Journal of Safety Research 81 (2022) 259–269

Contents lists available at ScienceDirect

Journal of Safety Research

journal homepage: www.elsevier.com/locate/jsr

The effect of an embargo, sanctions and culture on safety climate: A qualitative view from aviation maintenance in the MENA region

Mohamed Ben-Saed, Colin Pilbeam *

Cranfield Safety and Accident Investigation Centre, Cranfield University, Cranfield MK43 0AL, UK

ARTICLE INFO

Article history:
Received 28 April 2021
Received in revised form 29 October 2021
Accepted 8 March 2022
Available online 17 March 2022

Keywords:
Low- and Middle-Income Countries
Middle East and North Africa region
Occupational safety
Organizational safety culture
Safety reporting
Wasta

ABSTRACT

Introduction: Safety climate assessment is a key measure of organizational safety. A strong safety climate is integral to the high safety performance in aviation. Most survey instruments that purport to measure safety climate are derived from evidence obtained in developed countries in the west. It is rare for these studies to examine the influence of macro-environmental factors on safety climate, and rarer still in countries found in the Middle East and North Africa (MENA) region. *Method*: The researchers conducted 28 semi-structured interviews with experienced aviation maintenance engineers from a national carrier in the region. The interview questions were derived from an extensive review of existing studies of safety climate. Data from interview transcripts were coded, creating a data structure using participant quotes for 1st order codes and arriving at three aggregate dimensions: organizational commitment to safety, organizational safety practices and social relationships and their consequences. *Results*: Commercial considerations influenced negatively organizational commitment to safety. Organizational safety practices were weak. There was a lack of safety training, a lack of resources to support safe working, poor safety communication, and a failure to report safety issues. Strong friendships were developed through working together in teams. This adversely influenced the reporting of errors and the punishment of violations. *Discussion and conclusion:* The apparently weak organizational safety climate reported here was attributed to financial constraints following the imposition of economic sanctions and embargos, and to the influence of Arabic cultural values that privilege family connections and the importance of maintaining harmony in social relationships that precludes punishment. *Practical application*: Financial constraints inevitably limit resources for safety and encourage prioritization of production. Arabic cultural values inhibit the development of a 'just' culture and a 'reporting' culture and challenge the universal adoption of approaches for promoting organizational safety developed in the West.

1. Introduction

A strong safety culture is taken to be an effective indicator of organizational safety, yet as Reason (1997) notes "few things are so sought after and yet so little understood, pg. 191." This pursuit of a strong safety culture is demonstrated most obviously in the global aviation industry (ICAO, 2018), which often provides a benchmark standard for other sectors to emulate. Authoritatively defined by the International Nuclear Safety Advisory Group (1991), "safety culture is that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, [nuclear plant] safety issues receive the attention warranted by their significance." Since then, researchers predominantly in developed countries in the West have investigated it extensively (see reviews by Guldenmund, 2000; Goncalves, Filho, & Waterson, 2018; Yorio et al., 2019). However, there are considerably fewer studies of safety culture in low and middle-income countries (LMICs). Bye et al. (2020) found only 29 papers from countries outside of Europe, North America, and Australia in a review of 229 papers investigating safety culture. Organizational culture, of which safety culture is a part (Haukelid, 2008), is acknowledged to be influenced by environmental factors (Johns, 2006), including national culture (De Witte & van Muijen, 1999) but in ways and to an extent that are not clearly specified (Gerhardt, 2009). This exposes a clear limitation in our understanding of organizational safety culture with its heritage in the West and raises the question, "how do environmental factors not experienced in the West influence the safety culture of organizations?".

To address this deficit, this paper investigates the more immediately measurable aspects of safety culture, namely safety climate

* Corresponding author.
E-mail address: colin.pilbeam@cranfield.ac.uk (C. Pilbeam).

https://doi.org/10.1016/j.jsr.2022.03.003
0022-4375/

(Flin et al., 2000; Guldenmund, 2007) in aviation maintenance of an airline operating in the Middle East and North Africa (MENA) region. We used this description intentionally to preserve the anonymity of the interviewees, airline, and country involved. The paper is organized as follows: Drawing on existing reviews of safety culture the literature review discusses the definition and assessment of safety culture and the related and more immediately measurable concept of safety climate noting the Western origins of many of these studies, and how some studies suggest that different national cultures may influence safety culture differently. The literature review also presents existing studies on aviation maintenance noting its safety critical role, and how it is considered often only in passing (Hampson et al., 2012). The methods section provides details of the study context, reporting on the method of data collection, and the method of thematic analysis used for analyzing and reporting the qualitative data. Findings are presented under three aggregate dimensions. The discussion considers how these themes are influenced by factors in the environment not prevalent in the West and argues that the experiences reported in this study are not local and unique, but generalizable to a wider subset of LMICs. This provides the basis for future research into the influence of economic sanctions on organizational safety and the influence of national culture (in this case Arabic values) on practices integral to the creation and development of organizational safety.

2. Literature review

2.1. Safety culture, safety climate and national culture

Safety culture has strong face validity (Guldenmund, 2000) and appeals to practitioners, and yet it is poorly defined (Guldenmund, 2010). There is, however, agreement that a strong safety culture is an organizational culture that prioritizes safety-related beliefs, values, and attitudes (Edwards et al., 2013). Building on Guldenmund (2010), Edwards et al. (2013) observe that safety culture can be conceptualized and studied in three different ways: ethnographically, pragmatically, and normatively. Ethnographic approaches elicit shared values, beliefs, and attitudes through observations and interviews. Pragmatic approaches investigate actions and behaviors (Yorio et al., 2019). Normative approaches to the study of safety culture, often using questionnaires, focus on the perception of safety including the presence or absence of things (such as structures and practices) that support safety. These perceptions of safety are often described as safety climate (Zohar, 1980; Griffin & Cucuruto, 2016).

Safety climate is considered to be a 'snap-shot' of an organization's safety culture (Flin et al., 2000) or the "perceived state of safety at a particular place at a particular time" (Wiegmann et al., 2002; pg. 10). As an area of research under the umbrella of organizational culture, Zohar (1980) adopted the definition of organizational climate "as a summary of the molar perceptions that employees share about their work environments, pg 96", and supplemented it with the adjective safety. This definition of safety climate has evolved, and more recently, "safety climate can be viewed as a shared and overall perception about the underlying values, beliefs and principles that operate in relation to safety within [their] organization" (Griffin & Cucuruto, 2016). In a recent extensive review of the safety climate literature drawing on 494 articles Bamel et al. (2020) suggest that existing studies emphasize two distinct antecedents, either leadership and management or perceptions of safety rules, resources, risk, and employee involvement. Since Zohar's early work, many different safety climate scales have been developed for use in surveys of employees (e.g., Glendon & Litherland, 2001; Evans et al., 2007; Kines et al., 2011; Gao et al., 2015; Chen et al., 2018). Typically, safety climate scales assess employees' perceptions of these two antecedents through such measures as management commitment to safety, safety communication, work pressures, safety training and safety rules, procedures, and policies. Normatively, safety climate (and therefore organizational safety) is evaluated positively if scores on these dimensions are high rather than low, and this is assumed to indicate an acceptable level of safety in the organization. However, it is evident that safety climate is neither homogenous nor stable within an organization. It has been shown to vary within an organization (Coyle et al., 1995; Glendon & Stanton, 2000; Zohar, 2000), and also vary with time (Tharaldsen et al., 2008; Zhang et al., 2018), suggesting that this 'snap-shot' can be influenced by organizational and contextual factors. Several authors (Mearns et al., 2004; Høivik et al., 2009) have indicated that there is little evidence of how macro-contextual factors, such as national culture or the availability of resources at a country level can influence safety climate.

Nations have characteristic cultures. These have been characterized by differences along a small number of key dimensions. Hofstede's work (2001) identified five characteristics as important dimensions: individualism-collectivism, uncertainty avoidance, power distance, masculinity-femininity, and long-term orientation. Other authors, for example Gelfland et al. (2004) and Triandis (2000), refer to some similar characteristics but also identify others, selectively combining them in different ways. Gelfland et al. (2004) used three dimensions (individual/collective, tightness/looseness, and hierarchy/egalitarianism), while Triandis (2000) identified nine dimensions of 'cultural syndromes.' Some of these dimensions are considered a strong influence on organizational safety. Noort et al. (2016) showed that uncertainty avoidance is negatively associated with safety culture, so that countries characterized by low uncertainty avoidance have a stronger safety culture than those countries with high uncertainty avoidance. Starren et al. (2013) argue that both uncertainty avoidance and power distance influence safety attitudes and behaviors. Therefore, as Mearns and Yule (2009) note it is likely that national cultural differences will impact safety climate differently. Yorio et al. (2019) similarly observe that "national culture, along with its institutionalized values, creates a backdrop for which locally meaningful and legitimate behavior is rationalized, pg 402." Differences in these national cultures create biases that determine an individual's perception (Rippl, 2002). Existing studies of safety climate come predominantly from countries in the West, which have broadly similar cultural characteristics when assessed using existing national cultural scales (Hofstede, 2001; Gelfland et al., 2004; Triandis, 2000). LMICs are positioned differently. Using Schwartz (2006) analysis of three cultural value dimensions for example, countries in Western Europe are high on autonomy, egalitarianism, and harmony, whereas countries in Africa and the Middle East are high on embeddedness and low on autonomy and high on hierarchy and low on egalitarianism. The limited national cultural spread of available studies of safety climate may account for the widespread acceptance of a common profile of responses against the regular dimensions of safety climate as indicating an acceptable safety climate.

