Abstract: The importance of risk perception in culturally diverse organizations is neither widely acknowledged nor adequately conceptualized. The aim of this article is to examine the issues associated with the risk perception safety behavior of employees. Through the literature, this article delineates the potential major risk perception behavior of multi-ethnic group of employees within organizations and then offers a model by linking a number of organizational and human factors with theories linked to ...

Perceiving Safety and Risk in Culturally Diverse Organizations: Towards a Conceptual Model

The importance of risk perception in culturally diverse organizations is neither widely acknowledged nor adequately conceptualized. The aim of this article is to examine the issues associated with the risk perception safety behavior of employees. Through the literature, this article delineates the potential major risk perception behavior of multi-ethnic group of employees within organizations and then offers a model by linking a number of organizational and human factors with theories linked to organizational behavior, cultural intelligence and emotional intelligence, to identify the risk perception safety behavior asymmetries. The article provides an insight into the conjoint factors that contribute to risk perception behavior from a multi-theoretical perspective. Several propositions are derived from the model and the implications are discussed.

Key words

Risk perception, safety risk management, human factors, culturally diverse organizations, cultural intelligence, emotional intelligence.

Introduction

Substantive evidence from various high-profile international accidents and incidents, for example, the Union Carbide gas tragedy, Bhopal (December, 1984); the Chernobyl nuclear power plant accident (April, 1986); the MS Estonia sinking, Baltic Sea (September, 1994); Tokaimura nuclear accident, Japan (September, 1999); Singapore Airlines Flight 006 crash, Taiwan (October, 2000); Prestige oil spill, Spanish coast (November, 2002); Space Shuttle Columbia disaster (February, 2003); BP oil spill, Gulf of Mexico (April, 2010); and more recently the MS Costa Concordia capsize, Italy (January, 2012) suggests a significant problem is risk assessment and safety management. The problem may exist in an anomaly between the perception of risk and the impact of human factors associated with culture and attitudes within the error chain of safety risk management.

Safety risk management is defined as managing the effect of uncertainty on objectives (ISO, 2009). The importance of safety risk management to industry can be identified by how a more informed understanding of risk must be balanced with the application of cultural values which are likely to affect the perceptions and attitudes towards managing such risk. Risk management is therefore the process of measuring risk and developing strategies to manage it to involve changing the severity of risk; or the likelihood of occurrence, while also identifying hazards and understanding the interactions between the hazards and detection systems (Stolzer, Halford, & Goglia, 2008).

Contextually, the consequences of ineffective safety risk management can be illustrated in an organization's accident or incident profile, which may not simply represent a fiscal cost, but significant loss on a human scale. Notwithstanding, there are social and ethical implications that may further compromise an organization's brand, or an industry's credibility through media, and compensation litigation.

The guidelines put forward by the International Standards Organization (ISO 31000) note the safety risk management process is concerned with preparing for and then conducting risk assessment leading, as necessary, to risk treatment. The process starts through defining what the organization wants to achieve and the external and internal factors that may influence success in achieving those objectives and therefore establishing the context is an essential precursor to risk identification. Safety risk assessment under ISO 31000 comprises three steps i) risk identification, ii) risk analysis, and iii) risk evaluation (Purdy, 2010). As such, risk identification requires the application of a systematic process to understand what could happen

as well as how, when, and why the event occurred. The human factor in this is likely to vary across cultures due to the degree of what is, and what is not valued from one cultural identity to another. Moreover, the behavior and values of the organization have significance, as do the backgrounds of individuals, their education, tacit knowledge, age, and the like. In contemporary terms, while societies in general collectively value the notion of being safe, Slovic & Peters (2006) theorize attitudes and perceptions towards risk are not the same universally.

The aim of this article is therefore three fold: i) to achieve a more informed understanding of how risk is perceived in culturally diverse organizations, ii) to identify the conjoint factors associated with risk perception behavior of multi-ethnic group of employees and iii) to discuss the theories viz organizational behavior, cultural intelligence (CQ), emotional intelligence (EI), within organizational risk-management frameworks that underpin the risk perception behavior.

The article poses the following structure. In the subsequent section, the related concepts are linked to the human and organizational factors and synthesized to derive a unified conceptual model conducive to identifying links between safety risk perception behavior and the culture. The next section summarizes past literature and its main theoretical concepts - the risk perception behavior, organizational culture, CQ and cultural adaptability, and EI dealing with self-awareness and relationship management—to identify critical consensus in this research stream. A number of propositions are then presented. The article concludes with contributions for theory and practice and directions for future research.

1. SAFETY RISK MANAGEMENT: A SNAPSHOT

Determining the causes as to how and why accidents occur, Reason's (1997) accident causation model suggests accident factors may be attributed to either a human, or organizational factors, or a combination of both. From the human context, high-level human capacity remains subject to cultural limitations or, similarly, may result from internal cultural perspectives based on individual or small-group decisions. The Chernobyl nuclear power plant accident (1986) was a major catastrophic illustration of systemic and cultural inadequacies whereby government and high-level technical expertise was destructively embellished by cultural attitude. The report published by The World Nuclear Organization (2009) asserted the Chernobyl accident was a result of a flawed reactor design that was operated with inadequately trained personnel without the proper regard for safety.

