

# The role of national culture in determining safety performance: Challenges for the global oil and gas industry

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## Abstract

This paper addresses the issue of occupational safety and how the process of globalisation can potentially influence the attitudes, beliefs and behaviour of disparate ‘national’ workforces working across the globe for the same multi-national company. The paper reviews published literature on cross-cultural differences in attitudes, perceptions and beliefs regarding safety and presents details of a study examining the relationship between Hofstede’s [Hofstede, G., 1984. *Culture’s Consequences; International Differences in Work-Related Values*, Abridged edition. Sage Publications, London, Hofstede, G., 1991. *Culture and Organisations; Software of the Mind*. McGraw Hill, Maidenhead] cultural values dimensions (i.e., Power Distance, Individualism/Collectivism, Masculinity/Femininity); safety climate (perceived management commitment to safety) and risk-taking behaviour in workforce members of a multi-national engineering organisation operating in six countries. The results suggest that more proximal influences such as perceived management commitment to safety and the efficacy of safety measures exert more impact on workforce behaviour and subsequent accident rates than fundamental national values.

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## 1. Introduction

This chapter addresses the issue of occupational safety and how the process of globalisation can potentially influence the attitudes, beliefs and behaviour of disparate ‘national’ workforces working across the globe for the same multi-national company. The industry under scrutiny is the oil and gas industry, which in the past decade or so, has become truly global in nature. Operating companies such as Exxon Mobil, BP, Shell E&P, ConocoPhillips and ChevronTexaco are responsible for discovering and producing hydrocarbon reserves from areas as geographically and ‘culturally’ diverse as Alaska, Azerbaijan, Algeria and Australia. Obviously, there are major climatic differences between these areas as well as differences in the values, beliefs, training, education and experience of their

respective workforces. The picture is further complicated by the fact that a wide range of contractor and sub-contractor companies support the operating companies by developing infrastructure, offering engineering solutions and supplying and operating highly specialised equipment. These organisations provide most of the workforce for these projects and therefore shoulder much of the risk associated with finding and developing hydrocarbon reserves. Some of these organisations may be local in nature (particularly the sub-contracting organisations) but sometimes they are also multi-national corporations often with headquarters in the US, such as AMEC and Halliburton.

The oil and gas industry is high risk in nature and several well-publicised inquiries into major disasters such as Piper Alpha (UK), Alexander Keilland (Norway), Longford (Australia) have focused the attention of both operating and contracting company management on safety issues. For example, in the US, Canada, UK, Norway and the rest of Europe, the management of health, safety and the environment takes high priority, endorsed and monitored by

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the various health and safety regulatory bodies in these countries (e.g., US Occupational Safety and Health Administration, UK Health and Safety Executive). Increasingly, oil and gas companies are moving into less developed areas of the world where traditionally there has not been such a strong focus on health and safety issues and employees are predominantly concerned with securing employment to provide for basic needs such as food, water and shelter. This is in line with Maslow's (1943) 'Hierarchy of Needs', where physiological needs have to be fulfilled before employees move on to fulfilling safety or security needs (which are next in the hierarchy). According to Helmreich and Merrit (1998), safety is a 'universal value', which every culture should endeavour to hold and there is little doubt that people will react unfavourably to their family, friends and colleagues being harmed at work. There are human costs associated with all accidents, but risk and safety regulation and the strategies used to manage risk and safety, vary widely between countries and organisations. Whereas the 'value of life' is incalculable at an individual level, some may question the relative 'value of life' at a societal level. In some countries, the political regime may perceive labour as cheap and dispensable but for Western organisations operating in these countries, the moral and ethical obligations associated with protecting people from harm at work should be a sufficiently strong motivating force to ensure implementation of effective safety management systems that go beyond local legislative requirements.