2.2. Safety climate and the production-protection tension

Hollnagel (2014) introduced the Efficiency-Thoroughness Trade-Off (ETTO) principle, which captures the production-protection tension within organizations, where concurrent improvements in both are expected (Hasle et al., 2021; Johnston et al., 2020). Presented in this way, it suggests that decision-makers in organizations have choice, and moreover, assumes that continuity of production is assured. In some circumstances, pro-

duction may not be guaranteed, and future viability of the organization may be uncertain. In these situations, decision makers in organizations may naturally focus on production rather than protection, directing available resources to production to ensure business survival. We have been unable to identify literature that deals specifically with the safety challenges of such circumstances. Most available studies of safety climate, specifically, and operational safety more generally, omit a consideration of any limitations imposed by a lack of resources, and implicitly assume that resources are sufficient to satisfactorily discharge safe operations. For organizations in LMICs this may not be so. It is unclear how variations in economic wealth in a country influence safety climate in organizations. The existing literature on safety climate predominantly reports studies from the West, where economic wealth provides no such limitation.

2.3. Aircraft maintenance operations

Aircraft maintenance operations have contributed considerably to aviation safety, so that air transport is widely regarded as the safest mode of travel and aviation is described as an ultra-safe system (Yeun et al., 2014). Airlines, aircraft manufacturers, and organizations involved in maintenance operations invest heavily in safety to reduce incidents and maintain the hard-won safety image of aviation (Atak & Kingma, 2011). Aviation maintenance engineers (AME) have contributed significantly to this success (Rao et al, 2017). An aircraft cannot return to service and fly unless the AME sign off that the aircraft is airworthy, making them a 'last line of defense' to ensure aircraft safety (Rao et al., 2017). Despite the apparent criticality of this role for safety, their work has been rarely studied (Hampson et al., 2012).

The performance of the tasks in the AME role influences both airline safety and performance, and so they operate at the nexus of competing demands for excellent safety outcomes, high operational performance (including reduced costs), and regulatory compliance (Hampson et al., 2012). AME perform several different types of periodic checks on aircraft, conducted either outdoors at the operational line (lighter checks) or in hangars (more major checks) (Atak & Kingma, 2011). They also inspect, service, troubleshoot snags, and remove and install parts (Atak & Kingma, 2011; Rao et al., 2017). All of these tasks are performed in accordance with aircraft maintenance manuals. These are produced and continuously updated by aircraft manufacturers, who provide procedures for maintaining aircraft, engines, and components (IATA, 2009). Departure from the stipulated procedures can lead to cancellation of licenses or fines (Hampson et al., 2012). However, despite these penalties, departures from the task procedures are nevertheless common (Hobbs, 2008), most commonly attributed to either management pressure or the cultural value system of the airline (Hobbs, 2008). Although AME are trained to maintain safety standards, they can be unofficially encouraged to contravene the required procedures stipulated in the maintenance manuals in order to get the job done (CAA, 2003). Consequently, they may be pressured to sign off work that has not been conducted to their satisfaction (Hampson et al., 2012), which ultimately compromises aircraft safety.

Safety climate perceptions have been investigated among different professional groups within aviation, for example amongst commercial pilots in Australia (Evans et al., 2007; Gao et al., 2015), ground handlers in Spain (Diaz & Cabrera, 1997), and also personnel in aviation maintenance organizations in Ireland (McDonald, et al., 2000). While the aviation sector strongly supports a global standard for safety (ICAO, 2006a), the national culture of the countries in the aforementioned studies is relatively similar, and none of them are LMICs.

This brief literature review has highlighted the dearth of studies investigating the influence of national cultures, in particular non-Western cultures, and national economic wealth on organizational safety climate. This study addresses the following questions:

1) How do Arabic cultural values influence organizational safety climate?
2) How do economic sanctions and embargos influence organizational safety climate?

These are answered through an investigation of the perceptions of safety amongst AME working for a national airline based in the MENA region.

3. Methods

3.1. Study context

The study was conducted in the context of ongoing aviation operations in an airport involving maintenance engineers working for a single airline. These operations include various aircraft maintenance services such as line and major checks. Line checks (including pre-flight checks, daily, weekly checks, transit checks and troubleshooting procedures) are conducted in parking areas. Major tasks and repairs are conducted in hangar areas (Atak & Kingma, 2011). At the time of the study (late 2019/early 2020) the airline employed 86 certified AME. They begin their studies at a technical college of aviation. Once they gained their HND qualification they join an airline as an apprentice, where they work under supervision of a senior certified engineer. They are required to pass the CAA examinations and have a letter of recommendation from their direct supervisor and line manager to gain the B1 (mechanics) or B2 (avionics) licenses.

3.2. Research design and participants

Thirty-two personnel (predominantly AME) working at the line and hangar maintenance operations of an airline were invited to participate, but four declined at the interview when permission to record was requested. In total, 28 interviews were conducted by the first author between December 2019 and April 2020. Individuals were recruited using both snowball sampling (Biernacki & Waldorf, 1981) and purposive techniques (Suri, 2011; Bryman, 2012). Four initial face-to-face interviews were facilitated by the line manager and these became "the seed" for the snowball sampling technique (Johnston & Sabin, 2010). These four interviews generated 12 further interviews. In a separate second phase of interviews an additional 12 individuals were recruited using a purposive sampling strategy to maximize variation in role, experience, and age and so potentially their responses to the questions. These individuals were approached directly by the first author because he had spent time on site a few months earlier during the first phase of interviews and was therefore known to the participants.

The average age of the participants was 49 but their ages ranged from 27 to 64 years old. They had worked at the same airport for between 5 and 39 years, and on average their length of work experience was 23 years. All participants were male; 22 participants were CAA certified AME; 13 were B1 qualified (mechanics); 4 were B2 qualified (avionics); and 5 were qualified with both accreditations (B1 and B2). Four of the other six participants were technicians or mechanics and considered here as unqualified AME. The final two participants were the safety officer and the safety manager. The engineers normally worked 8-h rotating shifts and spent most of their time in the ramp area in physical proximity to hazardous operations.

3.3. Data collection procedure including instrument development and testing

A safety climate scale does not exist for aviation maintenance in this national setting, and so semi-structured interviews were used to explore the safety climate and influencing factors in this context. Common measures of safety climate found in existing studies were re-phrased as open questions to permit the exploration of participants' perceptions. The questions focused in particular on safety rules and procedures (Zohar, 1980; Glendon & Litherland, 2001; Lin et al., 2008; Gao et al., 2015; Parker et al., 2017), on safety communications (Curcuruto, et al., 2018; Huang, et al., 2018; Cheng, 2019; Zohar & Luria, 2005; Evans et al., 2007; Lin et al., 2008; Olsen et al., 2010; Lu & Yang, 2011; Kines et al., 2011; Huang et al., 2013; Gao et al., 2013), on accountability and responsibility for safety of self and others (Ghahramani & Khalkhali, 2015; Cheng, 2019; Lu & Shang, 2005), and on management commitment to safety (Kines et al., 2011). In addition, the interview questions covered demographic details (including job title, position, age, type rating, years of experience).

The set of 10 questions (see Appendix 1) were pilot tested in the UK with one English and one Arabic speaking postgraduate student to check for ambiguous wording. Prior to commencing fieldwork, the refined set of questions was further tested amongst five ground handlers working at the same airport as the AME to check for appropriateness and intelligibility of the questions. No changes were required following this check.

With one exception, the interviews were all conducted by the first author in English because the engineers were fluent in the language. The exception was conducted in Arabic. The interviews were recorded and lasted between 30 and 90 min (an average of one hour). Interviews were conducted based on the participants' availability. Sixteen interviews in the first phase were conducted face-to-face in the Maintenance Control Centre at the airport with participants who had free time between or after maintenance tasks. Following the WHO notification that the COVID-19 outbreak was a pandemic, the remaining 12 interviews in the second phase were undertaken by telephone/Skype calls. Informed consent was obtained before commencing the interviews.

