obtaining meaning in every coded group. Fourth, the researchers developed a contents summary in each code group and proceeded to generalize the descriptions that reflected the most crucial elements based on the interviewees' opinion concerning HSE culture and its associated challenges. The researchers did not include any information that was traceable to any interviewee, such as specific job title, department or station location. An iterative review of the categorized statements led to the identification of the most important aspects related to the interviewees' prompts based on their descriptions.

5. Results

5.1 Conceptualization of health, safety and environment culture

5.1.1 Ways of referring to the health, safety and environment culture concept. The analysis of the interview data showed that the interviewees understood and referred to HSE culture in four different ways. In most cases, their expressions were descriptive, containing both negative and positive statements including the following:

My company takes good care of us (employees).

The 100 per cent HSE policy is very clear and we are trying very much to achieve the standards stated although it is really hard because it is new.

Some people ensure safety every time and others think it is just for the work.

I am not sure what to do sometimes to ensure this safety all the time.

The interviewees used the HSE culture concept to define the cultural expressions that are linked to HSE. Their stories were dominated by aspects of a “typical organization”. Most of them exhibited a tendency towards telling normative stories concerning safety and health, which inclined towards suggestions for improving HSE within the organization or simply criticizing it.

The second trend entailed using the HSE culture concept from a causal perspective. In this respect, the interviewees treated culture as one of the numerous factors that influences organizational HSE. They equated culture to behaviors and attitudes. In some instances, the interviewees mentioned the terms, “behaviors” and “attitudes”, explicitly in their sentiments. For example, one interviewee stated the following:

HSE culture to me is about all the people in the organization acting safely at all times because they have the supportive attitude throughout.

There were also indications that culture could be acquired and altered through proper education. Such education influences the culture of an individual in terms of safety because it altered the qualities and behaviors of the individual towards safety. Culture was therefore dependent on the influence of attitudes and behaviors of the person, as opposed to culture being the determinant of such attitudes and behaviors. One plant manager said:

[...] HSE culture is not like the ordinary culture [...] the more a person is ignorant of safety, the more they have negative attitudes and behaviors to ensuring a safety culture. But if we educate them properly on safety, they can then change their behaviors, attitudes, and culture towards HSE.

The third pattern in the conceptualization of safety culture was that of a systemic way of signifying the holistic interdependency and interrelationship among the various components of a structured and defined system. For some interviewees, HSE culture was workplace-dependent. Therefore, for example, the HSE culture at a plant would differ from the HSE culture at an office setup although the organization is the same. For employees, their safety challenges were different from those of HSE managers. Therefore, there is a need to consider the diversity of tasks, workplace, and organization as influencers of the HSE culture. Consider the following description by an HSE manager:

The HSE culture – and now the 100 per cent HSE culture at ADNOC – defines nearly every aspect in an organization. It begins with the employee at entry level to the person at the highest level of management carrying out his executive role. It also defines requirements and quality of safety within the procedures we execute. As a manager, I am required to be a role model and I must take care of every employee and his or her performance whether in safety or otherwise because the needs of every workplace are different. In the onshore rigs, it is difficult to manage and uphold the HSE culture than in an office setting, for example.

The fourth way of referring to HSE culture was alluded to by the fewest number of interviewees. It entailed reference to HSE culture as a legal requirement or obligation. This trickled down to the HSE policy at the organization being a legal requirement of UAE law. Therefore, the only way the interviewees under this category described the HSE culture was from a legal perspective. For example, one employee stated the following:

The HSE culture is the law that defines how safety in the organization is ensured. It is also a regulation by government for all of us to adhere to the same law. The law requires every organization to have a HSE policy, which then becomes its culture of safety.

5.1.2 Health, safety and environment is all about safety. In describing HSE culture, most interviewees alluded most often to safety. Indeed, many interviewees, particularly those from the production and maintenance departments, only talked about safety, without mentioning the environment or occupational health aspects when they gave their opinions about HSE culture. The interviewees discussed issues such as the safety of work processes, the use of protective equipment, communication to ensure safety, work-process safety, and being mindful about the safety of others. A plant manager stated, for example:

HSE culture of ADNOC is about offshore safety and taking care that your colleague is safe at all times.