Usually, the bottom line for focussing the efforts of oil and gas producers and their associates are incident and accident data. These data are often taken as the single defining measure of the industry's state of safety and the veracity of these data are rarely challenged. Indeed, such data are often the initiator for expensive and elaborate safety improvements by the companies involved. Interestingly, incident statistics reported by the Oil and Gas Producers (OGP) in 2004 ([www.ogp.org.uk/pubs/367.pdf](http://www.ogp.org.uk/pubs/367.pdf)) indicate that the Former Soviet Union (FSU), the Middle East, Africa and Asia/Australasia all perform better than the world average of 1.09 lost time injuries (LTI) per million hours worked. Asia/Australasia is considered to be the best performing region on the LTI measure, although the greatest improvement from 2003 to 2004 was seen in the Middle East. When the performance of individual countries is considered, the majority of countries in the FSU, Africa and Asia/Australasia perform at least as well as the global average, however, North America and the majority of European countries perform worse. It could be argued that the accident/incident rates are lower in the former countries due to less reporting, possibly related to differences in interpretation of what constitutes a reportable injury in different cultures or due to fear of losing a precious livelihood. Furthermore the sanctions and consequences of being signed off work as sick or injured are more much severe in less developed countries where there is no national health or welfare service to intervene in times of ill-health and hardship. Nevertheless, anecdotal reports

from senior managers, who are working in the industry across the world, reflect beliefs that different 'nationalities' differ in their risk-taking propensity at work. Certainly, official accident data would seem to reflect that different 'oil provinces' have differing accident rates, however, as noted above, this may have more to do with under-reporting and therefore attitudes to reporting accidents and incidents, rather than better safety performance *per se*.

This chapter will review the current literature on comparisons of safety performance between different national groups and consider whether fundamental values and beliefs can potentially influence attitudes to safety, propensity to take risks at work and ultimately differences in occupational accident involvement. Firstly, we offer a consideration of the values of globalisation and how they might sit with respect to safety values. Safety values are further discussed under the banner of 'safety culture', particularly the development of safety culture within the oil and gas industry. Finally, we consider studies where the relationship between nationality and safety performance has been investigated, although not necessarily with reference to cultural values. These studies conclude with a summary of our own work conducted on a multi-national basis within the oil and gas industry sector. It is argued that although fundamental underlying views of the world can exert some sway on safety attitudes, risk taking and safety performance, proximal influences (particularly perceptions of management commitment to safety) are more salient influences on the front-line operator behaviours that can cause and prevent many accidents.

## 2. The values of globalisation versus safety values

According to Arnett (2002, p. 779), the values of the global culture are based on Individualism, the free market economy and democracy. These are essentially the Western values that organisations associated with the oil and gas industry subscribe to and would bring with them in their 'colonisation' of new sectors of the globe. Furthermore, as Arnett also notes, these values are fundamentally appealing and are therefore widely embraced by people all over the world, if the opportunity arises. This does not necessarily mean that people will entirely reject their old values – to some extent local cultures will continue to exist and fundamental religious values in particular, will continue to exert an influence on the habits and traditions of the people – however, new forms of sense-making and attribution processes are likely to develop from the absorption of the new cultural values. The values of global culture encourage individual choices rather than conformance with traditional social roles and reinforce decision-making processes guided by personal ambitions and aspirations rather than traditional 'cultural' expectations. In accordance with Hofstede's (1994) cultural values framework, these are essentially the values of 'Individualism' (where everyone is expected to look after him or herself) as opposed to 'Collectivism' (where strong cohesive groups protect and sup-

port their members) and ‘Masculinity’ (where people value money, material success and progress over relationships) versus ‘Femininity’ (where people value other people and relationships over material success). There may also be changes regarding the value of Power Distance implicit in the new democracy of globalisation. In high Power Distance cultures, superiors are encouraged to wield and exercise power. Subordinates are expected to be passive, the organisation is hierarchical and decision-making is decentralised. In low Power Distance cultures, there is a closer relationship between supervisors and subordinates, organisational structures are flatter and subordinates are more involved in decision-making. Yet, how are these values enacted at work and in particular, with regard to safety at work? To what extent are fundamental national cultural values a driving force in employee behaviour as opposed to the perceived values of the organisation as embodied by Individualism, the free market economy and democracy. It may also be argued, that oil and gas organisations claiming to have a strong focus on safety means that safety, in itself, becomes a central value, which may be in conflict with traditional work values regarding productivity and speed of work (aided by the piece-rate systems in operation in many occupations). Having safety as a central value would be the defining moment for any organisation embarking on the development of a positive safety culture, irrespective of the national context it is working in. Given these potential conflicts, what can we learn from the experiences of multi-national Western organisations that claim to have ‘safety’ as a central value, as they expand their enterprises into areas of the world where ‘safety’ behaviour and safety performance may not necessarily be seen as a central objective of work?