3.4. Data analysis and reporting

Interviews were transcribed verbatim by the first author and anonymized; identifiable only by a number (i1-i28). These are used as identifiers in the quotes reported in the text and figure. The interview conducted in Arabic was translated into English by the first author, a native Arabic speaker. These qualitative data were analyzed using a form of template analysis proposed initially by Gioia and Chittipedi (1991) and developed subsequently by Corley and Gioia (2004) and by Gioia et al. (2012). The process of data coding and analysis followed three steps:

1) The interview questions provided tentative *a priori* codes to 'seed' the coding process. Using participants' descriptions and terms, a complete set of first-order codes was generated from a review of all 28 transcripts by the first author. Two other researchers separately and independently checked the reliability of this coding process. They were given a randomly selected sample of transcripts, which they were asked to code against the complete set of first-order codes. They achieved inter-rater reliability scores of 70% and 80%, when compared with the first author, giving Cohens' Kappa values of 0.64 and 0.77, indicating substantial agreement (McHugh, 2012).
2) Following the coding process, these open codes were combined through axial coding into second-order themes that were labelled using academic terms. The processes of combination and labelling were conducted collaboratively between the authors.
3) These second-order themes were then merged into a higher level of aggregate dimensions through discussion between the authors. Any discrepancies between the authors, in either the categorization of content to a particular code or the labelling of a code, discovered at this stage or the previous one were resolved through discussion.

This process produced the data structure (Fig. 1). No new first-order codes were identified after the coding of the 22nd interview. It was deemed that data saturation had been reached. The transcripts of the last six interviews provided corroborating data.

The validity of our interpretation of the data structure was checked in three separate discussion groups, each with a different selection of the original interviewees. These were conducted in country by the first author early in 2021. They confirmed that our overall interpretation of the interview data was accurate. Nevertheless, they provided a more nuanced insight into five themes in the data structure. Specifically, they noted that aircraft safety was safeguarded, only occupational safety was compromised by performance considerations. They confirmed a lack of resourcing had impacted the supply of tools and equipment. While the initial staff shortages had created problems, the significant loss of aircraft during the war meant that staffing levels were now too high. They confirmed that safety communications were generally poor, except for those concerning Covid-19 (which struck after the first phase of interviews). The participants noted that everyone provided reports on aircraft safety, but very few reported on colleagues' safety performance. They also noted that the hierarchical relationships were only observed between pilots and junior engineers and unqualified technicians.

4. Results

The findings are summarized in Fig. 1 and categorized around three aggregate dimensions: organizational commitment to safety; organizational safety practices; and role of social relationships.

4.1. Organizational commitment to safety

This dimension refers to the AME perceptions of management commitment towards safety, in particular noting the influence of commercial considerations on safety. The engineers contended that while management promoted safety it also applied pressure to complete the work-orders on time:

> *"I feel unsafe when I work under pressure or when my supervisor is around me all the time, and especially when he constantly moves around when I work, probably because he wants me to expedite performance or something like that." (I16).*

Participants confirmed that safety maintenance procedures were in place, but the performance of these procedures varied. Some senior engineers attributed the supervisors' pressure and their prioritization of production over occupational safety to the European Aviation Safety Agency (EASA) embargos on flights from the country. Throughout the interviews, participants stated the adverse impact of these embargos on the financial viability of the airline:

> *"Because of these embargos, we could not make money. Accordingly, the managers are very anxious and worry about flight time priorities simply to make money." (I5).*

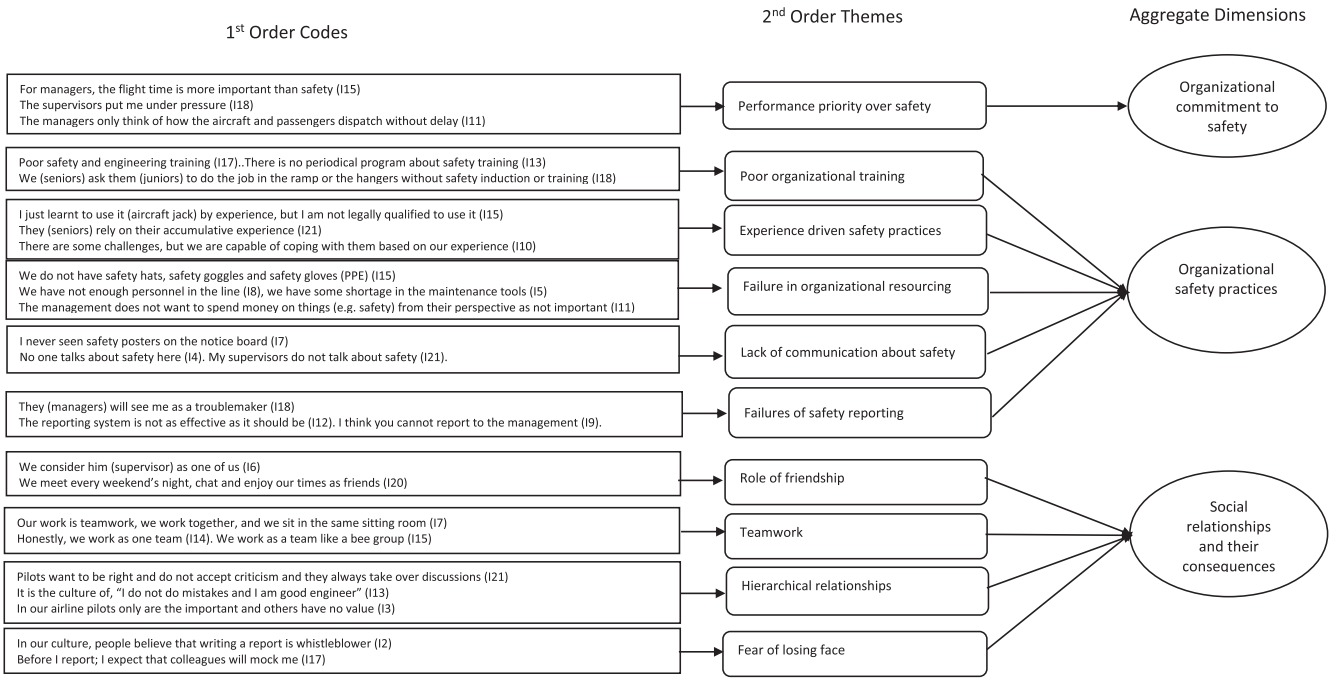

Fig. 1. Data structure for safety climate interviews with aviation maintenance engineers in a country in the MENA region 2019–2020. First-order codes are quotes from different respondents indicated by I1-I28.

Other participants noted the implications of these embargos for aviation safety and stated that while a historical organizational commitment to safety remained, it had been moderated by the need for production because of the crippling effect of embargos on generating revenues:

> *"The embargo hurts us, and I am seriously speaking, and it made us unable to compete and work as we used to. Most of the financial challenges are due to the embargo and as an airline we could not do anything because it's beyond of our control."* *(I2).*

4.2. Organizational safety practices

Organizational safety practices were weak according to all respondents. These practices were a lack of formal safety training with an emphasis on experience-driven safety practices; a lack of organizational resources to support safe working; poor safety communication; and failure to report safety issues.

4.2.1. Poor organizational training

Aviation maintenance operations demand essential training for AME, often airside. The findings from this study indicated, however, that although the older AME received training when they were first employed, training provision had decreased because of lack of finances, and now these individuals and the new recruits were expected to teach themselves or learn from others. One line manager stated, *"I had training and personal efforts to develop myself like information related to firefighting under airplanes, and I sometimes look at YouTube to develop myself."* *(I2).* While another engineer commented, *"I have learned most of the work tasks by experience"* *(I15).* But this situation outraged one chief engineer, *"The new employees and trainees are not trained"* *(I8).* Another noted that, "*new technicians need more training and attention from us [senior engineers] to do what they do as safe as it should be"* *(I7).*

Most of the participants believed in the significance of training on maintenance works, however, specific safety training was rarely available. For example, one senior engineer stated, *"In our airline we do not focus on the occupational safety, and we do not have effective and sufficient training on that"* *(I3).* Where training occurred, it was of poor quality, which reduced the safety competence of the workforce. He continued, *"We have no set of standards of the content of the training syllabus"* *(I3).* Others noted, *"We do not have the international standard of training, we have the same titles as the international standards, but the content of the training is weak"* *(I17).*

This lack of safety training reflects the general reduction in formal training and education provided by the organization, and the implicit expectation that others will perform this training. Some did not accept this responsibility for training others: *"For me as a line manager, my job is to execute the job not training because training is a responsibility of somebody else, which is the training department. Even the trainees should be briefed from somebody else not from us in this section"* *(I2).*