However, the interviewees also projected safety as a challenge with respect to achievement of an effective HSE culture. Their stories were about incidents and episodes that reflected the safety challenge, including the lack of managerial response to safety incidents and unsafe behavior, using the wrong equipment for safety, not using safety equipment at all, overlooking safety procedures and failing to secure confidential documents. Ignoring or overlooking occupational accidents and injuries, behavior and attitude were mentioned during the interviews, with one informant stating the following:

There is just a tendency to overlook digressions from safety and not many people are concerned about it – especially if they look small. There seems to be an acceptance that some ‘small’ safety concerns can be ignored and this is acceptable.

Noting that the interviewees were not tending to mention the environment and health aspects of HSE, the first author had to probe them for their opinions. The interviewees from office workplaces only talked about issues within their scope of work, such as inadequate communication, job (dis)satisfaction, work–life balance, intense work schedules and pressing deadlines and safety compliance challenges. Interviewees from the drilling department were concerned about burnout, noise, exposure to risk of injury and medical insurance cover. In both cases, the employees applauded the company for ensuring that they received adequate safety training and catered for their rights to take leave, days off or paid overtime adequately. For example, one employee working in the drilling department said:

I know I am exposed to very serious risks of getting injured, but then my company ensures that I have adequate medical cover and I can take leaves that I am entitled to or earn overtime when I work over my work hours.

5.1.3 Environment and working and health environment. Overall, the interviewees expressed a high degree of satisfaction levels in terms of the health environment at ADNOC and the conditions of their working environment, health and wellness programs, counseling and therapy facilities and the opportunities to give their input on how to improve the working environment. There was remarkable reference to work presence rather than absence. In addition, at least one interviewee in each department mentioned the involvement of the company in the personal lives of employees, especially when they fell sick or had to take educational leave. One employee asserted:

I feel that my company minds how I am doing and the comfort and safety of the environment within which I work. Even when I fell sick and exceeded my sick leave allocation, my manager gave me lighter tasks at the office and I did not have to drill. They take care of me and that I think is what HSE culture is all about, isn't it?

The views of managers concerning the HSE culture reflected that they were responsible for ensuring that the environment and the health of their employees remained paramount. They even stated that their successes as managers depended on the degree of wellness and health of their employees. For example, a HSE culture manager stated:

I have to take extra care of my workers and ensure they are healthy and well all the time. I must go out of the way to know what is happening to them outside work because this could very well affect how they perform. How well I perform depends on how well they perform and they cannot perform well when they are unwell or under difficult working environments.

There were concerns about aging and accessibility features within the work premises. These issues were related to health and working environment. According to one safety representative:

Some of the designs of our premises are not disability-friendly or accommodative of weakly or aging workers. For example, the designs of plants where we have tanks require one to be capable of using ladders and this requires quite a degree of fitness. When an engineer is injured, disabled or is too old, he cannot reach the top of the tanks and this can be depressing for someone who is used to doing this all his life. This is sad because some people might be forced out of the [work] system before their time or they have to be reassigned to roles they are not passionate about.

Altogether, the overall notion was that ADNOC was handling the environment satisfactorily. Four out of the five HSE managers included sustainable development features in their stories. They talked about the need to ensure that future generations had their needs met, as opposed to exploited, in terms of good quality of life. The HSE managers underscored the importance of adhering to international regulations and ensuring that high technical development levels were realized. As part of countering environmental hazards and preventing pollution, the employees and safety representatives worked to ensure zero spills and contained chemical pollution. Interestingly, there was no reference to security from any of the interviewees.

5.1.4 Health, safety and environment culture description. The interview data analysis revealed four themes (based on at least four interviewees mentioning it) that were regarded as important determinants of HSE culture. These included behavior and procedures, management, competence and collaboration, which are covered in the four subsections below.

5.1.4.1 Behavior and procedures. The behavior of the employees towards safety was both a concern and a strong point in the management and employee stories, with appreciation and criticism in equal proportion. However, nearly all the concerns were related to how easy it was to uphold positive behavior and difficult in changing negative behavior. For example, some employees and managers were concerned that behaviors towards safety precautions were not always a priority among employees. An HSE manager and an employee, respectively, stated:

I see some of the behaviors among few employees and I am afraid some are difficult to change at all from where I stand. The only important thing is to ensure that behavior is contained by managing the consequences. An HSE manager has to make sure he stamps his authority without leniency to ensure proper safety behavior.