### 3. Safety culture in the oil and gas industry

A prime assumption in the safety literature is that the workforce’s safe or unsafe behaviour is a function of the organisation’s prevailing safety culture. However, the direction of causality is not necessarily well established in this relationship. The assumption is that a positive safety culture leads to the workforce exhibiting safer behaviour however the relationship may well be reciprocal with safer behaviours leading to a more positive safety culture. For many years, the oil industry in the Western world has been dominated by a male-dominated, ‘macho’, ‘can do’ culture (Wright, 1994). The early oil pioneers were ‘rough and tough’ guys, who relished taking risks and accepted it as part of the job. One reason why US and UK oil workers were originally so well paid in the 1970s and 1980s was because the industry was considered ‘high risk’ and workers were effectively being paid to cope with this enhanced level of risk (i.e., ‘danger money’). This may be an example of how the industry culture was developed through who was attracted to, accepted by and retained by the industry, as exemplified in the ‘Attraction, Retention, Attrition’ model (Schneider, 1987). Hence, the behaviour drove the

culture – not the other way around. In the wake of the Piper Alpha disaster in 1988 (Cullen, 1990) attempts have been made to change this culture, firstly through a focus on engineering improvements, secondly through the implementation of safety management systems and latterly through behavioural safety interventions. During this time, the UK oil industry in particular has been concentrating its efforts on developing a positive safety culture throughout the whole industry (<http://stepchangeinsafety.net/step-change/>) however the extent to which these interventions are accepted and implemented by the UK offshore workforce and also how well they translate to other national contexts is not fully understood. It is worth noting that the concept of safety culture arose out of major accidents such as Bhopal, Chernobyl and Piper Alpha (largely with the benefit of hindsight) and reflected the failings of both organisations and politicians to manage the risks associated with hazardous technologies effectively. These incidents are actually national scandals and at the time, reflected the underlying values of the societies in which they were perpetuated. This does not mean to say that they reflected the individual values of those who were caught up in the disasters, indeed their very identification as system failures would preclude this, however, it is worth considering to what extent the notion of safety culture can actually be linked with the individual accident data (e.g., loss time incidents – LTIs) that the oil and gas companies are trying to reduce in number.

The question remains as to what actually constitutes a positive safety culture? Definitions abound but the one provided by the Advisory Committee for the Safety of Nuclear Installations (Health and Safety Commission, 1993) tends to be the benchmark, i.e. ‘the safety culture of an organisation is determined by the product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviours that determine the commitment to, and the style and proficiency of an organisations health and safety management.’ (p. 23). This definition is essentially ‘all things to all men’ but it is interesting to note that most empirical studies of safety culture have focused on individual attitudes, perceptions and patterns of behaviours with regard to safety (Guldenmund, 2000). None of the extant literature seems to measure values, which one would have assumed to be at the core of safety culture. As noted above, it is assumed that organisations in a position to discuss the development of a positive safety culture already hold or are beginning to develop ‘safety’ as a central value and consequently organisations that have a focus on other beliefs and values are unlikely to achieve a safety culture (Hale, 2000).

Since the concept of safety culture has proved difficult to deconstruct and operationalize, many researchers focus on safety climate, which has been conceptualised as employee perceptions regarding the enactment of organisational policies and procedures relating to safety (Zohar, 2003). Thematic analyses of the safety climate literature (Dedobbeleer and Beland, 1998; Flin et al., 2000; Guldenmund, 2000)

have identified management commitment and workforce involvement as the key characteristics of safety climate, thus there appears to be consensus amongst both climate and culture researchers that at least one of the factors characterising safe operations relates to management. This is the perspective taken in this paper, namely that perceived management commitment to safety will be a key factor in determining levels of safety behaviour in the workforce. These perceptions indicate the true priority of safety as they are construed through the relative value of safety in relation to other organisational goals (Neal and Griffin, 2004; Zohar, 2002). Employees are informed about the possible consequences of safe or unsafe behaviours by paying attention to overt statements and actions by managers, supervisors and co-workers regarding safety as well as implicit messages from management about the relative status of safety compared to other organisational goals such as productivity, efficiency, schedule, service, and quality. It is important to note that different levels and different types of management within an organisation will be exerting an effect on the attitudes, perception and behaviours of the workforce (Yule et al., 2007). For example, in contracting organisations supervisors, site managers, senior corporate managers and the managers of the client organisation will be exerting influence. However, it is also possible that basic 'national' values contribute to the safety culture and the focus of the current discussion is to determine to what extent fundamental cultural values may influence safety behaviour, compared to the reinforcing words and actions of managers at all levels, who are associated with the organisation.