4.2.2. Experience-driven safety practices

The AME took pride in their work in the face of the challenging circumstances and lack of resources. While the older interviewees confirmed that they had received some formal training when they were first employed, this was now supplemented by experience on-the-job and learning from others. Engineers in different roles learnt from each other as they performed their tasks together: *"When I work with others, I learn from them, and I learn even from the juniors because their minds are still fresh, and they remind me with different basic information"* *(I7).* In some cases, this proved more accurate than the maintenance manuals: *"Many certified engineers rely on their experience, not just me. Have you talked to […], he is the best engineer we have in the airline, he is one of the elites, seven months ago he detected a mistake in maintenance manual of the type A320 and nobody had noticed that, and when he emailed the company in Germany, they said oh that is right, and they apologized and amended that chapter"* *(I15).* Nevertheless, the manuals and the checklists that they contain still provided a useful resource for learning, which junior engineers were encouraged to use: *"They continuously remind me to use the work task and follow the steps one by one"* *(I21).*

4.2.3. Failure in organizational resourcing for safety

Interviewees generally acknowledged that a lack of resources was a factor influencing their occupational safety and the safety of maintenance operations. The poor financial position of the airline led to lack of resources such as maintenance tools and equipment. A shift leader contended that the organization's management did not consider their safety needs and metaphorically asserted, *"These orphans [engineers] have not yet got their uniforms" (I4).* Another participant highlighted the lack of provision of PPE stating, *"For my safety, we do not have safety hats, safety goggles and safety gloves. These are very basic equipment for any engineer, and we have not got them for over three years."* (I15). Some participants felt that staff shortages, especially on night shifts, had affected safety performance, *"When I work alone in the line and especially during night shifts, I feel I am not safe, and that is because we do not have enough technicians especially at night shifts" (I14).* Many believed the failure to provide sufficient staff and the technical tools and equipment necessary for maintenance operations was beyond their management's control, arising from the EASA embargo and consequent lack of money, *"We struggle with technical support services like having the right tools and equipment and a lack of metal sheets. We are isolated from the rest of the world, so when we order any tools or equipment, there are challenges due to the embargos and restrictions from the central bank which affects our ability to purchase the tools and needed equipment" (I12).*

4.2.4. Lack of communication about safety

There was a shared perception that safety communications were poor, for example, *"No one talks about safety here" (I4).* This began with a lack of safety training programs for AME but continued with a reduction in information dissemination and safety promotion. "*There is no information about health and safety but with regard to aircraft we have the AMM" (I11).* An avionics engineer contended, *"When it comes to safety information, it is all stated in the maintenance manual. If you mean that the company is giving us some safety bulletins or posters, no it is not, because the company is cutting expenses up to the maximum" (I7).* Another engineer noted that, *"We used to have regular posters and notes and read and sign in our previous base about health and safety, this was before the war and embargoes. But now, not as often as we used to be" (I14).* This again emphasized the impact of the war and the embargoes on resource availability, and subsequently the organizational focus on financial viability and survival, and the inevitable prioritization of production.

4.2.5. Failures of safety reporting

Many of the interviewees felt that the safety reporting system, where it concerned colleagues' safety performance, was ineffective, even though they accepted that safety reporting was essential for improving safety climate and culture. Safety reporting was discouraged for two reasons. First, some interviewees asserted that little attention was given to safety reports. They were low priority compared with other issues. "*The managers do not take these reports seriously. Their reaction to such reports is not encouraging. They just look at these reports as a routine job, and some see them as silly reports.*" *(I11).* Second, there was a perception that management viewed reports of safety incidents negatively, and those that made them unfavorably. This discouraged individuals from speaking up. A senior engineer noted, *"They will see me as a troublemaker, they will ask me to fill a report to get rid of me and then they put it in the file cabinet."* *(I8).* Another stated that, "*In our culture in [country], junior mechanics or other apprentice do not talk because they think if they tell us, we will make trouble for them" (I14).*

4.3. Social relationships and their consequences

Safety climate is a function of the interactions between people and the perceptions they share of their work environment. The findings draw attention to the close friendship formed through working together in teams, while acknowledging the existence of hierarchical relationships. Importantly, the findings highlight the perceived importance of maintaining these relationships and the influence this has on reporting errors and punishing violations.

4.3.1. Role of friendship

Through the course of the 28 interviews, the respondents described their relations with their peers and with their supervisors and/or line managers. Relationships between the engineers were very close, *"I am talking about my experience, his treatment to others might be different, I do not know. But for me, we are like brothers" (I20).* These friendly relationships were also found between workers and supervisors extending even beyond the work environment to connections between their families. *"I can say he is one of us. We are friends, and even our families are friends, we visit each other, and our families visit each other as well" (I6).*

One of the consequences of striving to maintain such close social relationships is that punishment for safety violations is less likely. One interviewee noted, "*We have no punishment, and I would relate this to our social life" (I10).* Another provided more detail*: "It is very hard to punish someone in our organization. By law, everyone can be punished; however, as we are Arabs, it is socially sensitive because our social life is very close, and it is different from the Americans and Europeans" (I18).*

In order to preserve these close relationships managers may overlook some breaches of safety rules and are less likely to punish or apply organizational policies especially to those to whom they are tied: "*The top manager sometimes does things and actions against his beliefs because he is influenced by external factors such as social pressures. This is the available system. We have no accountability. The philosophy of stick and carrot is absent" (I2).* Additionally, people use their relations and connections to get things done even when it was against organizational policy: "*When I do something wrong, I will not be punished because I will make some contacts with some acquaintances and friends and no one would punish me as nothing happened.*" *(I10).*

4.3.2. Teamwork

Interviewees commented on the value of team interactions for effective aircraft maintenance operations, asserting that team working was essential:

> *"I do not know everything and I cannot do everything, but my colleagues can. The best work is the one based on teamwork" (I1).*

And:

> *"In aviation, there is no place for arrogance, and we work as a team (I4)".*

A senior engineer described the friendly and collaborative teamwork environment: "*We are like one collective family, and when someone could not perform his work tasks, we all go and help him" (I7).*

This was confirmed by a junior engineer: "*The atmosphere is very nice and we are like brothers in the workplace and outside the workplace. We meet outside the workplace and chat in a coffee or on the beach. So we are friends and brothers, although I am young and not as senior as they are but I do not feel a difference between me and others" (I21).* The results of effective teamworking were summarized by a senior engineer: "*In the 35 years I have been here, I have seen the relation between the AME grow dramatically. The one*

thing I really love is that we care about the aircraft and about each other, we are one family, we work together to ensure a safe, enjoyable and safe experience for our passengers" (I5).

4.3.3. Hierarchical relationships

Even within these close working relationships amongst AME, interviewees identified a hierarchy based on seniority. *"There are some protocols like seniority. Socially it's impolite to critique or give feedback to someone old or senior; there are some borders and limits between the young and old senior engineers" (I13).* In addition, the importance of seniority led some senior engineers to overlook their own mistakes and to disregard the challenges of juniors, leading to the belief that juniors were more prone to making mistakes. A junior engineer speaking to more senior engineers felt that they "*looked at me as one of their children" (I21).* He even noted that, "*some of them told my father that I disturb them because they felt who am I to ask or remind or guide them on safety rules" (I21).* In contrast to the teamwork amongst AME, relationships with other non-maintenance functions were less collaborative. According to a junior engineer, pilots believed they were superior to them: "*Some pilots somehow have an odd attitude; they always want to be right and do not accept criticism and they always take over discussions" (I21).*

4.3.4. Fear of losing face

The close personal relationships between AME arising from the social context that favors social cohesion had a negative impact on organizational reporting policies:

> *"We are friends, not colleagues, and we spend time together outside the workplace. So it's very sensitive to report that he is not following the rules and procedures or not wearing the right PPE. It's a little bit difficult" (I19).*

Interviewees noted that they would neither report their own errors nor the mistakes of their colleagues for fear of losing face or being seen as whistleblowers. Interviewees explained how others viewed them when they provided safety reports: *"They will consider me like a Whistle-blower. I cannot report one of my colleagues or engineers under my supervision because of its sensitive issue. Reporting on issues in our country and even in other Arab countries is very sensitive" (I4).*

Interviewees mentioned the implications of reporting safety mistakes on their own social prestige and reputation, which they have built during a long career: *"In our country, if you write a report, colleagues will disdain you and take it as a joke. Let me explain it more. Before I report, I expect that colleagues will mock me. They think it as whistleblowing" (I17).*

5. Discussion

Organizational commitment to safety, availability of safety training, adequate resources to purchase appropriate and necessary safety equipment, and effective reporting are vital pillars of organizational safety and commonly used as key indicators of organizational safety climate (e.g., Gao et al., 2015; Kines et al., 2011; Zohar & Luria, 2005). The findings in this study indicate the following perceptions: commitment to occupational safety was secondary to production; there was little safety training; resources to purchase safety equipment and provide PPE were lacking; safety communications were absent; and safety reporting was not encouraged. These negative responses to key indicators of safety climate suggest that, amongst AME at this airport, safety climate is weak. This is remarkable because the global aviation industry promotes and affirms a strong safety culture as an indicator of safety (ICAO, 2018). Consequently, assumptions about the universality of strong safety climate, even in aviation, are perhaps unwarranted.