I sometimes get very offended when some of my colleagues ignore safety procedures just because they have been doing it for years. So, are they waiting for an accident to happen or what!?

5.1.4.2 Management. The prevalence of terminologies such as “manager”, “management” and “managing” resounded in nearly every employee narrative. Emphases were placed on

the extent to which the manager was clear in communication as well as his/her consistency as a good safety role model. Both employees and managers mentioned the importance of the manager being able to speak and show interest in rallying his subordinates towards ensuring 100 per cent HSE culture. For most employees, it is important for a manager to show and teach good HSE practice to employees. One employee stated:

I believe it is the role of the manager to show direction and set the pace for achieving the 100 per cent HSE culture by communicating clearly and leading by example. My manager needs to be seen and heard all the time.

The views of manager visibility were rather countered by those indicating that the manager was not supposed to be reactive. Some employees preferred a manager with an open mind, one who did not suspect them of compromising safety all the time. This result was based on negative evaluations of managers by most employees; one employee stated:

I cannot believe that some managers are like the bad cops who are always sniffing to find out mistakes from their employees. I need a manager who follows regulations and shows me how to, acts to prevent accidents and deals with them when they happen. I don't want to feel like I am being safe to help the manager; I need to do it for me, for the organization.

5.1.4.3 Competence. The term, "competence", was used in reference to the skillfulness, understanding and experience in relation to safety issues within the oil and gas industry. Competence was applicable to both employees and managers. For managers, competence meant a thorough theoretical understanding of the safety requirements in accordance with the 100 per cent HSE culture implemented by ADNOC and awareness of existing regulations and safety guidelines that apply to the oil and gas industry. Thus, a manager with an understanding of just the safety issues within his or her operation area was considered incompetent. This was captured by one of the plant managers:

[...] It is not enough to just know about the safety requirements of a department or a production plant or an office [...] one needs to be informed about any requirements and regulations across the entire petroleum business both in theory and in practice, if possible [...] the 100 per cent HSE culture is just but a small fraction of this [...]

5.1.4.4 Collaboration. The theme, "collaboration", emerged after the interviewees mentioned issues such as safety not being an individual responsibility, safety requiring everyone in the organization to work together, or the organization working with other external partners and stakeholders to ensure safety. In most cases, the interviewees connected this collaboration with the need to develop attitudes that favor a good HSE culture. Internally, such collaboration was both achievable horizontally (with colleagues at the same level with an interviewee) and vertically (with a senior or junior colleague) within the organizational structure. Sample responses in this category from employees and managers, respectively, included:

We have to work with everyone including those outside or inside the organization like our contractors and other partners to ensure safety.

The most important thing is that safety is an individual responsibility, but it can only be achieved when you work with those above you, below you, at your level and everyone else to develop a culture of safety.

According to the results presented in the four subsections above, safety featured in most of the narratives, particularly from interviewees working in the production and maintenance

departments. Although rarely mentioned, the environment and working environment also emerged as vital components.

5.2 Manager–employee differences in health, safety and environment culture conceptualization

Overall, there was negligible variation in the use of the HSE culture concept between employees and managers. All the managers and employees conceptualized HSE culture in a similar way, with the exception of very few interviewees. The interviewees used HSE culture mainly to describe “the typical organization,” with the aspects of HSE culture description being dominant for both managers and employees. Variation in employee departments and business units was insignificant in terms of how employees and managers conceptualized HSE culture. Altogether, there was a notable keenness by employees for the commitment and competence of managers, while the managers were keener on the attitude and behavior of employees towards HSE. For example, an employee and a manager, respectively, stated:

[...] My manager must be knowledgeable and experienced [...] HSE culture is about management.

I am more concerned about how employees feel about safety [...] their attitudes and behaviors about HSE.