#### 4. National culture and its impact on safety

It is clear that despite the caveats outlined above about the values of globalisation versus safety values, a key issue for organisations seeking to develop a positive safety culture is the interface between national culture and organisational safety. In recent years there has been recognition of a relationship between safety and national culture (Helmreich and Merrit, 1998). Indeed Helmreich (1999) claims that organisations need to have a full appreciation of the influence national cultural has on their functioning if safety measures are to be effective and worthwhile. Nevertheless, empirical studies on the impact of national culture on safety attitudes, behaviour and performance appear to be few and far between. It does not seem unreasonable to anticipate that people's attitudes to risk will vary according to deeply held values, beliefs and assumptions, i.e., the foundations of national cultural differences. National culture has been defined as 'the collective programming of the mind acquired by growing up in a particular country' (Hofstede, 1991, p. 262). Such collective programming is formed by values, 'a broad tendency to prefer certain states of affairs over others' (Hofstede, 1984, p. 18). Therefore national culture denotes a set of common mental programmes that are shared by a group of individuals. How-

ever, some major issues exist with the sweeping generalisation of 'culture' being equated with 'country' and 'nationality'. Although Hofstede is very much of the opinion that nations are political units with their own educational systems, legal systems, forms of government and so on, Tan (2002) maintains that evidence from a number of studies indicates this is not necessarily the case. Whereas, the divergence approach argues that the inherent values that characterise the national culture will hold forth rather than the ideology of globalisation and several studies using Hofstede's framework have supported this contention (see Tan, 2002 for an overview), proponents of the convergence approach argue that the process of globalisation, industrialisation and economic development leads to a convergence of attitudes and behaviours irrespective of national culture, particularly at management level. Tan (2002) investigated the personal values of 462 Chinese managers across the US, China (PRC) and Singapore and found support for the convergence theory, implying that the processes of globalisation (industrialisation and modernisation) leads to the personal value systems of managers becoming more and more similar. Interestingly, the values of the Singaporean managers were closer to those of the US managers than the Chinese managers. Tan (2002) attributes this to environmental factors, i.e., both countries have evolved out of democratic legal and political systems and capitalist business environments. In addition, both countries embrace Westernised education systems, with Western management theories being widely taught.

A further complication to disentangling the impact of fundamental values and attitudes to risk and risk taking is that a considerable body of evidence is starting to support the view that risk attitudes and behaviour are domain-specific rather than consistent across domains. This would seem to indicate that situational factors will exert a considerable effect on individual risk-taking propensity. Thus, people of different nationalities working for the same organisation across the globe may exhibit risk averse behaviour in their working life but risk-taking behaviour in their private life, for example when driving their car home from work. Nevertheless, it is useful to address the issue of fundamental national values in this review.

Hofstede (1984, 1991) conducted one of the most influential studies on national and organisational culture based on work conducted between 1967 and 1973 at IBM worldwide. The empirical analysis resulted in a concise framework of dimensions for differentiating national culture. As discussed previously, the five dimensions found to differentiate national culture groups were: Power Distance, Uncertainty Avoidance, Individualism (Collectivism), Masculinity (Femininity) and Long-term Orientation (added later when the study was extended to cultures of the Far East). In recent years there has been some active criticism of Hofstede's work (McSweeney, 2002; Spector et al., 2001), however his work has remained influential and more recent research endeavours such as the GLOBE

project (House et al., 2001) have brought a more modern approach to the study of culture on an international scale. Although, studies of national culture on attitudes to work have continued, there is little research on the influence of national culture on safety climate and safe/unsafe behaviours. The following sections outline some of the key studies in this area.