Safety climate is regularly assessed by capturing employee perceptions through survey questions on several aspects of organizational life. Respondents are typically asked to agree-disagree on a Likert scale with statements pertinent to organizational safety, including organizational commitment to safety, safety training, provision of PPE, safety communication, and reporting (e.g., de Wet et al., 2015; Evans et al., 2007; Flin et al., 2000; Glendon & Litherland, 2001; Kines et al., 2011; Seo et al., 2004). Positive responses (i.e., agree statements, unless reversed coded) are deemed to indicate a positive safety climate and vice versa. This study is unusual insofar as safety climate was assessed through interviews rather than a survey. This allows us to not only comment on this alternative approach to investigating safety climate, but also to examine two important explanations provided by interviewees for their perceptions of a negative safety climate in aviation maintenance in this setting, which have not been considered previously in the literature on safety climate. These are economic sanctions and embargos, and the influences of Arabic cultural values, through wasta (described in section 5.3), social harmony, and a well-developed oral tradition. Neither of these explanations could be observed from studies conducted in developed countries, where much of the previous work has been conducted. The observation of the perceived effects of these macro-factors on organizational safety climate is therefore new.

5.1. Interviews to investigate safety climate

Deriving interview questions from existing surveys of safety climate inevitably means that similar issues will be reported in both types of study. The importance of organizational commitment to safety (Chen et al., 2018; Kines, et al., 2011; Seo et al., 2004), safety training (Cheng, 2019; Evans et al., 2007), resourcing (Evans et al., 2007; Glendon & Litherland, 2001; Huang et al., 2013), safety communication (Evans et al., 2007; Gao et al., 2015; Kines et al., 2011), and reporting (Chen et al., 2018; Gao et al., 2013, 2015) noted elsewhere, were found here. This alternative method of data collection therefore offers an equally useful tool for capturing safety climate data. This may be particularly valuable in situations where exploratory studies are required, such as in situations where safety climate has not been investigated before, existing safety climate scales are inappropriate, and new scales need to be developed.

Collecting data through interviews is not without practical challenges. In this study the request to record the interview caused four possible interviewees to exercise their right to withdraw. This was respected. Research ethics approval for the study required this, but such withdrawals from research studies using qualitative methods are rarely reported. In contrast, quantitative data collection methods, like surveys, frequently report response rates. These also indicate the number of potential participants that decline to participate, and where response rates are low, this number may be large. It is unclear why the four respondents withdrew at this stage. Tentatively, we suggest that they may have been wary of their recorded comments being shared with their line managers and were fearful of possible repercussions. Several interviewees shared their concerns over reporting others and appearing to be a 'whistleblower.' Evidently other engineers had no such concerns, and freely shared their views.

In situations where there are a limited number of potential interviewees, the achievement of data saturation (i.e., the appearance of new codes in the data) may be compromised if interviewees withdraw because of the request to record. This may impact the value of the study. Other ways of capturing data in interviews, for example note taking using shorthand, may be needed, if recording is unacceptable. Fortunately, this was not a

problem in this study where data saturation was achieved after the 22nd interview. Furthermore, if interviews are unacceptable to respondents, then other methods are required. We suggest methods that require trust to be built between researcher and the researched, such as participant-observation or other ethnographic approaches may be appropriate. However, these create different challenges, such as time commitment and maintaining researcher objectivity during the collection, analysis, and interpretation of the data (LeCompte & Goetz, 1982).

5.2. Economic sanctions and embargos

Economic sanctions and embargos are most often imposed on LMICs by countries in the developed world. The UN currently (2021) has sanctions in place against North Korea, Iran, Mali, South Sudan, Central African Republic, Yemen, Guinea-Bissau, and Libya. The UK government has some form of sanctions (including transit controls) against more than 70 countries, including for example Afghanistan, Azerbaijan, Myanmar, Somalia, Syria, and Zimbabwe, while the United States has embargoes against 30 countries, including Cuba, Venezuela, and Turkey. In this case, the country is subject to an embargo imposed by the EU, under the auspices of European Union Aviation Safety Agency (EASA), preventing air carriers holding an Air Operator Certificate (AOC) issued by the country's Civil Aviation Authority (ICAO, 2006b) from entering European airspace (Griffiths & Bromley, 2008) and competing for space in the lucrative European market. Sanctions and embargos are designed to have a punitive financial impact on those countries that are subject to them. Inevitably, this will result in constraints on businesses operating in these locations. One casualty of this identified unequivocally by participants in this study was organizational safety. The findings revealed that the airline prioritized production over occupational safety in order to remain solvent (section 4.1). Consequently, resources (including equipment, training, and staff) were scarce (section 4.2) and there was a strong perception amongst interviewees that this adversely influenced organizational safety practices around aircraft maintenance. Engineers worked without appropriate safety equipment and with incorrect tools (section 4.2). Safety training was considered inadequate (section 4.2). These findings are consistent with the report of the adverse impact of international sanctions on Iranian air carriers on safety perceptions of the airlines by passengers and the occurrence of technical defects in the aircraft (Majidi et al., 2014). These results are not found in situations where sanctions are not present. Studies of aircraft manufacturing organizations operating in Australia did not report the prioritization of production over safety (Karanikas et al., 2018). The imposition of sanctions on other nations can unintentionally therefore have an adverse effect on organizational safety in those affected countries. Most of the existing studies of safety climate have been conducted in the West where sanctions are not experienced and so this particular response has not been reported previously.

5.3. Arabic cultural influences through wasta, social harmony and oral tradition

According to Reason (1997) organizational safety culture is comprised of four critical components: a reporting culture, a just culture, a flexible culture, and a learning culture. This study amongst AME suggests that some of these components may be influenced strongly and also negatively by the prevailing national, predominantly Arabic, culture. Arabic culture has values that are different from those found in Western cultures, and so its influence on organizational safety cannot be understood from investigating safety in a Western context, where it is less strongly present, if not entirely absent. Several of these values have an important influence on organizational safety as indicated by the interviewees in this study (section 4.3), in particular the role and importance of family connections, the importance of harmony in social relationships, and acceptability of punishment.

Resembling Guanxi in Chinese culture (Hutchings & Weir, 2006), Ubuntu in African cultures, and the 'old-boys network' in the UK (Liao, 2015; Ramady, 2015), wasta is a dominant social practice throughout the Arab world, indicating obligations and duties to members of an extended family. The practice refers to "social networks and connections," and anticipates mediation and intercession (Cunningham & Sarayrah, 1994) between people who are connected through extended family ties (Harbi & Thursfield, 2017). It strongly influences management practices (Budhwar & Mellahi, 2007), decision making, and organizational behaviors (Tlais & Kauser, 2010; Weir, 2003). Managers in Arabic countries often depend on friendship and family ties to get things done (Al-Faleh, 1987; Bjerke & Al-Meer, 1993). The findings in this study suggested it has a strong and apparently negative influence on organizational safety culture in the following way. Individuals connected to influential others may be less likely to be punished than others without these connections through the intercessory aspects of wasta. There was a general perception among interviewees that responsible managers were more lenient on offenders to whom they were tied by wasta (section 4.3). This encourages a perception of inequality (Harbi & Thursfield, 2017) undermining the necessary 'just' culture aspect of organizational safety culture. Liao (2015) has made a similar observation in a study of Chinese pilots with weak Guanxi relationships, which resulted in a distrust of the safety system.

Another important value in Arab culture is the pursuit of social harmony encouraging people to bond together forming loyal groups (Atiyyah, 1999; Al-Kandari & Gaither, 2011), which is promoted by Islamic teaching (Kalliny & Gentry, 2007; Ourfali, 2015). Managers and employees in organizations in Arab countries strive for close relationships and group harmony (Dedoussis, 2004; Kabasakal et al., 2012) and as a consequence conflict is avoided (Atiyyah, 1999). People withdraw in situations where confrontation is possible (Abdalla & Al-Homoud, 2001), as might occur for example where individual performance is poor. In order to maintain harmonious social relationships individuals are less likely to report errors, more especially if this identified the failings of others. Where individuals do report they risk being considered whistleblowers, and losing face amongst their colleagues (Labben, 2018). In this study, the person making the report risked being considered a whistleblower and subsequently publicly shunned (section 4.3), undermining the necessary 'reporting' culture of organizational safety culture (Reason, 1997).