Based on the social theory of risk put forward by Douglas and Wildavsky (1982), the concept of risk and how it is perceived by diverse societies is selected within various societal spheres based on a collective people's method of assessment and revealed preference, i.e. the risk people take or accept. Douglas and Wildavsky (1982) suggest risk is a collective construct where the selection of dangers and the choice of social organization are symbiotic. In essence, individuals are ethnocentric when it comes to risk assessment in that they strongly feel that what is normal in their culture is and should be normal everywhere (Triandis, 2006). This is supported by Steg & Sievers (2000) who argue that cultural theory establishes that systematic individual and cultural differences may well exist in the perception of risk.

Unfortunately is seems that contemporary safety risk-management practices do not effectively engage the cultural elements of risk perception as risk-management systems and behaviors do

not articulate organizational and workplace factors such as values and belief systems, geographic locations, cultural norms, or poor cross cultural management practice that inadvertently promote unsafe behaviors. As Purdy (2010) highlights, a recurrent theme in the International Standards Organization IS0 31000 suggests that for risk management to be effective, it must be integrated into an organization's decision-making processes, however as Purdy (2010) puts forward, many organizations struggle to achieve this in practice.

While organizations promote Safety Management Systems (SMSs) that comply with statutory requirements and international standards in risk minimization, human factors that mitigate risk in organizations may not be wholly recognized, acknowledged, or identifiable when applying a risk-management template. To overcome this anomaly, awareness as to the relationship between organizational risk factors and the synthesis and alignment to the organization's people and ethnic group culture, risk perception, and attitude is required. This deficiency is what Ting-Toomey (1999) identifies as a need to maximize structures that address strategic human factors linked to risk-management design and organizational management in that existing approaches to managing risk are either deficient or not rigorously contextual when applied to professional practice.

Commensurate with this idea in an organizational setting, Reason (1997) suggested implementing layers of 'defense' in detecting and managing organizational risk, such as risk analysis and risk assessment. Nonetheless, this coupled with standard operating procedures (SOPs) may in effect unwittingly fail to address human error at critical stages of task

performance. The 'error' ingredient may fundamentally be how an individual, a team, or an organization views the degree of acceptable risk, promoting error or violation to the performance of tasks, or similarly not detecting unsafe condition that remains dormant over time (Reason, 1997, Edkins, 2002). Therefore, a key mitigating factor requiring further investigation is the significance and influence of cultural perception and its adaptability to effectively detecting and addressing risk-management situations.

This philosophy applied to the constructs of culturally-diverse organizational frameworks suggests common cultural variables exist to influence risk perception and associated task performance when managing risk. In this sense, the concept of cultural intelligence, or cultural quotient (CQ) identified by Earley & Ang, (2003) may be employed in establishing cultural adaptability attributes that determine cultural adaptability from one cultural setting to another, adaptability within a mix of cultures in one setting, and the subsequent perception in managing risk effectively in those environments. This is based on a four factor model comprising meta-cognitive, cognitive, motivational, and behavioral attributes. Within the realm of these attributes that contribute to adaptability and cultural mix lies the independent variable, emotional intelligence (EI). Contextually, this is an important link to CQ, and risk perception in that as Bucher (2008) identifies, EI is the ability to recognize, interpret and respond to feelings in others and within the individual. Accordingly, Moon (2010) asserts EI correlates to the four factor model of CQ in the context that culture within diverse workforces promotes an alignment of understanding that certain behaviors are 'emotional' rather than 'technical' in this approach.

Circumstances such as those surrounding the Chernobyl accident identify the extent to which latent issues in culture, perception, and EI competence remained dormant which ultimately manifested itself into tragedy. Reflected in the International Standards Organization (ISO 31000) model of risk-management processes, elements such as engaging a systematic application of management policies, procedures and practices to tasks, communication, consultation, context, identification, analysis, evaluation, treatment, monitoring, and reviewing the risk may enable cross-cultural influences to be embodied within the organizational risk management framework to which variables such as culture, perception, and EI can be considered. This may then be incorporated within the foundations of an organization's safety and risk-management system.

Figure 1 represents a model developed from earlier studies (1997; Cacciabue, 2004; Geller, 2005; Petersen, 1996; Peterson et al., 1995; Rasmussen & Svedung, 2001; Reason, 1997; Reyna, 2004; 2007) that suggests major concepts and their transactional impact of the factors concerning risk management in relation to organizational culture, cultural adaptability and non-cognitive capabilities, competencies, and skills that influence a person's ability to cope with environmental demands. Figure 1 presents three domains and shows all possible associations among the represented factors.

The safety risk perception, cultural adaptability and responsiveness to the way others feel, contribute to the resultant framework of effective safety risk management. This includes the presumed association of a number of variables, including the sub-categories of human factors and organizational factors. The consequences of these interrelations are delineated as outcomes.

This speculates the interrelations of the factors, and the following discussion reviews what is known about the interrelations represented in the figure.

2. SAFETY RISK ATTITUDES, RISK PERCEPTION AND CROSS CULTURALL DIFFERENCES - DOMAINS

Differences in risk perception can be held to rest within the individual, cross-situational, and cross-cultural differences in risky choice behavior. Bontempo, Bottom, and Weber (1997) maintain that realizing the origin of these differences could be crucial to avoiding cross-cultural misunderstandings, yet also advantageous to ensuring the prevention of risk-type behaviors. Their Conjoint Expected Risk (CER) model captures similarities in people's risk judgments utilizing a common form by which probability and outcome information of risk-type options are combined with individual differences that reflect the relative value given to a positive and a negative outcome.