## 5. National culture in aviation

Perhaps the most extensive study of differences between national cultures in a high risk/high reliability industry is a study of pilots (Merrit and Helmreich, 1996; Helmreich and Merrit, 1998). The study was questionnaire-based and included 15,454 pilots from 36 airlines operating in 23 countries. The questionnaire included 16 items from the Values Survey Module (Hofstede, 1982) and the Cockpit Management Attitudes Questionnaire (Helmreich, 1984). Most of the questionnaires were completed in English since English is the international language for flight operations however the questionnaire was translated for airlines operating in several countries. Needless to say, the dataset was complex and required analysis at different levels (e.g., individual, organisational (airline), national). There were also issues related to culture-sensitive data sampling and culture-level response biases to be considered. In summary, however, the researchers found evidence for national differences between the pilots particularly in the areas of command, attitude to automation and attitude to rules and procedures. With reference to Hofstede's taxonomy, the pilot data indicated inter-correlations between Individualism, Power Distance and Uncertainty Avoidance suggesting that one or more of these dimensions may determine their behaviour. For example, pilots from high Power Distance nationalities may be more likely to follow orders and adhere to the standard operating procedures. Pilots from countries high on Individualism may try to be more independent, more flexible and use company procedures with more discretion.

## 6. The resund study – comparing Swedish and Danish safety performance

Other studies have examined cross-cultural differences but not with the same representation of national cultures and not using the Hofstede framework. Spangenberg et al. (2003) investigated why Danish workers had approximately 4 times the lost-time injury rate of Swedish workers during a joint-venture to construct the 16 km road/rail link across Øresund (a sound between Denmark and Sweden). The study was unique in that it provided an opportunity to compare Danish and Swedish workers working in cross-national gangs on the same work task and using the same procedures for reporting occupational injuries. The authors explained the results in terms of macro (national and societal), meso (company and organisational) and micro (work group and individual)-level factors. At the macro-level, dif-

ferences in national waging practices during sick leave, national educational programmes, work environment legislation and differences in the socio-economic structure of the construction industry in the two countries were proposed as determinants of the differential safety performance. Swedish workers have to pay for their first day of absence if off work due to illness or injury, whereas in Denmark the employer pays. After this first day anomaly, employers in both countries pay workers during the first two weeks of sick leave. Due to the economic penalty imposed on the first day of absence, Spangenberg et al. (2003) propose that the Swedish workers have a greater interest in work-place health and safety. Furthermore, Swedish workers have more formal education than their Danish counterparts, both in terms of public schooling and professional training. Danish construction workers are more likely to be inducted into work practices by their supervisors whereas Swedish workers undergo a long and structured apprenticeship which imparts knowledge of construction methods and techniques and knowledge of health and safety practices and injury prevention. There were less clear indications of impact from the other two factors identified as the macro-level.

At the meso-level, employment practices and planning and preparation of work were identified as key factors. The Swedish Øresund contractors were employed on full-time salaries and stayed with the company for a number of years. This gave the opportunity for the employing organisation to enforce their health and safety policy, thereby influencing the safety attitudes of the workers. The Danish workers tended to be employed temporarily and paid according to a piecework system, leading to more movement between employers. It is also significant to note that the Swedish contractors spent more time planning and preparing for their work than the Danes, including addressing health and safety issues.

Finally, two of the factors identified at the macro- and meso-levels resurfaced at the micro level, namely training and learning and attitude towards work. The focus on schooling and apprenticeship for construction workers in Sweden as compared to the practical on-site experiences and the passing down of work practices from supervisor and work team members in the Danish contingent could have contributed to the differences in lost-time injury rate as could the stronger bonds between the companies and their workers due to the Swedish employment conditions. In Sweden, it is common for construction workers to return immediately to work after a minor injury, and will carry out other tasks if they cannot work on-site. In Denmark it is accepted that injured workers take sick leave (irrespective of the severity of the injury). This situation is no doubt reinforced by the differing waging practices during sick leave that are on offer in the two countries. The important lesson to be learned from this unique study is that even in countries that might be deemed culturally similar according to Hofstede's model, i.e., Scandinavian countries in general are identified by high Collectivism, low Power Distance and low Masculinity, there are subtle differences in national

and company policies and practices that have an influence on work group and individual factors and thereby influence lost-time injury rates. In many ways, it is an indication that the Hofstede approach may be too simplistic to discriminate the subtle influences of specific practices on safety performance.