A further aspect of Arabic culture pertinent to the findings in this study is the oral tradition. This contrasts with cultures of the West with their focus on the written word and reasoning and critical analysis (Zaharna, 1995). From this Western perspective, safety training and safety communications rely on written documents and logical explanations. Where these written documents are absent, as in this study for reasons of economic constraint, other means of ensuring effective transmission of necessary information were needed. An oral tradition reliant on storytelling and repetition to maintain audience attention, and where the spoken word has a significant impact (Gruyter, 2012; Stetkevych, 2010) helped to provide such a medium. In this study, apprentices were trained by senior engineers through sharing their experiences in conversation and through constant reminders of what each task required (section 4.2). This tradition strongly resembles situated learning (Lave & Wenger, 1991) and the notion of legitimate peripheral participation in a community of practice (Lave & Wenger, 1991), where expertise is gained through experience, and not only through the study of written materials. This strong oral tradition

may help to mitigate the potential adverse effects of the reliance on written safety communication that were absent in this study, and which are commonly observed in organizations in the West.

5.4. Limitations and future work

The study was conducted with AME of a single airline in one country at a specific point in time. Nevertheless, the explanations offered by the participants to account for the perceived poor safety culture of the organization support naturalistic generalization because they relate to macro-environmental factors that are not specific to this country or to the aviation sector. The explanation of the findings has application in other settings characterized by either a lack of resources or sharing Arabic cultural values, suggesting that situations influenced by these factors should be investigated to check for similar negative influences on safety climate to those reported here. While these macro-environmental factors are unusual in developed countries, they are more commonly found in LMICs including those in the MENA region, emphasizing the importance of conducting research in these settings.

Furthermore, it could be argued that these findings were manifested more clearly, because the study was conducted in a safety critical industry where participants had an underlying clear knowledge of the importance of safety and strive to maintain safety. Where this underlying awareness is less strong, the results may be less apparent, because the context fails to throw them into such sharp relief. Such settings require investigation.

Throughout the discussion, we have noted obvious differences between these results and those found in developed countries. This suggests that those factors that contribute to the creation of strong safety climate in organizations in the West cannot be assumed to pertain unequivocally elsewhere, where other macro-environmental factors have an important influence. The explanations offered here require more widespread testing in LMICs. In particular, the (probably) unintentional adverse effects of economic sanctions and embargos on organizational safety deserves further study. In addition, the influence of non-Western cultures on the understanding of the basis of safety and how this translates into effective organizational safety merits more consideration as recently advocated by others (e.g., Bamel et al., 2020; Yorio et al., 2019). It has previously been discussed that beliefs about safety and perceptions of risk are determined by culture (Kouabenan, 2009), which is not homogeneous.

5.5. Practical implications

The study suggests that macro-environmental factors that influence resource availability may encourage senior managers in organizations to focus on production in order to maintain organizational viability, rather than on safety performance. This prioritization may occur despite the commitment of the workforce to safety, creating tensions in the workplace that must be managed. Here the provision of safety training was reduced to a minimum because of a lack of resources. In this situation, the locally strong oral tradition could be exploited to encourage and support the sharing of safe working practices between experienced qualified engineers and their trainees. Through this approach, more junior members may become involved more rapidly in the local community of practice strengthening it for the future. The oral tradition involving storytelling could be exploited also by aircraft manufacturers to provide video presentations of safe and accurate task performance rather than relying solely on written manuals.

Arabic cultural values may create difficulties in establishing a strong organizational safety culture using methods developed in the West. Promoting both a ‘just’ culture and a ‘reporting’ culture may be challenging amongst a workforce that is wholly or predominantly Arab, because their values encourage and promote different behaviors. In these circumstances, the basis of safety in an organization needs to be reconsidered. In devoutly religious societies it may be possible to appeal to values underpinned by religious belief to shape safety practices. The adoption of practices found to be successful in the West therefore may not apply everywhere.

6. Conclusion

Despite sector-wide normative expectations of a strong safety culture within aviation, this study amongst AME in a country in the MENA region has shown that this is not universal. Moreover, participants in this study explain that the apparently weak safety climate can be attributed to the influence of two hitherto unexplored macro-factors, economic sanctions and embargos, and Arabic cultural values. The embargo has an unintended consequence on organizational safety by necessitating a focus on production over protection, and consequently by limiting the availability of resources to support occupational safety. The multi-faceted characteristics of Arabic values provide several challenges to the pillars of safety culture, making it difficult to establish both a reporting culture and a just culture.

These macro-factors are unique to LMICs and therefore unobservable in the West where much of the prior research on safety climate and safety culture has been conducted. This strongly suggests that important concepts in organizational safety, like safety climate, that underpin effective safety management systems in the West may not be readily or easily transferrable from these settings into LMICs. A more extensive investigation and thorough testing of some of these ‘taken-for-granted’ safety approaches in a greater diversity of settings is warranted.

7. Declarations of interest

None.

Acknowledgements

We thank the aviation maintenance staff who freely gave their time to be interviewed. MBS gratefully acknowledges the financial assistance of his national Government through a scholarship for his PhD studies. We acknowledge the constructive and helpful comments of two referees in improving this manuscript.

Appendix. Questions on safety climate used in semi-structured interviews with AME.

1. How would you describe safety in your organization?
2. What information about H&S do you receive from your organization?
3. How do you do your day-to-day job?
4. Do you think you work safely? Why?
5. What safety rules and procedures do you have in your company?
6. How does your manager/ supervisor treat you / your colleagues?
7. If you see something dangerous/risky /hazardous, can you tell your manager? Why(not)?
8. Do you think that accidents can be avoided? Why?
9. How responsible do you feel your manager/supervisor is for your safety at work?
10. How responsible do you feel about you own/your colleagues’ safety?

References

Abdalla, I. A., & Al-Homoud, M. A. (2001). Exploring the Implicit Leadership Theory in the Arabian Gulf States. *Applied Psychology, 50*(4), 506–531.

Al-Faleh, M. (1987). Cultural influences on Arab management development: A case study of Jordan. *Journal of Management Development, 6*(3), 19–33. https://doi.org/10.1108/eb051643.

Al-Kandari, A., & Gaither, T. K. (2011). Arabs, the West and public relations: A critical/cultural study of Arab cultural values. *Public Relations Review, 37*(3), 266–273. https://doi.org/10.1016/j.pubrev.2011.04.002.

Atak, A., & Kingma, S. (2011). Safety culture in an aircraft maintenance organisation: A view from the inside. *Safety Science, 49*(2), 268–278. https://doi.org/10.1016/j.ssci.2010.08.007.

Atiyyah, H. S. (1999). Public organisations effectiveness and its determinants in a developing country. *Cross Cultural Management: An International Journal, 6*(2), 8–21.

Bamel, U.K., Pandey, R., Gupta, A. (2020). Safety climate: systematic literature network analysis of 38 years (1980-2018) of research. Accident Analysis and Prevention 135.

Biernacki, P., & Waldorf, D. (1981). Snowball sampling: Problems and techniques of chain referral sampling. *Sociological Methods & Research, 10*(2), 141–163.

Bjerke, B., & Al-Meer, A. (1993). Culture's consequences: Management in Saudi Arabia. *Journal, Leadership and Organisational Development, 14*(2), 30–35.

Bryman, A. (2012). *Social research methods* (4th edition). Oxford: Oxford University Press.

Budhwar, P., & Mellahi, K. (2007). Introduction: Human resource management in the Middle East. *International Journal of Human Resource Management, 18*(1), 2–10. https://doi.org/10.1080/09585190601068227.

Bye, R. J., Aalberg, A. L., & Røyrvik, J. O. D. (2020). What we talk about when we talk about HSE and culture – a mapping and analysis of the academic discourses. *Safety Science, 129*.

CAA. (2003). Safety Health of Aviation Maintenance Engineering: Project Description. CAA Paper. Retrieved from https://publicapps.caa.co.uk/docs/33/CAPAP2003_10.Pdf.

Chen, Y., McCabe, B., & Hyatt, D. (2018). A resilience safety climate model predicting construction safety performance. *Safety Science, 109*, 434–445. https://doi.org/10.1016/j.ssci.2018.07.003.

Cheng, Y.-H. (2019). Railway safety climate: A study on organizational development. *International Journal of Occupational Safety and Ergonomics, 25*(2), 200–216.

Corley, K. G., & Gioia, D. A. (2004). Identity ambiguity and change in the wake of a corporate spin-off. *Administrative Science Quarterly, 49*(2), 173–208. https://doi.org/10.2307/4131471.