While psychometric models of perceived risk center on a multi-dimensional construct, Bontempo et al., (1997) suggests that safety risk perceptions of lay people tend to differ systematically from those of experts creating a further dimension to the cultural constructs of risk perception and judgment. To this end, little is known about cultural differences in perception of uni-dimensional tasks; the CER model could be utilized as a means to understand risk, irrespective of cultural conditioning. As such, Bontempo et al., (1997) hypothesize the functional way in which people combine information about outcomes and probabilities is

universal within a cultural dimension, providing further support for Triandis (2006) mentioned earlier.

Citing the example of risk with a cross-cultural reference in risk perception in a financial setting, Weber and Hsee (1998) note a study with respondents from the People's Republic of China, the United States of America, Germany and Poland measuring buying prices for risky financial options. The study revealed differences in risk preference that were mainly associated with cultural differences in the perception of the risk rather than with cultural differences in attitude towards perceived risk, suggesting the perception of risk is associated with cross-cultural differences.

Also, the degree of decision-making processes and indecisions by individuals in culturally-diverse environments may be paramount to the immediacy of effective risk-judgment outcomes. Yates, Ji, Oka, Lee, Shinotsuka, and Sieck (2010) undertook studies that examined cultural variations linked to indecisiveness among Chinese, Japanese and American participants. Frost and Shows (1993) note that the first study was obtained through validated self-reporting that illustrated comprehensive measures of indecisiveness and indicated large cultural differences. Correspondingly the second study provided evidence that cultural variations corresponded to variations in people's positive versus negative values for decisive behaviors, suggesting that such values are an important means for motivating and sustaining cultural differences in indecisiveness. The third study provided direct behavioral instances of the differences in indecisiveness implied in the previous studies (Frost & Shows, 1993). Accordingly, the notion of Frost and Shows (1993) suggests thoroughness might be an

important cognitive mechanism whereby cultural differences in indecision actually occurs Perception and Risk-Taking Behavior: Systems Thinking Approach

The rationality of risky decisions based on perception focuses upon the different task constructs between experimenters and participants. Kuhberger (2002) highlights that different task constructs may be related to different thinking systems to enable a more biased treatment of the rationality issue. When investigating the context of rationality, Kuhberger (2002) put forward the notion of utility theory to suggest that people behave in ways which maximize their utility, with a preference order that allows the choice of the option that offers the maximum utility. Hence rational decision-makers may be indifferent between different combinations of probability and value (Kuhberger, 2002). As such, the proposition of good judgment as opposed to rationality is deemed domain specific and therefore reflects basic principles of survival and adaptation.

When examining the determinants of risk-taking in a dynamically uncertain context, Slatery and Ganster (2002) note that consistent with decision-makers who fail to reach their goals, lower and less risky goals are set in subsequent decisions. This was illustrated in a simulated realistic decision-making environment in which individuals chose more or less risky goals in a complex dynamic task that featured uncertain outcomes and meaningful consequences (Slattery & Ganster, 2002). The assumptions of Slattery and Ganster (2002) utilized several measures of risk propensity designed to assess personal behavior in hypothetical standardized situations framed as a basic risk paradigm. Measuring attitude towards risk included a measure of a self-reported willingness to take risks. The result indicates consequences of subsequent choices are

influenced by the outcomes experienced in past decisions (Slattery & Ganster, 2002) which plausibly, may be based on the decisions made in different cultural settings.

2.1 SAFETY RISK PERCEPTION AND HEURISTIC BIASES

Heuristic biases are similarly deemed to influence perception within an interpersonal context according to Kuhberger (2002). There contextual factors offered by Lee (2008) suggest that heuristic biases and applied cognitive psychology appreciate that human judgment is not inherently rational or irrational, but sensitive to contextual factors in that it can modify the environment to fit the processes that people bring to it. This notion embraces context specificity in identifying sub-environments. Lee (2008) suggests participants may enhance their performance given their goals and resources for the purposes of designing conditions that avoid or compensate for anticipated errors. Congruently, risk perception is believed to be influenced by geography, sociology, political science, anthropology and psychology (Slovic & Peters, 2006). Hence, with respect to culture, geography is of interest when understanding human behavior in the face of natural and technological hazards.

The psychometric paradigm put forward by Slovic (2000) asserts that people may make measureable judgments about the risk of diverse hazards and the desired level of regulation in each noting there is an optimum balance between the risks and benefits associated with an activity maintaining it is indicative of acceptable risk / benefit trade-offs. The assertion of Slovic (2000) is the acceptability of risk from an activity is roughly proportional to the third power of the benefits for that activity. The argument is supported further by Slimak and Dietz

(2006), who note that psychometric tradition examines the characteristics of risk that drive risk perception, whereby a substantial body of research suggests some characteristics of risk influence people's assessment of the amount of risk involved.

2.2 RISK PERCEPTION AND DECISION-MAKING

Commensurate with the idea of risk perception and culture in risk-oriented decision-making is Reyna's (2008) notion of the Fuzzy Trace Theory (FTT). The key concept of FTT holds that people rely on the general idea of information i.e. the 'gist', as opposed to precise details in judgment and decision-making. Based on research in the medical field, Reyna (2008) argues that precise information about risk may not be effective in encouraging prevention behaviors because people may perceive certain facts which are not derived from intended meanings. Reyna (2008) suggests that FTT characterizes human judgment and decision-making primarily based on a vague 'gist' that forms the major means by which people indicate and act on health relevant information.