### 7. Psychosocial and organisational factors in offshore safety – a comparison of UK and Norwegian workers

In another study comparing two national groups Mearns et al. (2004) investigated how Norwegian ( $n = 1138$ ) and UK offshore workers ( $n = 622$ ) evaluated psychosocial and organisational factors regarding safety in the industry. A total of 18 installations across the two sectors were involved in the study, six in the UK sector and 12 in the Norwegian sector. Respondents completed a self-report questionnaire containing scales measuring risk perception, satisfaction with safety measures, perceptions of the job situation, perceptions of others' commitment to safety, perceptions of social support and attitudes to safety. As anticipated there were significant differences both between sector (UK versus Norway) and between installations on the workforce's evaluations of these factors, however, eta squared analysis indicated that for every factor except attitudes to safety, installation explained more of the variance in responses than sector. This pointed to the conclusion that despite legislative and cultural differences between the two sectors, local installation-specific practices appeared to exert more influence on workforce perceptions of psychosocial and organisational factors associated with safety. It is also worth noting that subscales of safety attitudes scale were the only examples where both sector and installation contributed to the effects. These subscales included 'fatalism', 'causes of accidents' and 'production versus safety goals'. There were no differences between UK and Norwegian workers regarding attributions of the causes of accidents, however, Norwegian respondents tended to have more 'fatalistic' attitudes, e.g., 'accidents just happen, there is little one can do to avoid them' and UK workers tended to express the belief that production came before safety goals, e.g., 'rules and instructions relating to safety make it difficult to keep up with production targets'. However, caution must be exercised in the interpretation of these results as the internal reliability for two of these scales was low (Cronbach's  $\alpha = 0.53$  for accident causation and Cronbach's  $\alpha = 0.49$  for fatalism). Interestingly there were no significant differences in the accident rate across the two sectors, despite a strong myth circulating at the time that safety performance was better in the Norwegian sector than the UK sector.

### 8. National culture, management commitment and risk taking behaviour at work

More recently, Yule and Mearns (under review) have examined the extent to which Hofstede's dimensions of

national culture are applicable to the study of safety climate (defined as workforce perceptions of management commitment to safety) and safety-related behavior in a multinational construction, maintenance and facilities management company, particularly as such differences in national culture may have a profound influence on the validity of transferring safety procedures and work methods from one country to another. For instance when these five dimensions are applied to the working environment it is possible that they will have a varying impact on the safety performance of its members. High Power Distances could result in a one-way flow of communication from superiors to subordinates resulting in the knowledge and experience of frontline operators not being utilised to aid the development of a positive safety culture. As Reason (1997) points out the emergence of a 'good' safety culture is dependent on the willingness and active participation of the workforce. Extremes of either Collectivism or Individualism may be detrimental to the safety of an organisation. If Collectivism becomes too strong, known in psychological terms as 'groupthink' (Janis, 1972), individuals may refrain from offering a divergent point of view vital in critical safety decision-making situations. On the other hand, according to Fiske (2002), Individualism is related to more direct communication and speaking up about issues, an attribute that appears to be particularly important in developing a positive safety culture (Reason, 1997). Extremes of the Masculinity/Femininity dimension indicate differences in the need for challenge, progress and distinction, which could ultimately result in the loss of interpersonal relations and good communication. While it is likely that no culture possesses all the optimum components necessary for safety, it is possible that certain combinations of national dimensions (especially Power Distance, Individualism, and Masculinity – based on the arguments above) have the potential to create cultural norms that will determine the propensity to engage in risk-taking behaviours at work. The support and commitment of management may be an important mediating influence if this is the case by encouraging employees to behave safely even if they may be more naturally disposed to take more risk than is deemed acceptable.