Coyle, I. R., Sleeman, S. D., & Adams, N. (1995). Safety climate. *Journal of Safety Research, 26*(4), 247–254.

Cunningham, R., & Sarayrah, Y. (1994). Taming wasta to achieve development. *Arab Studies Quarterly, 16*(3), 29–42.

Curcuruto, M., Griffin, M. A., Kandola, R., & Morgan, J. I. (2018). Multilevel safety climate in the UK rail industry: A cross validation of the Zohar and Luria MSC scale. *Safety Science, 110*, 183–194.

Dedoussis, E. (2004). A cross-cultural comparison of organizational culture: Evidence from universities in the Arab world and Japan. *Cross Cultural Management: An International Journal, 11*(1), 15–34.

De Wet, C., Spence, W., Mash, R., Johnson, P., & Bowie, P. (2015). The development and psychometric evaluation of a safety climate measure for primary care. *BMJ Quality and Safety, 19*(1), 578–584. https://doi.org/10.1136/qshc.2008.031062.

van De Witte, K., & Muijen, J. J. (1999). Organizational culture. *European Journal of Work and Organizational Psychology, 8*(4), 497–502.

Diaz, R., & Cabrera, D. (1997). Safety climate and attitude as evaluation measures of organizational safety. *Accident Analysis and Prevention, 29*(5), 643–650.

Edwards, J. R. D., Davey, J., & Armstrong, K. (2013). Returning to the roots of culture: A review and re-conceptualisation of culture. *Safety Science, 55*, 70–80.

Evans, B., Glendon, A. I., & Creed, P. A. (2007). Development and initial validation of an Aviation Safety Climate Scale. *Journal of Safety Research, 38*, 675–682. https://doi.org/10.1016/j.jsr.2007.09.005.

Flin, R., Mearns, K., O'Connor, P., & Bryden, R. (2000). Measuring safety climate: Identifying the common features. *Safety Science, 34*(1–3), 177–192. https://doi.org/10.1016/S0925-7535(00)00012-6.

Gao, Y., Bruce, P. J., Newman, D. G., & Zhang, C. B. (2013). Safety climate of commercial pilots: The effect of pilot ranks and employment experiences. *Journal of Air Transport Management, 30*, 17–24.

Gao, Y., Bruce, P. J., & Rajendran, N. (2015). Safety climate of a commercial airline: A cross-sectional comparison of four occupational groups. *Journal of Air Transport Management, 47*, 162–171. https://doi.org/10.1016/j.jairtraman.2015.05.010.

Gelfland, M. J., Lim, B.-C., & Raver, J. L. (2004). Culture and accountability in organizations: Variations in forms of social control across cultures. *Human Resource Management Review, 14*, 135–160.

Gerhardt, B. (2009). How much does national culture constrain organizational culture? *Management and Organization Review, 5*(2), 241–259.

Gioia, D. A., & Chittipeddi, K. (1991). Sensemaking and sensegiving in strategic change initiation. *Strategic Management Journal, 12*, 433–448.

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2012). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational Research Methods, 16*(1), 15–31. https://doi.org/10.1177/1094428112452151.

Glendon, A. I., & Litherland, D. K. (2001). Safety climate factors, group differences and safety behaviour in road construction. *Safety Science, 39*, 157–188.

Glendon, A. I., & Stanton, N. A. (2000). Perspectives on safety culture. *Safety Science, 34*(1–3), 193–214. https://doi.org/10.1016/S0925-7535(00)00013-8.

Goncalves Filho, A. P., & Waterson, P. (2018). Maturity models and safety culture: A critical review. *Safety Science, 105*, 192–211.

Ghahramani, A., & Khalkhali, H. R. (2015). Development and validation of a safety climate scale for manufacturing industry. *Safety and Health at Work, 6*, 97–103.

Griffin, M. A., & Curcuruto, M. (2016). Safety climate in organizations: New challenges and frontiers for theory, research and practice. *Annual Review of Organizational Psychology and Organizational Behavior, 3*(3), 191–212.

Griffiths, H., & Bromley, M. (2008). *Stemming destabilizing arms transfers: The impact of European Union Air Safety Bans*. Stockholm: Stockholm international peace research institute.

Gruyter, D. (2012). Medieval oral literature. In Orality and the tradition of Arabic epic storytelling. Berlin: Gedruckt auf säurefreiem Papier.

Guldenmund, F. W. (2000). The nature of safety culture: A review of theory and research. *Safety Science, 34*, 215–257.

Guldenmund, F. W. (2007). The use of questionnaires in safety culture research – an evaluation. *Safety Science, 45*, 723–743.

Guldenmund, F. W. (2010). (Mis)understanding safety culture and its relationship to safety management. *Risk Analysis, 30*(10), 1466–1480.

Haukelid, K. (2008). Theories of (safety) culture revisited – an anthropological approach. *Safety Science, 46*, 413–426.

Hampson, I., Junor, A., & Gregson, S. (2012). Missing in action: Aircraft maintenance and the recent "HRM in the airlines" literature. *International Journal of Human Resource Management, 23*(12), 2561–2575. https://doi.org/10.1080/09585192.2011.633278.

Harbi, S., & Thursfield, D. (2017). Culture, Wasta and perceptions of performance appraisal in Saudi Arabia. *International Journal of Human Resource Management, 28*(19), 2792–2810.

Hasle, P., Madsen, C. U., & Hansen, D. (2021). Integrating operations management and occupational health and safety: A necessary part of safety science. *Safety Science, 139*. https://doi.org/10.1016/j.ssci.2021.105247.

Hobbs, A. (2008). An overview of human factors in aviation maintenance. Australian Transport Safety Bureau. Retrieved from <file:///C:/Users/s234327/Downloads/Overviewofhumanfactorsinmaintenance.pdf>.

Hofstede, G. (2001). Culture's consequences: Comparing values, behaviours, institutions, and organisations across nations (second edition). California: USA.

Høivik, D., Tharaldsen, J. E., Baste, V., & Moen, B. E. (2009). What is most important for safety climate: The company belonging or the local working environment? - A study from the Norwegian offshore industry. *Safety Science, 47*(10), 1324–1331. https://doi.org/10.1016/j.ssci.2009.04.001.

Hollnagel, E. (2014). Safety-I and Safety-II. The past and future of safety management. Ashgate: Farnham, UK.

Huang, Y.-H., Zohar, D., Robertson, M. M., Garabet, A., Murphy, L. A., & Lee, J. (2013). Development and validation of safety climate scales for mobile remote workers using utility/electrical workers as exemplar. *Accident Analysis and Prevention, 59*, 76–86.

Huang, Y.-H., Sinclair, R. R., Lee, J., McFadden, A. C., Cheung, J. H., & Murphy, L. A. (2018). Does talking the talk matter? Effects of supervisor safety communication and safety climate on long-haul truckers' safety performance. *Accident Analysis and Prevention, 117*, 357–367.

Hutchings, K., & Weir, D. (2006). Understanding networking in China and the Arab world: Lessons for international managers. *Journal of European Industrial Training, 30*(4), 272–290.

IATA. (2009). Technical Reference Manual (ITRM). Available from <https://www.scribd.com/doc/99930245/IATA-Technical-Reference-Manual-ITRM-Ed01Rev01-2009> (Accessed: 29 November 2020).

ICAO (2006). Safety Management Manual (SMM). Doc 9859. First Edition. ICAO: Montreal, Canada.

ICAO. (2006). Continuity of the United States embargos on the civil aviation of the Islamic Republic of Iran and the safety deficiencies arising out of it (Vol. DGCA/06-IP). Montréal.

ICAO (2018). *Safety Management Manual (SMM). Doc 9859* (Fourth Edition). Montreal, Canada: ICAO.

International Nuclear Safety Advisory Group (1991). Safety culture: a report by the international nuclear safety advisory group. Safety Series No. 75-INSAG-4. Vienna: International Atomic Energy Agency.

Johns, G. (2006). The essential impact of context on organizational behaviour. *Academy of Management Review, 31*(2), 386–408.

Johnston, D., Pagell, M., Veltri, A., & Klassen, R. (2020). Values-in-action that support safe production. *Journal of Safety Research, 72*, 75–91.

Johnston, L. G., & Sabin, K. (2010). Sampling hard-to-reach populations with respondent driven sampling. *Methodological Innovations Online, 5*(2), 38–48. https://doi.org/10.4256/mio.2010.0017.

Kabasakal, H., Dastmalchian, A., Karacay, G., & Bayraktar, S. (2012). Leadership and culture in the MENA region: An analysis of the GLOBE project. *Journal of World Business, 47*, 519–529. https://doi.org/10.1016/j.jwb.2012.01.005.