The other difference related to the extent to which production was gauged through financial outputs. Only one HSE manager mentioned this (once), while nine employees talked about the competing priorities of financial productivity and maintaining safety or being safe. It is worth mentioning that none of the prompts in the interview guide was about financial productivity. The following statement by a safety representative is an illustration:

We must make money, but then again, ensure you are safe at all times.

Although this was not always the case, employees from both onshore and offshore plants hinted at financial productivity often receiving lower prioritization than safety at ADNOC. There was an indication that midline managers and supervisors were under-involved in matters concerning safety because they were uninterested or had heavy workloads. Also, some employees were cautious about suggesting safety interventions that would be too costly:

“Even when I am making suggestions about safety in the organization, I must consider how expensive the suggestion is going to be if implemented.”

The interviewees also felt that a good HSE culture at ADNOC was critical for ensuring that the company did not incur losses resulting from injury or destruction of equipment. In addition, a good HSE culture was considered appealing to both prospective and existing human resources because they wanted to be accepted as a “safe company.” Managers linked the reputation of ADNOC in terms of its HSE culture to reduced employee turnover due to high employee retention rates. Thus, most managers stated that a good HSE culture meant lower costs for operations and human capital acquisition, which translated to better financial results:

Everyone wants to work in a safe environment. Those already employed are proud of it and the others want to join ADNOC because it is safe! When our HSE culture is as good, we do not have to keep advertising for jobs, keep hiring, or incur such costs because our employees stay with us to retirement in most cases. Others are always looking to join us [...] they [prospective employees] tell us how safe they think ADNOC is when we ask them why they want to work with us.

6. Discussion

6.1 Conceptualization of health, safety and environment culture and existing theories

The four usages of the HSE culture concept by the interviewees were interpreted as varying concepts. The varying use of the concepts of culture and HSE culture further reinforced the narrative of an elusive definition of culture, resulting in further confusion in meaning and interpretation (Schein, 1985, 2010; Trompenaars and Hampden-Turner, 1998; Cooper, 2000; Guldenmund, 2000; Alvesson, 2002; Emetumah, 2016, 2018). There was prevalent descriptive use of HSE culture at ADNOC, which corroborated the aspect of Schein's (1985) artifacts. However, reference to behaviors and attitudes by mainly the managers coincided with the importance of values of culture (Schein, 1985) and safety culture (Mearns and Flin, 1999; Fang *et al.*, 2006).

The views of some of the interviewees suggested that culture could be influenced behaviors that one undertakes, thus reinforcing "culture" as being subject to influence rather than being an influencer all the time. The interviewees referred to culture as non-conscious ideas, symbols, and meaning within the various departments or units at ADNOC. There was little reference to HSE culture from a holistic perspective, and this partially coincided with the notion of fundamental basic assumptions of Schein (1985) and Guldenmund (2007). Although very few interviewees mentioned experiences about safety incidents, the responses of all the interviewees showed that the rationale for HSE culture was to avoid accidents. This is an indication that the metric for success of the 100 per cent HSE culture was the number of accidents, as stated in the ADNOC (2017) safety report. This renders the 100 per cent HSE culture commitment by ADNOC a systemic model that will influence the creation of HSE culture across the entire organization if fully and methodically implemented. In fact, most of the interviewees limited HSE culture to safety by referring to the lack of any serious safety incidents.

There were evident variations in the interpretations of environment and health in HSE culture. Onshore employees referred to aspects of employee welfare and job satisfaction as the indicators for health and safety, whereas offshore employees were more concerned about injury rates and risk of injury. This means that onshore workers perceived HSE culture from a short-term angle, whereas their offshore colleagues considered it from a longer-term perspective. This underscores the potential discord in meanings and interpretations by different employee groups within ADNOC. There were no contentions about the importance of ADNOC's role in ensuring employee's health and safety of working environments. However, the variations in terms of what environment and health mean to onshore and offshore workers implies the need to tailor the 100 per cent HSE culture to the peculiar needs of offshore and onshore workers. While all employees were keen on job satisfaction, less strain, low injury rates and so on, their needs differed by context, sector, unit and department. This is achievable considering that the interviewees acknowledged the safety performance of ADNOC as well as the commitment of the company's management to the 100 per cent HSE culture.