As far as we can tell, the present study represents one of the first to address culture, management and safety across national contexts. Other cross-cultural studies on leadership and management (e.g., GLOBE) have been more wide-ranging in terms of nationalities studied but have not measured safety as an outcome. Risk-taking behaviours at work were chosen as the outcome measure in this study due to the relative unreliability and incompatibility of reported injury data across sites (i.e., different sites throughout the world were using different reporting systems) and because a number of studies have indicated that violations and unsafe acts are key antecedents for accident involvement. To balance this, safety-enhancing behaviours (e.g., putting pressure on managers to improve safety) were also measured. Six national workforce groupings were rep-

resented in this study UK ( $n = 87$ ), US ( $n = 216$ ), US-Hispanic ( $n = 83$ ), Malaysia ( $n = 73$ ), Philippines ( $n = 303$ ), and Australia ( $n = 83$ ). The total sample was  $n = 845$  (54% response rate) and all data were from front-line workers to ensure that the findings could be interpreted accurately (data were collected from supervisors and managers but were not included in this analysis). Respondents were asked to complete a self-report questionnaire which included the following scales:

- VSM 94 (Hofstede's cultural value dimensions).
- Safety climate (4 items on management commitment to safety e.g. 'Managers act promptly on safety concerns'). Responses were on a 5 point likert scale. A mean scale score was calculated for each worker ranging from 1 (poor safety climate) – 5 (good safety climate).
- Risk-taking at work scale (6 items which measured self-reported frequency of unsafe acts, taking shortcuts, rule violations and risk-taking by the individual at work e.g. 'I ignore safety rules to get the job done'). Responses were on a 5 point likert scale. A mean scale score was calculated for each worker ranging from 1 (rarely engages in risk-taking behaviours) – 5 (frequently engages in risk-taking behaviours).

There is considerable debate about the validity and reliability of Hofstede's cultural value dimensions (e.g., McSweeney, 2002; Spector et al., 2001), but for this data set, confirmatory factor analysis found Hofstede's five-factor solution to be an acceptable factor structure. Furthermore, the measure was sensitive enough to differentiate between the different national groups on all cultural dimensions. Power Distance was generally low for all samples and significantly lower in the Filipino sample. The samples were also highly Individual in nature, although workers in the Malaysian sample were significantly lower on this dimension (i.e., were more Collective) than workers from the other cultures. There was more variability in Masculinity scores: workers in the US samples were significantly less Masculine (i.e., tended towards Femininity) than workers from British, Australian and Filipino backgrounds. We also found that Filipino workers scored significantly lower on Uncertainty Avoidance than other groups, and that workers in the UK had a significantly shorter-term view than workers from the other five groups. For full details of the cultural values within each sample, see Yule and Mearns (under review).

There were also significant differences between the groups on responses to perceived management commitment to safety scales and on risk-taking behaviours. Perceptions of management commitment were generally positive although there were variations between sites. For example, workers in the UK (mean = 3.75, SD = .74) and Hispanic-US sites (mean = 3.50, SD = .98) perceived management to be less committed than on other sites, and Filipino workers had significantly more positive perceptions of management than workers on all other sites

(mean = 4.56, SD = .56). Workers in the UK and Philippines reported engaging in significantly fewer risk-taking behaviours than other national cultures. Malaysian workers took significantly more risks than those in other national contexts.

Having established significant differences between the various national groups on self-reported risk-taking behaviours, we considered whether those differences were being driven by aspects of national culture or perceptions of management commitment to safety. This was tested using multiple regression techniques. In the analysis, the predictive power of Hofstede's cultural variables was established initially, and perceptions of safety climate were added to the analysis to establish the relevant predictive power of cultural versus management variables.

In step one of the analysis, we found that the only cultural variable to significantly predict risk-taking were Masculinity ( $\beta = .085$ ,  $p < .05$ ) and Power Distance ( $\beta = .075$ ,  $p < .05$ ), indicating that respondents who scored higher on those variables were more likely to take risks at work. These relationships were small but significant.

In step two when management commitment to safety was added to the analysis it emerged as a significant predictor of risk taking ( $\beta = -.43$ ,  $p < .01$ ). Adding management commitment rendered Power Distance non-significant although Masculinity remained a significant predictor ( $\beta = .069$ ,  $p < .05$ ). Management commitment was a strong negative predictor, indicating that respondents who perceived managers to be committed to safety engaged in less risk-taking behaviours at work. The value of  $\text{adj}R^2$  for the final model predicting risk-taking behaviours was .188 [ $F(3, 799) = 62.79$ ,  $p < .01$ ].