Kalliny, M., & Gentry, L. (2007). Cultural values reflected in Arab and American television advertising. *Journal of Current Issues and Research in Advertising, 29*(1), 15–32. https://doi.org/10.1080/10641734.2007.10505205.

Karanikas, N., Melis, D. J., & Kourousis, K. I. (2018). The balance between safety and productivity and its relationship with human factors and safety awareness and communication in aircraft manufacturing. *Safety and Health at Work, 9*(3), 257–264. https://doi.org/10.1016/j.shaw.2017.09.001.

Kines, P., Lappalainen, J., Mikkelsen, K. L., Olsen, E., Pousette, A., Tharaldsen, J., ... Törner, M. (2011). Nordic Safety Climate Questionnaire (NOSACQ-50): A new tool for diagnosing occupational safety climate. *International Journal of Industrial Ergonomics, 41*(6), 634–646. https://doi.org/10.1016/j.ergon.2011.08.004.

Kouabenan, D. R. (2009). Role of beliefs in accident and risk analysis and prevention. *Safety Science, 47*, 767–776.

Labben, A. (2018). Face and identity in interaction: A focus on Tunisian Arabic. *Journal of Pragmatics, 128*, 67–81. https://doi.org/10.1016/j.pragma.2018.02.004.

Lave, J., & Wenger, E. (1991). *Situated learning Legitimate peripheral participation*. Cambridge, UK: Cambridge University Press.

LeCompte, M. D., & Goetz, J. P. (1982). Problems of reliability and validity in ethnographic research. *Review of Educational Research, 12*(1), 31–60.

Liao, M. Y. (2015). Safety culture in commercial aviation: Differences in perspective between Chinese and Western pilots. *Safety Science, 79*, 193–205. https://doi.org/10.1016/j.ssci.2015.05.011.

Lin, S.-H., Tang, W.-J., Miao, J.-Y., Wang, Z.-M., & Wang, P.-X. (2008). Safety climate measurement at workplace in China: A validity and reliability assessment. *Safety Science, 46*, 1037–1046.

Lu, C.-S., & Shang, K.-C. (2005). An empirical investigation of safety climate in container terminal operators. *Journal of Safety Research, 36*, 297–308.

Lu, C.-S., & Yang, C.-S. (2011). Safety climate and safety behavior in the passenger ferry context. *Accident Analysis and Prevention, 43*, 329–341.

Majidi, A., Nedjat, S., Mohammadi, A., Jamshidi, E., & Majdzadeh, R. (2014). Impact of sanctions on Iranian airlines: How people in Iran feel about air travel safety? *International Journal of Disaster Risk Reduction, 10*, 67–74. https://doi.org/10.1016/j.ijdrr.2014.04.005.

Mcdonald, N., Corrigan, S., Daly, C., & Cromie, S. (2000). Safety management systems and safety culture in aircraft maintenance organisations. *Safety Science, 34*(1), 151–176.

McHugh, M. L. (2012). Interrater reliability: The kappa statistic. *Biochemia Medica, 22*(3), 276–282.

Mearns, K., Rundmo, T., Flin, R., Gordon, R., & Fleming, M. (2004). Evaluation of psychosocial and organizational factors in offshore safety: A comparative study. *Journal of Risk Research, 7*(5), 545–561. https://doi.org/10.1080/1366987042000146193.

Mearns, K., & Yule, S. (2009). The role of national culture in determining safety performance: Challenges for the global oil and gas industry. *Safety Science, 47*, 777–785. https://doi.org/10.1016/j.ssci.2008.01.009.

Noort, M. C., Reader, T. W., Shorrock, S., & Kirwan, B. (2016). The relationship between national culture and safety culture: Implications for international safety culture assessments. *Journal of Occupational and Organizational Psychology, 89*, 515–538.

Olsen, E. (2010). Exploring the possibility of a common structural model measuring associations between safety climate factors and safety behaviour in health care and the petroleum sectors. *Accident Analysis and Prevention, 42*, 1507–1516.

Ourfali, E. (2015). Comparison between Western and Middle Eastern cultures: Research on Why American Expatriates Struggle in the Middle East. *Cross Cultural Issues, 13*(2001), 33–41. https://doi.org/10.1002/14651858.CD007483.pub2.

Parker, A. W., Tones, M. J., & Ritchie, G. E. (2017). Development of a multilevel health and safety climate survey tool within a mining setting. *Journals of Safety Research, 62*, 173–180.

Ramady, M. A. (2015). The political economy of wasta: Use and abuse of social capital networking. Switzerland: Springer International Publishing. https://doi.org/10.1007/978-3-319-22201-1.

Rao, M., Chaitanya, M., & Vidhu, K. (2017). Aircraft servicing, maintenance, repair overhaul - The changed scenarios through outsourcing. *International Journal of Research in Engineering and Applied Sciences (IJREAS), 7*(5), 219–239.

Reason, J. (1997). *Managing the risks of organisational accidents*. Aldershot: Ashgate.

Rippl, S. (2002). Cultural theory and risk perception: A proposal for a better measurement. *Journal of Risk Research, 5*(2), 147–165.

Schwartz, S. H. (2006). A theory of cultural value orientations: Explication and applications. *Comparative Sociology, 5*(2–3), 137–182.

Seo, D., Torabi, M. R., Blair, E. H., & Ellis, N. T. (2004). A cross-validation of safety climate scale using confirmatory factor analytic approach. *Journal of Safety Research, 35*, 427–445. https://doi.org/10.1016/j.jsr.2004.04.006.

Starren, A., Hornikx, J., & Luitjers, K. (2013). Occupational safety in multicultural teams and organizations: A research agenda. *Safety Science, 52*, 43–49.

Stetkevych, S. P. (2010). From Jāhiliyyah to Badīciyyah: Orality, literacy, and the transformations of rhetoric in Arabic Poetry. *Oral Tradition, 25*(1), 211–230.

Suri, H. (2011). Purposeful sampling in Qualitative Research Synthesis. *Qualitative Research Journal, 11*(2), 63–75. https://doi.org/10.3316/QRJ1102063.

Tharaldsen, J., Olsen, E., & Rundmo, T. (2008). A longitudinal study of safety climate on the Norwegian continental shelf. *Safety Science, 46*(3), 427–439.

Tlaiss, H., & Kauser, S. (2010). Perceived organizational barriers to women's career advancement in Lebanon. *Gender in Management: An International Journal, 25*(6), 462–496. https://doi.org/10.1108/17542411011069882.

Triandis, H. C. (2000). Culture and conflict. *International Journal of Psychology, 35*(2), 145–152.

Weir, D. (2003). *Human resource development in the Arab Middle East: A fourth paradigm*. London: Routledge.

Wiegmann, D.A, Zhang, H., Thaden, T. Von, Sharma, G., Mitchell, A. (2002). A synthesis of safety culture and safety climate research. Aviation Research Lab Institute of Aviation, Institute of aviation, UIUC. Technical Report ARL-02-3/FAA-02-2.

Yeun, R., Bates, P., & Murray, P. (2014). Aviation safety management systems. *World Review of Intermodal Transportation Research, 5*(2), 168–196.

Yorio, P. L., Edwards, J., & Hoeneveld, D. (2019). Safety culture across cultures. *Safety Science, 120*, 402–410.

Zaharna, R. S. (1995). Understanding cultural preferences on Arab. *Public Relations Review, 21*(3), 241–255.

Zhang, R. P., Pirzadeh, P., & Lingard, H. (2018). Safety climate as a relative concept. *Engineering, Construction and Architectural Management, 25*(3), 298–316.

Zohar, D. (1980). Safety climate in industrial organizations: Theoretical and applied implications. *Journal of Applied Psychology, 65*(1), 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, 85*(4), 587–596. https://doi.org/10.1037//0021-9010.85.4.587.

Zohar, D., & Luria, G. (2005). A multilevel model of safety climate: Cross-level relationships between organizations and group-level climates. *Journal of Applied Psychology, 90*(4), 616–628.

Mohamed Ben Saed is studying for a PhD at Cranfield University under the supervision of Dr Colin Pilbeam.

Dr Colin Pilbeam is Professor of Organizational Safety at Cranfield University. His research focuses on organizational safety, including safety leadership, safety learning and safety culture. He publishes regularly in safety journals and sits on the editorial board of Journal of Safety Research.

2022-03-17

The effect of an embargo, sanctions and culture on safety climate: A qualitative view from aviation maintenance in the MENA region

Ben-Saed, Mohamed

Elsevier

Ben-Saed M, Pilbeam C. (2022) The effect of an embargo, sanctions and culture on safety climate: A qualitative view from aviation maintenance in the MENA region. Journal of Safety Research, Volume 81, June 2022, pp. 259-269

https://doi.org/10.1016/j.jsr.2022.03.003