Research on adolescents in the United States on 'gist' based judgments towards the risk of pregnancy, sexually transmitted diseases and HIV/AIDS (Mills, Reyna, & Estrada, 2008) identified that measures emphasizing precise retrieval and measureable processing highlighted positive correlations between perceived risk and risk-type behavior. These perceptions reflected the extent to which individuals engaged in risk behavior. Correspondingly, measures that assess global gist based judgments of risk produced negative correlations. That is, higher risk perceptions were associated with less risk-taking suggesting a protective rather than a reflective

relationship. Here the results of the study by Mills et al. (2008) highlight a dual process interpretation of the relationship between risk perception and risk-taking whereby behavior might depend on the cues in question to form a trigger for precise or 'gist' processing.

2.3 RISK PERCEPTION AND SHARED MENTAL MODELING

The cognitive architecture to shared mental modeling, while improving team and workplace effectiveness, still draws on the relevance of task analysis, which according to Petersen (1996) is divided into a sub-task derivation of skill and knowledge analysis. Sub-task derivation is asserted by Petersen (1996) to comprise a statement of the task the category of the task, and the location in which the task is performed. Notably, Petersen (1996) establishes that as specific error information may not be readily attainable during the development stage, the likelihood of detecting error occurrences will be limited. Hence error analysis and a system-consequences analysis might be considered jointly to determine an error mode and effects analysis. Essentially the work by Petersen (1996) considers operator action within the workplace with the intent of eliminating operator error.

The construct and measurement of shared mental modeling outlines three important characteristics which, according to DeChurch and Mesmer-Magnus (2010), gauge similarity among team members with respect to their knowledge representations. These characteristics include a method for elicitation, structure representation, and representation of emergence. Elicitation means the use of ratings and concept maps based on the results of task analysis. However, how the knowledge contained in the model is represented is based on perception

(DeChurch & Mesmer-Magnus, 2010) and therefore, it is subject to values and beliefs contained in the cultural dimension. This may similarly be in a structure representation that captures the degree of association between distinct components of their team or task. Hence, as DeChurch and Mesmer-Magnus (2010) argue, representation of emergence involves how individuals' mental models are collectively considered as constituents of a team mental model in that it is the 'degree of sharedness' in perception and conceptualization that is of interest.

2.4 PERCEPTION AND KNOWLEDGE ACROSS COMMUNITIES

Mørk, Aanestad, Hanseth, & Grisot (2008) note that studies on communities of practice have focused on knowledge production within, rather than across, communities of practice. The elements of knowledge production within a high-risk industry such as the medical profession articulated that actual mechanisms by which knowledge is pursued, are different across the various communities of practice (Mørk, Aanestad, Hanseth, & Grisot, 2008). Moreover, Mørk et al. (2008) maintain that path-dependent learning processes and radical change may become limited if the knowledge required by new and different practices is incompatible with the existing bank of knowledge. As a consequence, a notion has evolved to suggest that 'the communities of practice approach' could be enriched by looking at diversity and discontinuity in the epistemic cultures and networks with which the different communities of practice are associated.

The extent to which people are consistent in their comparative risk judgments across time and events suggests strong evidence for consistency across time and some evidence for consistency

across events (Shepperd, Helweg-Larsen, & Ortega, 2003). Consistency across time and events is moderated by experience. Specifically, when viewed together, the studies suggest that experience produces an initial decrease in the consistency of comparative judgments followed by greater consistency in subsequent judgments.

In a study on risk perceptions immediately after a Californian earthquake, Shepperd, Helweg-Larsen, and Ortega (2003) drew on a small sample with a mix of gender, age groups and ethnicities. A mean correlation was calculated among ten risk items detailing whether participants were consistent across events in their comparative risk judgments. The correlation data revealed consistency in participant's comparative misjudgments across time but only modest consistency in their risk judgments across events. Consequently, the findings of Shepard et al (2003) for variability in comparative risk judgments were: i) comparative risk judgments will vary across time and events, ii) comparative optimism for some events is not the same at all events, iii) comparative restrictions vary with experience, iv) judgments will alter with the anticipation of receiving information bearing on the accuracy of the judgments. The following proposition is offered:

Proposition 1: The structure of interactions among the multi-ethnic group of employees and their experience and attitude toward the perception of safety risk in the culturally diverse environment has a bearing on their recognition of the incidence of risks in the organization.

3. RISK PERCEPTION BEHAVIOR

The preceding examples have focused on individuals, teams, workplaces and systems that make up an organization's components for effective risk management. Contemporary research to

organizational factors has in fact focused on statutory investigative bodies and the outcomes of their root-cause analysis investigations to determine causes of major accidents and incidents, and to then make recommendations

According to Stolzer, Halford, and Goglia (2008) there are four structural pillars that support an effective safety management system (SMS) that governs risk management: i) organizational policy; ii) safety and quality assurance; iii) roles, responsibilities and relationships; and iv) executive management involvement. As such, research on organizational factors affecting risk prescribes a reverse engineering of systems and behaviors that looks to identify the cause of incidents or accidents. In this sense, a description of what has evolved from various statutory recommendations to form contemporary organizational risk-management philosophies will be put forward as current foundation principles to research.