6.2 Combining theory and interviews to develop an illustration for communication

The interview findings show that behavior and procedures, management, competence and collaboration were the most crucial determinants of HSE culture, in agreement with the literature on safety climate (Zohar, 1980, 2000; Flin *et al.*, 2000; Guldenmund, 2000, 2010). To understand HSE culture for ADNOC, an illustration was developed based on the study findings and previous literature. The 100 per cent HSE culture at ADNOC was found to be working adequately; however, further improvements are still necessary to ensure optimal safety with zero incidents. Considering the framing of safety culture by Cox and Flin (1998)

as a vehicle that could be used to frame new improvements, the present research used the analogy of a vehicle to illustrate the communication concept within ADNOC with focus on its 100 per cent HSE culture concept. As ADNOC is a petroleum company, the researchers assumed that using a petroleum tanker as the analogical vehicle would resonate best with the employees and company operations, as illustrated in [Figure 1](#).

The driver's cabin in [Figure 1](#) signals the lead role that ADNOC management needs to continue playing in steering the company's 100 per cent HSE culture towards the right direction. Issues of financial management, training and reputation were considered categories within managerial level. Additionally, issues of training and ensuring employee welfare were also retained as a managerial role. Competence, combined with behavior and procedures, represent the various daily activities that workers perform within an organization at individual, departmental and organizational levels. In turn, these are the reflection of beliefs, perceptions and attitudes toward safety, thereby constituting the safety climate ([Zohar, 1980](#); [Guldenmund, 2000](#); [Neal and Griffin, 2006](#)) at ADNOC. Consequently, they will eventually shape the safety culture ([Bjerkan, 2010](#); [Waterson, 2017](#)) of ADNOC and, hence, the 100 per cent HSE culture. These elements are based on the skills, knowledge and rules that inform daily decisions and choices with respect to safety ([Guldenmund, 2007](#)).

Collaboration is the base upon which ADNOC's 100 per cent HSE culture is anchored and connects the cabin (management) and the wheels (collaboration, and behavior and procedures) in accordance with the phenomenon of group-level structures and organizational structure elaborated by [Guldenmund \(2007\)](#). Some of the interviewees expressed concern about the accessibility of facilities and infrastructure. Therefore, the physical conditions at ADNOC are the "road" upon which the truck moves because they determine the "terrain" of how management and employees collaborate, and their behavior, procedure adherence and competencies enable the achievement of the 100 per cent HSE culture. Remarkably, the categories shown in [Figure 1](#) are a broad approach to HSE, and individual constituents or how they relate to each unit/department may require customization. The improvement of the 100 per cent HSE culture may require the implementation of various parallel actions.

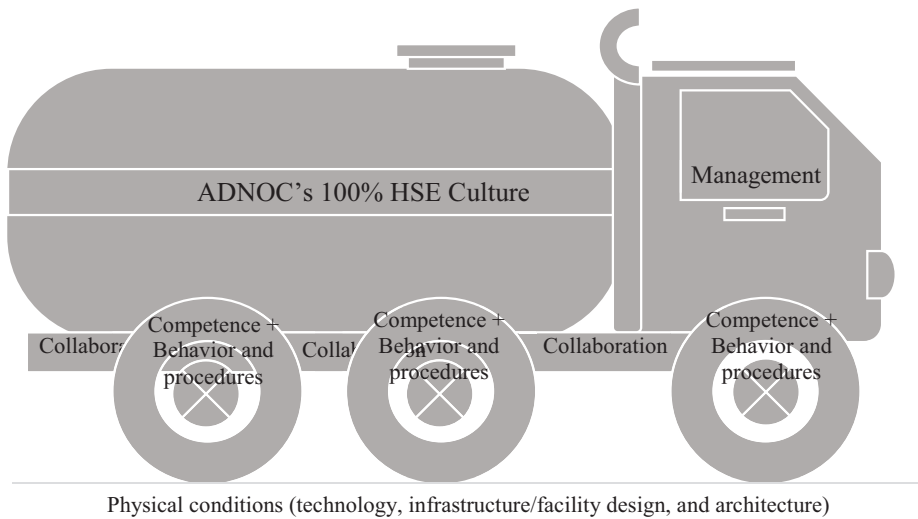


Figure 1.
An illustration of the
HSE culture
communication
framework developed
in this study

7. Conclusion

The content, description, conceptualization and usage of HSE culture differed across interviewees. The findings showed that most interviewees used HSE to refer to safety within their offshore and onshore operational plants, although the views of the interviewees in the two plants concerning HSE differed in terms of priority elements. This could cause confusion and pose challenges when it comes to improving HSE culture at ADNOC. Clarification of HSE and HSE communication within ADNOC is essential to enable common understanding and foster streamlined achievement of the aspirations of the 100 per cent HSE culture.