In our study, scores for some dimensions (e.g., Power Distance) were more homogenous than expected according to Hofstede's original data for these national groupings. This may reflect the fact that the data was collected from one organisation with a similarly flat management hierarchy structure regardless of the national context of its projects. Nonetheless, only Masculinity and Power Distance emerged as significant predictors of risk-taking behaviour. This is largely in line with ideas about the influence of cultural values on safety as outlined previously. For example, 'Femininity' is about valuing people and relationships, which could extend to concerns about others' health, safety and well-being. In contrast, Masculinity would refer to a value where success, progress and monetary gain were key motivators for behaviour not concern for other people. Our data also support the findings of Merrit and Helmreich (1996) and Helmreich and Merrit (1998) to some extent as Power Distance emerged as potentially significant influence on behaviour.

Our attempt to establish the relationships between cultural values, perceived management commitment to safety and risk taking behaviours suggest that these relationships are not uniform between cultures. However, the commitment of corporate (senior) managers is a more proximal predictor of self-reported safe and unsafe behaviours than

aspects of national culture. As perceptions about the commitment of senior managers deteriorate, workers appear to be more inclined to take risks and break rules. The opposite also holds true – as senior managers are perceived to be more committed to safety (e.g., by being trusted, by genuinely being concerned for well-being of employees, by acting promptly on safety concerns) propensity to take risks and break rules amongst workers appears to decrease.

What does this tell us about culture and safety? The oil industry has been built around a ‘macho culture’ which means that ‘macho’ type behaviours have been culturally selected and endorsed over time which makes them more ingrained in the culture. It is therefore very plausible that as workers become more ‘Masculine’ they will take more risks and break rules due to the effects of bravado and willingness to get the job done despite technical or other obstacles.

Other aspects of the safety system or prior experience are also likely to have a significant influence on the propensity to take risks and break rules. We did not measure these in the present study but the findings from Spangenberg et al. (2003) would seem to indicate that differences in regulatory regimes, training and education exert an effect in countries where the culture may be anticipated to be similar. More research is required to understand how tangible aspects of management commitment to safety influences worker behaviours at the sharp end. Although the role of senior managers in safety has been implicated in major accidents (Sheen, 1987), and company directors view occupational health and safety as a significant performance determinant (Smallman and John, 2001), there is currently little empirical evidence regarding safety influences of senior management on occupational safety performance.

## 9. Conclusion

In terms of application of this research to the process of globalisation and safety in the workplace, the following conclusions can be made. The studies reviewed thus far indicate that there are no consistent predictors of risk taking behaviour and safety performance across cultures. The study by Spangenberg et al. (2003) is significant in this context as it provided a unique opportunity to study workers of similar (yet distinct) national backgrounds involved in exactly the same tasks on the same project over the same time period. Although basic national values were not measured in this study, data from Hofstede and others would seem to indicate that Norway and Sweden have similar profiles regarding values such as Power Distance, Masculinity and Individualism, yet the safety performance of the two national groups was significantly different. Spangenberg et al. (2003) attribute this to differing levels of planning, education and education between the two countries and also differences in the work compensation systems. Furthermore, the study by Mearns et al. (2004) indicated that despite significant differences in the legislative and political regime in UK and Norway (which was

reflected to some extent in significant differences in the perceptions and attitudes of offshore workers in the two sectors), installation actually predicted more of the variance in the data than national sector indicating that it was facets of how safety was being managed at each location, that influenced workers risk perceptions and satisfaction with safety measures. The final study on the cultural values, perceptions of management commitment to safety and risk-taking behaviour in six different national groupings working for the same organisation highlights that management commitment is a more important determinant of behaviour at work than national culture. In many ways, this study shows that the values of globalization, embodied by management practices that are largely uniform across national contexts are stronger than locally-held cultural values in determining behaviour within a prescribed environment. Management and leadership have emerged as significant determinants of safety performance in most sectors, even those traditionally viewed as low risk (i.e., catering, government). This will continue to be the case in the age of increasing globalisation and organisations should be sensitive to the national context in which they work. This is especially true for organisations who appoint managers from western backgrounds to positions in non-western environments, however, it is likely that management commitment to safety as reflected in concrete provision of good training, education and sound planning and management exert positive effects irrespective of cultural context. Future research should take a multi-level approach, and should investigate whether differences in cultural values between the workforce and management has an impact on how management behaviours are construed, and what influence this has on employees’ behaviours and safety performance in high-hazard domains.

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