3.1 WORKPLACE ORGANIZATIONAL BEHAVIOUR, AND HUMAN FACTORS

Commonplace in managing the human component to safety risk minimization within organizations is the example offered in Reason's (1997) accident causation model. This model focuses on organizational and 'human factors' approaches to addressing some likely stages of latent or active pathways that fuel adverse safety risk management environments. The human factors philosophy focuses on human interactions in the context of the task environment. Human factors in this sense are viewed by Reason (1997) as the minimization of human error and its consequences through optimizing relationships within systems between people, activities and equipment. Non-alignment of these influences may have disastrous outcomes and,

in high-risk industries, lead to catastrophe. Notwithstanding; team and individual errors, and / or violations in standard operating procedures, or in task performance due to systemic or perception anomalies may, be a contributing factor to the cause (Edkins, 2002). Similarly, zero fatalities may also mean injuries, or damage to property and/or litigation, possibly resulting in reputation or financial ruin for an organization while also having an impact upon society at large. Reason's (1997) 'Accident Causation Model' highlights failures and conditions that may propagate a sequence of events leading to unsafe outcomes within an organization.

As a consequence, detecting and mitigating the cause of anomalies may be held with improving the system from a behavioral perspective. Cacciabue (2004) asserts this may be achieved by understanding why operators performed anomalous tasks and determine the root causes that may have generated or triggered the failure of the necessary human behaviors; what forms of inappropriate behavior are produced, or could result, from such socio-technical root causes; how systems may be developed to anticipate and prevent accident and incident initiators, manage accidents that still occur, and attempt to recover normality; and to minimize and protect other humans and environment from accident consequences when prevention and recovery did not happen.

Therefore the human factors component is concerned with the analysis and optimization of the relationship between people and their activities and the integration of human sciences and engineering in systematic applications. Cacciabue (2004) also considers the cognitive aspects and socio-technical working in context with the technical environment. Understanding how the transition from cultural settings might influence the perception and understanding of risk is of

potential importance. In this sense, Cacciabue's (2004) human-machine system interface can be incorporated as a composite level of complexity, personnel, procedures, materials, tools, equipment, facilities, and software used together in an intended operational or support environment to perform a given task or achieve specific production, support, or mission requirement summarized as organizational processes, personal and external factors, local working conditions and defenses, barriers and safeguards.

Congruent to this concept are the safety process measures, identified by Reason (1997) which comprise five broad clusters: 1.safety specific factors, for example, incident and accident reporting, safety policy, emergency resources and procedures, off-the-job safety,2.management factors, for example, management of change, leadership and administration, communication, hiring and placement, purchasing controls, incompatibilities between production and protection,3.technical factors, for example, maintenance management, levels of automation, human system interfaces, engineering controls, design, hardware,4.procedural factors, for example, standards, rules, administrative controls, operating procedures and 5.training, for example, formal versus informal methods, presence of a training department, skills and competencies required to perform tasks.

Notably, the core of these clusters is contextual in nature with regard to how the adaptation of cultural influences within the settings impact on the safe outcome of operations. In this sense, Reason (1997) notes that error management includes measures to minimize the reliability of the individual or team; reduce the vulnerability of particular task or task elements; discover, assess and eliminate producing factors within the workplace; enhance error detection; increase the

area tolerance of the workplace or system; make latent conditions more visible to those who operate and manage the system; and improve the organization's intrinsic resistance to human fallibility.

While Reason (1997) makes plausible criticisms about human factors and error management, the paradigm has shifted in contemporary perspectives to error management and how it may be viewed. Consequently, Dekker (2002) maintains there are two views on human error. First is the old view of human error which posits that human error is a cause of accidents and that to explain failure you must seek failure and accept fallibility in people with assessments, wrong decisions and bad judgments (Dekker, 2002). By contrast, Dekker (2202) postulates a new view of human error, asserting that human error is a symptom of trouble deep inside a system and to explain failure is to try to find where in the system people went wrong, instead of how people's assessments and actions made sense at the time given the circumstances that surrounded them.

3.2 ERROR AND MANAGING RISK

This notion of finding out where people went wrong adds scope to the proposition that human error is a symptom of a larger systemic cause. As Dekker (2002) highlights, connecting people's behavior with the circumstances that surround them helps point to the source of concern to assist in explaining behavior when reconstructing people's unfolding mindset that determines patterns of failure. This suggests that to reverse-engineer human error reconstructing people's mindsets to answer questions like influences on memory, perceptual store or knowledge retrieval are largely important.

Correspondingly, the aim is to conclude that error originated at a certain stage along a psychological processing pathway in the mind. These approaches explain error by taking it back to the mind from which it came and as such, the level of cultural dimension may be a significant factor in how, on a global scale, an individual may effectively adjust from organizational setting to setting with respect to perception and adaptability. Dekker (2002) notes there are tight and systematic connections between situations and behavior, between what people did and what happened in the world around them. These connections between situations and behavior suggest that people change the situation by doing what they do, by managing their processes.

According to Dekker (2006), there are three accident models. The first is the sequence of events model that views accidents as a chain of events that lead to a failure. The second is the 'epidemiological model' that views accidents as being related to latent failures that hide in everything from management decisions to procedures to equipment design (Dekker, 2006). These pathogens do not normally recover unless they are activated by other factors. The final model is the 'systemic model' that highlights accidents emerging from interactions between system components and processes, rather than failures within. Dekker (2006) notes that this represents an idea that actions come from the normal workings of the system as they are a systematic by-product of people and organizations, and that a by-product of people is broadly contained in such human traits of perception contained in CQ and EI. The following proposition is offered

Proposition 2: The linear relationship between the incidence of risk in the organization/workplace and the risk perception behavior of the multi-ethnic group of employees affects the probability of human error.