The focus of employees and managers was mainly on the issues of the physical conditions, behavior and procedures, management, competence and collaboration. This was a reflection that the HSE culture at ADNOC, or the underlying policy, was common to different people at different levels in the organization. The findings are consistent with literature concerning the safety climate, although focusing on HSE culture has a significant potential to expand the approach so as to make safety issues on health, environment and working environment important.

This research is innovative in the UAE context and indeed, in the Gulf region. The study has contributed to knowledge by expanding the scope of safety culture to cover HSE culture based on the experience of various workers in the oil and gas industry. Apart from the Norwegian-focused study by [Hoivik et al. \(2009\)](#), the researchers did not find another research similar to the present study. Moreover, the present study is the first to consider the improvement of an already existing and elaborate HSE culture, like, the 100 per cent HSE culture at ADNOC. The development of an illustrative framework for communicating HSE culture within an oil and gas industry is also a novel approach in investigations of safety culture.

8. Limitations and directions for future research

In a qualitative research, there are no particular guidelines governing the sample size, as the aim is to understand a given phenomenon, as opposed to determining significant differences between groups statistically. The insight, meaning and validity of qualitative inquiry concern information richness based on purposive sample selection ([Patton, 2002](#)). In this study, only 30 interviewees were purposively selected from various employment levels and departments of ADNOC. This study was an explorative research, hence the narrow selection. However, increasing the sample size by selecting numerous workers from the same units or work areas might have yielded more reflective findings.

There is need to carry out future research on related subjects across different countries and industry sectors to compare and generalize the findings of this study. Besides testing the feasibility of the illustration for communication developed in this research, detailed studies should be carried out to establish the extent to which HSE components relate to different organizational goals, such as financial performance and productivity.

References

- Abu Dhabi National Oil Company (ADNOC) (2015), "ADNOC group sustainability report 2015: taking innovation to new heights", available at: www.adnoc.ae/-/media/adnoc/files/publications/adnoc_sr_main-eng.ashx (accessed 28 July 2019).
- Abu Dhabi National Oil Company (ADNOC) (2017), "Corporate review: health, safety and environment", available at: https://www.adnocdistribution.ae/reports/ar2017/pdf/Health_Safety_and_Environment.pdf (accessed 28 July 2019).
- ADNOC Group (2018), "ADNOC group health, safety and environment (HSE) policy", available at: www.adnoc.ae/-/media/adnoc/files/publications/safety/unified-group-wide-hse-policy-april-2018.ashx?la=en (accessed 1 October 2018).

- Alvesson, M. (2002), *Understanding Organizational Culture*, Sage, London.
- Bjerkan, A.M. (2010), "Health, environment, safety culture and climate – analysing the relationships to occupational accidents", *Journal of Risk Research*, Vol. 13 No. 4, pp. 445-477.
- Bryman, A. (2016), *Social Research Methods*, 5th ed., Oxford University Press, London.
- Buell, R.S. (2006), "Creating a culture to deliver sustainable HSE performance", paper presented at the 2005 SPE International Conference on Health, Safety, and Environment in Oil and Gas Exploration and Production, 2-4 April, Abu Dhabi.
- Cooper, M.D. (2000), "Towards a model of safety culture", *Safety Science*, Vol. 36, pp. 111-136.
- Cox, S. and Flin, R. (1998), "Safety culture: philosopher's stone or man of straw?", *Work and Stress*, Vol. 12 No. 3, pp. 189-201.
- Creswell, J.W. and Poth, C.N. (2018), *Qualitative Inquiry and Research Design: Choosing among Five Approaches*, 4th ed., Sage, Thousand Oaks, CA.
- De Castro, A. (2003), "Introduction to Giorgi's existential phenomenological research method", *Psicología Desde el Caribe: Revista Del Programa de Psicología de la Universidad Del Norte*, Vol. 11, pp. 45-56.
- Emetumah, F.C. (2016), "Appraising management perception of health safety and environment culture in a Nigerian petroleum company", *Advances in Research*, Vol. 7 No. 5, pp. 1-15.
- Emetumah, F.C. (2018), "Evaluation of health, safety and environment culture perception by construction workers in Owerri metropolis, Nigeria", *Asian Journal of Advanced Research and Reports*, Vol. 1 No. 4, pp. 1-11.
- Fang, D.P., Chen, Y. and Wong, L. (2006), "Safety climate in construction industry: a case study in Hong Kong", *Journal of Construction Engineering and Management*, Vol. 132 No. 6, pp. 573-584.
- Filho, A.P.G. and Waterson, P. (2018), "Maturity models and safety culture: a critical review", *Safety Science*, Vol. 105, pp. 192-211.
- Flin, R., Mearns, K., O'Connor, P. and Bryden, R. (2000), "Measuring safety climate: identifying the common features", *Safety Science*, Vol. 34 No. 1-3, pp. 177-192.
- Giorgi, A. (1985), "Sketch of a psychological phenomenological method", in Giorgi, A. (Ed.), *Phenomenology and Psychological Research*, Duquesne University Press, Pittsburgh, PA, pp. 8-22.
- Glaser, B. and Strauss, A.L. (1967), *The Discovery of Grounded Theory: Strategies for Qualitative Research*, Aldine, New York, NY.
- Griffin, M.A. and Curcuruto, M. (2016), "Safety climate in organizations", *Annual Review of Organizational Psychology and Organizational Behavior*, Vol. 3 No. 1, pp. 191-212.
- Guldenmund, F.W. (2000), "The nature of safety culture: a review of theory and research", *Safety Science*, Vol. 34 No. 1-3, pp. 215-257.
- Guldenmund, F.W. (2010), "(mis)understanding safety culture and its relationship to safety management", *Risk Analysis: An Official Publication of the Society for Risk Analysis*, Vol. 30 No. 10, pp. 1466-1480.
- Guldenmund, F.W. (2016), "Organizational safety culture", in Clarke, S., Probst, T.M., Guldenmund, F. and Passmore, J. (Eds), *The Wiley Blackwell Handbook of Occupational Safety and Workplace Health*, Wiley, Chichester, pp. 437-458.
- Hofstede, G.H. and Hofstede, G.J. (2005), *Cultures and Organizations: Software of the Mind*, McGraw-Hill, New York, NY.
- Høivik, D., Moen, B.E., Mearns, K. and Haukelid, K. (2009), "An explorative study of health, safety and environment culture in a Norwegian petroleum company", *Safety Science*, Vol. 47 No. 7, pp. 992-1001.
- Hudson, P. (2007), "Implementing a safety culture in a major multi-national", *Safety Science*, Vol. 45 No. 6, pp. 697-722.