4. RISK PERCEPTION, CULTURE, AND CULTURAL INTELLIGENCE

The important focus is the analysis of effective safety risk management within the context of individual and team traits as they relate to cultural adaptability and risk perception, noting their influence on self and social awareness within organizational and workplace settings. Simply ensuring national or international standards meet regulatory compliance, does not adequately ensure an ironclad system for recognizing the potential of systemic and human performance anomalies based on situational awareness. This is evidenced by the many regulatory inquiries that follow organizational collapse, exploration and transport accidents, or medical incidents, in that these analogies can be likened to erecting a building with poor structural foundations, the structure may be evident but the imperative support is missing.

Evident through the work of Vecchi & Brennan (2009) and Geller (2005), the examples offered thus far propose a relationship and interdependence between behavior and culture, human-resource capability, and safety risk-management models. As high-risk industries represent a high-risk/high-workload capacity, the principles and values that govern human resource capabilities and risk management have a potentially direct bearing on the notion that cultural values potentially impact on the practices and methodologies of task performance. In this way, common denominators to gauging and assessing cultural adaptability may be applied to complement a framework that contributes to professional practice in forming a culturally-aligned safety and risk-management culture.

As proposed by Matkin & Scotti (2010), a paradigm is needed to rethink the managerial and corporate psychology of high-performance industries so as to form a sustainable and

harmonious balance between corporate and social need, the individual, the team, and organizational performance with error-chain systems and methodologies. The strategies to effectively manage risk may be enhanced by incorporating cultural intelligence (CQ) concepts and principles within the framework of constructs based on the theory put forward by Douglas and Wildavsky (1982), Triandis (1990), and Steg & Sievers (2000) to suggest that risk perception may be culturally based.

Contemporary industry perspectives to risk suggest little emphasis is placed upon CQ within these frameworks as the focus is more on individual 'error' and systemic and organizational elements. As CQ looks to the level of adaptability from one cultural setting to another, research suggests most cultural approaches to safety risk management deal with the connections between the forms of social relations within groups and the risk concerns of those groups (Earle & Cvetkovich, 1997). Vechhi and Brennan (2009) contend that the culture specific argument can be used as an explanatory construct that explains variations in quality management and perception towards risk. Vechhi and Brennan (2009) revealed a causal link to differences in priorities, practices, and performance across national cultures.

According to these theories, a certain limited set of different relational forms lead to specific, different and conflicting, risk concerns. In contrast, Earle & Cvetkovich (1997) put forward the concept of cosmopolitanism as an approach to culture that focuses not on forms of sociality, but on changes among forms by persons from one form of sociality to another. These approaches draw parallels to engaging a culturally diverse workforce from a local organizational setting to a cross-border setting. Relative to other cultural theories, Earle &

Cvetkovich (1997) suggest cosmopolitans are more concerned with the solution of safety risk management problems than with their origins and this may be reflected in how they address safety risk management problems.

Douglas and Wildavsky (1982) have long put forward the notion of a connection between social theory and the perception of risk, suggesting that risk is a construct that may be culturally determined. In this sense the notion of CQ has significance, as the underpinning core of 'culture' consists of historically-derived ideas that are attached to values (Earley & Ang, 2003). They assert that CQ is based on the need to understand why some people are more adept at adjusting to new cultural surroundings than others (Earley & Ang, 2003). However, there are enough distinctions between the concepts of culture, social contexts and society to suggest that culture consists of patent ways of thinking, feeling, and reacting to various situations and actions acquired and communicated by individuals and groups. Hence Earley and Ang (2003, p.67) suggest CQ comprises three elements of cognitive or specific knowledge, where people are able to gain and comprehend a new culture based on various type of cues provided; motivation, based on the propensity and commitment to act on the cognitive facet as well as persevere in acquiring knowledge and understanding a new culture; and behavior, being the capability of a person to enact their desired and intended actions in a given cultural situation.

Further constructs in this area suggest CQ consists of knowledge, mindfulness, and behavioral ability that when combined, interact effectively across cultures (Ting-Toomey, 1999). Moreover, the cognitive frameworks help to organize and process information whereby selective attention to meaning and perceptions are formed (Thomas, 2006). The motivational

influences are such that individuals seek to ensure differential motives are lined with their cultural values within the context of their interaction with others who are culturally different (Thomas, 2006). Vechhi and Brennan (2009) similarly contend that the culture specific argument can be used as an explanatory construct that explains variations in quality management and perception towards risk. Their studies revealed a causal link to differences in priorities, practices, and performance across national cultures. The suggestion is that differences in priorities were affected by masculinity and uncertainty avoidance (Hofstede, 1991) but only to a small degree, based upon what may be considered to be the effects of globalization. The findings of Vechhi and Brennan (2009) confirm that quality practices can vary significantly across dimensions of culture.

In extending this proposition, Geller (2005) notes the importance of instructional, supportive, and motivational interventions as influences with powerful external consequences. The behavior-based safety concept (Geller, 2005) suggests several key principles that minimize risk through safety-related behaviors, one of which looks to design interventions with consideration to internal feelings and attitudes that in effect may be culturally related.