- Kvale, S. (1996), *Interviews: An Introduction to Qualitative Research Writing*, Sage, Thousand Oaks, CA.
- Martin, J. (1992), *Cultures in Organisations: Three Perspectives*, Oxford University Press, New York, NY.
- Mearns, K.J. and Flin, R. (1999), "Assessing the state of organizational safety-culture or climate?", *Current Psychology*, Vol. 18 No. 1, pp. 5-17.
- Mohamed, S. (2003), "Scorecard approach to benchmarking organizational safety culture in construction", *Journal of Construction Engineering and Management*, Vol. 129 No. 1, pp. 80-88.
- Neal, A. and Griffin, M.A. (2006), "A study of the lagged relationships among safety climate, safety motivation, safety behavior, and accidents at the individual and group levels", *Journal of Applied Psychology*, Vol. 91 No. 4, pp. 946-953.
- Panchal, R. (2016), "Oil and gas regulation in the United Arab Emirates: overview", available at: <https://uk.practicallaw.thomsonreuters.com/2-528-1046> (accessed 27 July 2019).
- Patton, M.Q. (2002), *Qualitative Research and Evaluation Methods*, 3rd ed., Sage, Thousand Oaks, CA.
- Prochaska, J.O. and DiClemente, C.C. (1983), "Stages and processes of self-change of smoking: toward an integrative model of change", *Journal of Consulting and Clinical Psychology*, Vol. 51 No. 3, pp. 390-395.
- Schein, E.H. (1985), *Organizational Culture and Leadership*, Jossey-Bass, San Francisco, CA.
- Schein, E.H. (2010), *Organizational Culture and Leadership*, 4th ed., Jossey-Bass, San Francisco, CA.
- Silbey, S.S. (2009), "Taming prometheus: talk about safety and culture", *Annual Review of Sociology*, Vol. 35 No. 1, pp. 341-369.
- Silvestre, B., Gimenes, F.A. and Silva Neto, R. (2017), "A sustainability paradox? sustainable operations in the offshore oil and gas industry: the case of petrobras", *Journal of Cleaner Production*, Vol. 142, pp. 360-370.
- Trompenaars, A. and Hampden-Turner, C. (1998), *Riding the Waves of Culture: Understanding Cultural Diversity in Global Business*, The Electric Book Company, London.
- Walker, G., Mooney, J. and Pratts, D. (2000), "The people and the hazard: the spatial context of major accident hazard management in Britain", *Applied Geography*, Vol. 20 No. 2, pp. 119-135.
- Waterson, P.E. (2017), "I came into safety by accident (interview with professor Andrew hale)", *The Psychologist*, pp. 64-66. August.
- Zohar, D. (1980), "Safety climate in industrial organizations: theoretical and applied implications", *Journal of Applied Psychology*, Vol. 65 No. 1, pp. 96-102.
- Zohar, D. (2000), "A group-level model of safety climate: testing the effect of group climate on microaccidents in manufacturing jobs", *Journal of Applied Psychology*, Vol. 85 No. 4, pp. 587-596.

Appendix. Interview guide

Your name:

Your role/responsibility area/position:

How long is your past experience? In what area?

HSE culture

- Kindly explain what you understand by the term, "HSE culture".
- When you think of an organization with a strong HSE culture, what characteristics come to mind?
- Which components do you think are the most critical for the creation of good HSE cultures in an organization?

- In your opinion, what are the reasons behind the focus on HSE in the petroleum industry in the UAE?
- Are you conversant with the HSE culture concept? If yes, kindly explain whether you believe that implementing an HSE culture can help ADNOC to deliver better HSE.
- Kindly explain whether you believe that the implementation of the 100 per cent HSE culture at ADNOC will enable the achievement of better HSE results.
- In your opinion, are health, safety and environment concepts related in any way?
- What are your views about ADNOC's HSE culture? Please state any strong components or aspects of ADNOC's HSE culture. Are you aware of any problems or challenges?
- In your view, what attitudes does ADNOC have with respect to HSE?
- Please share any example(s) you might have to describe HSE culture in the section of the organization that you work in.
- In what ways do you think the HSE culture can be changed?
- Please explain the role of managers in the promotion of the HSE culture.
- Kindly share your thoughts on the statement that culture will form from the things that managers pay systematic attention.
- In the event of a critical event, how should a manager respond?
- Does ADNOC have a tool or tools to measure HSE culture? If yes, state them. If no, are you aware of any tools?

Working and health environment

- How does ADNOC consider health in your area of operation? Kindly share any examples from your experience.
- How does ADNOC consider working environment in your area of operation? Kindly share any examples from your experience.

Safety

- Explain your understanding of safety culture.
- In what ways does ADNOC consider safety in the area where you work?
- Kindly state the characteristics of safety culture at ADNOC.
- Please share any examples or experiences in this regard.

Environment

- In what ways does ADNOC consider the environment in the area where you work?
- Please share any experiences and/or examples.

Corresponding author

Mohmaed Almazrouei can be contacted at: emarrati@hotmail.com

For instructions on how to order reprints of this article, please visit our website:

www.emeraldgroupublishing.com/licensing/reprints.htm

Or contact us for further details: permissions@emeraldinsight.com