An example of safety risk management interventions were those examined in the hospital system in the Netherlands by Duckers, Faber, Cruijsberg, Grol, Schoonhoven, and Wensing (2009). The aim of the research was to synthesize evidence on the effectiveness of detection, mitigation and actions that reduce risks in hospitals, and identify and describe components of interventions responsible for effectiveness. Examples cited by Duckers et al. (2009) include behavior, performance, communication, system factors, and external factors beyond the control

of the organization. Duckers et al. (2009) state that the results of these different analysis methods suggest that their reliability and accuracy have limitations and that the study, which compared the effectiveness of analysis techniques, found no associations. With this is mind, Malenfant (2009) notes that with data reporting accepted as a major tool for mitigating risk, risk management may also be influenced by socioeconomic considerations that may interfere with the decision-making process in the belief that people perceive risks according to their own knowledge, experience and interests with the aim of making others understand personal perspectives. Hence, the following proposition is offered to guide the proposed research:

Proposition 3: *The linear relationship between the risk perception behavior of the multi-ethnic group of employees and their cultural intelligence affect the probability of incidence of human error within the workplace*

5. RISK PERCEPTION AND EMOTIONAL INTELLIGENCE (EI)

Within the proposed conceptual framework model (Figure 1.), EI remains an important link to CQ and risk perception in that EI is the ability to recognize, interpret and respond to feelings in others and within the individual (Bucher, 2008). This offers a unique perspective to value systems and emotional intelligence (EI) within multinational and culturally diverse workforces. As Clark (2010) noted in a study comparing EI scores on the measures of team effectiveness (i.e. goal focus and process effectiveness), teams deemed to have high EI initially performed better than those teams with low EI. However, low EI teams eventually increased their performance to match that of the high EI teams suggesting EI in a team environment may over

time be improved commensurate with cooperation, commitment, and trust; and is therefore particularly important when establishing risk-management ideals and safety-related behaviors.

Accordingly, EI correlates to the four-factor model of CQ meta-cognitive, cognitive, motivational, and behavioral in the context of culture in diverse workforces (Moon, 2010). This is also reflected in the 'Emotional Competency Inventory' (Boyatzis & Goleman, 2002), which includes competencies such as self-awareness, self-management, social awareness, and relationship management. The ability model of EI and its role in team effectiveness (Salovey & Mayer, 1990) suggests there are four cognitive abilities associated with processing emotional information including i) perceiving emotion, ii) using emotions to facilitate thinking, iii) understanding emotions, and iv) managing emotions in oneself and others, as noted in the Mayor-Salovey-Caruso Emotional Intelligence Test (MSCEIT) (Mayer, Salovey, & Caruso, 2002).

In this way an emotional rather than a technical approach has been put forward as experimental strategies within industry. The idea of incorporating EI concepts in risk management and safety leadership is demonstrated in a case study put forward in the petroleum industry (Matkin & Scotti, 2010). The strategy, built around three phases, includes a 'leadership in safety' workshop driven by the chief executive officer of the organization with EI concepts embedded through to middle management so as to personally promote a risk and safety message to the front-line workforce to ensure that the messages become effective interventions in the organization. Matkin and Scotti (2010) assert the goal is to develop a deep sensitivity within leaders towards intrinsic values in order to drive safety performance. Developing EI towards safety within a

leader is noted by Matkin and Scotti (2010) to be paramount to defining future actions and judgments pertaining to managing risk highlighting the focus and sensitivity to intrinsic values as to what defines a safety change-agent.

In a further study conducted by Clark (2010), comparing EI scores on the measures of team effectiveness (i.e., goal focus and process effectiveness), teams deemed to have high EI initially performed better than those teams with low EI. However, he notes that the low EI teams eventually increased their performance to match that of the high EI teams. This suggests EI in a team environment may over time be improved commensurate with those building blocks of cooperation, commitment, and trust; and might be particularly important when establishing risk-management ideals and safety-related behaviors.

5.1 EMOTIONAL INTELLIGENCE, TEAM COLLABORATION, AND CROSS-CULTURAL COMPETENCE

Golm, Corser and Dalsky (2005) indicate that across the participant range in studies they conducted with respect to clarity of emotion versus confused emotions, individual's self-reported ability to identify and describe their emotion was related to EI and stress. Therefore, clarity may moderate the relationship between EI and stress in terms of emotional intensity

When applying the notions of CQ and EI to safety risk management and workplace settings, managerial self-awareness and the subsequent effectiveness of teams are pertinent in the sense that, as noted by Shipper, Kincais, Rotondo and Hoffman (2003), self-awareness of different managerial skills may vary by culture. In this way, the application of previously learned

information, and the application and response of such information in different cultural settings has significance (Brislin, Worthley, & Macnab, 2006). This presents difficulties on a global scale with respect to teams in that Janssens and Brett (2006) assert team members may differ in culture and functional backgrounds thereby impacting on complex task performance and decision-making within the workplace. This suggests there are different cultural precepts and dynamics that may not be managed successfully on a home-based culture template.

As such, Janssens and Brett (2006) put forward a 'Fusion Model' of team collaboration within the workplace based on the coexistence of differences. This is aimed at creating realistic solutions to global workplace challenges in recognizing team members' differences and combining them in ways that accentuate the qualities of those differences. Key to the ingredients of the Fusion Model is 'creative realism' and the tasks of information extraction and decision-making. The important point here is recognizing that team members in global multicultural workplaces may focus on common knowledge yet fail to embrace important unique knowledge from each other (Janssens & Brett, 2006). The approach may offer credence to creative realism to act as a conduit in the detection of unseen risk pathogens in the workplace across a global scale.

This leads to an area of research in bicultural competence and its impact on organizational team effectiveness put forward by Hong (2010) in learning to address the challenges that arise from team members differing nationalities and cultural backgrounds. Bicultural individuals are those who have internalized two cultural schemas in the values, norms, and beliefs of each culture. As such, Hong (2010) notes they constitute a specific type of competence that may make them

effective in cross-cultural teams as bi-culturalism blends the construction of CQ in the service of interactive cross-cultural environments. Hence, this construct of bi-cultural competence places emphasis on how cultural frame switching (a culture-specific skill), and cultural meta-cognition (a culture-general skill), ensures bi-cultural individuals remain competent in cross-cultural interactions, as it links a cultural knowledge dimension.

Extending on the proposition of bi-cultural competence is the notion of tacit knowledge. Such competencies can be promoted using tacit signals which, as noted by Kesti and Syvajarvi (2010), are personal feelings and ideas relevant to improvement needs arising from emotional and experiential knowledge that may be used to reinforce or improve safety practices reflecting and utilizing cultural understanding. When taking into account varying cultural platforms and dimensions on how tacit knowledge affects the promotion of effective safety risk management, encouraging and sharing tacit knowledge within the workplace could be done via an internal electronic enquiry platform that may be subsequently analyzed to determine whether safe task-performance competence may need reinforcement or development within the workplace (Kesti & Syvajarvi, 2010). Accordingly, the following proposition is offered to guide the proposed research:

Proposition 4: The linear relationship between the risk perception behavior of the multi-ethnic group of employees and their emotional intelligence affect the probability of incidence of risk in the organization.

6. TEAM EFFECTIVENESS AND SAFETY RISK MANAGEMENT

The preceding discussion illustrates that emotional intelligence might contribute to better cognitive analysis of issues and prioritization of planning and tasks in self-managed team behaviors. An individual's ability to perceive and appraise emotions is significant in utilizing and appropriately acting with greater sensory awareness in the achievement of tasks (Clark, 2010). What becomes of interest in the value of having high EI is the possibility of individuals in teams being too emotionally aware, that is, reading too much into the cues of particular team situations and this detracts from the reality of what actually is (Rozell & Scroggins, 2010). This is supported by studies conducted by Rozell and Scroggins (2010) to suggest that as EI increases, feelings regarding group cohesion decrease. What is of significance here is that cohesion offers a shared perspective to task-oriented team behaviors, and this may impact on the shared behaviors associated with effective implementation of a safety risk management strategy.

As self-awareness and the individual's ability to perceive and appraise emotions is a key ingredient to EI, collective team situation awareness may follow suit. In a high-risk industry such as aviation, continuous perception of self and aircraft in relation to a dynamic environment and the ability to forecast and execute tasks based on that perception is paramount (Prince, Ellis, Brannick, & Salas, 2007). They note that team-situation awareness based on flight knowledge collected in a low fidelity scenario is significantly correlated with team performance in the high fidelity simulation.

While the common ground to collective team-situation awareness may be based on EI self-awareness, Prince et al. (2007) concede that within a team, reasons for inaction may include the status within the team, lack of control over the necessary action, an expectation that another will take the action, and actions taken by another team member that precludes the individual's own actions. Correspondingly, as noted by Gohm, Corser and Dalsky (2005), EI includes the ability to interrelate and understand the meaning of emotions in a manner that may combine, progress, or transit the task being engaged in. Likewise, the ability to regulate emotions in self and others leads to feelings of situational control lessening the prospect of inadvertent risk for behaviors (Gohm, Corser, & Dalsky, 2005). Accordingly, the following proposition is offered to guide the proposed research:

Proposition 5: The degree of emotional intelligence will have a significant bearing on team effectiveness and team situation awareness in the application of safety risk management.

6. INTEGRATIVE CONCEPTUAL RESEARCH FRAMEWORK

This article delineates risk perception and cultural values and its relationship with organizational culture, CQ, EI, in the context of organizational risk-management systems. This may be illustrated in a multinational enterprise or small to medium enterprise with offshore subsidiaries combined with a culturally-diverse workforce. The risk-management template of the home-based organization may be influenced by the values and perceptions of risk deemed appropriate by its own cultural dimension that may not be transferred to the cross-cultural setting located elsewhere. In this setting, the perception of safety risk, its application in task performance, and the desired behaviors required may ultimately not be aligned. By gauging

31

levels of perception and cultural adaptability coupled with understanding the emotional competence for performing the task, risk-management processes may consequently be elevated to enhance contemporary practice from a contextual perspective gauging the levels of perception, adaptability and competence from a home-base perspective. The implications may present safer working practices in high-risk industries operating in and across multiple cultural settings.

The problem of performing high-risk tasks while ensuring risk is managed effectively has emerged as a critical factor in the successful implementation of organizational safety objectives. Earle and Cvetkovitch (1997) and Slovic and Peters (2006) indicate that within contemporary global business, various environments suggest processes of systematic cognitive behavior are deemed reliant upon organizational and individual values and motivations, and that similarly, such values may be associated with cultural adaptability and the perception of risk. In this way, an organization's culture and the performance of individuals are intertwined so as to potentially impact upon risk management, and thus, safety outcomes. Any departure from desired outcomes requires systematic examination to determine anomalies and subsequent workable remedies.

In this sense, CQ and the capability of an individual to adapt to new cultural settings (Earley & Ang, 2003) and circumstances is presented as a platform to suggest that different cultures place different emphases on the perception of risk and hence how particular situations are perceived. In support of this, Douglas and Wildavsky (1982) confirm that while all cultures have a fundamental need to be safe, Taylor-Goody & Zinn (2006) and Slovic and Peters (2006)

indicate that different cultural values, which may engage emotional and psychological perspectives, are likely to impact the assessment and judgment of risk. Nonetheless, such perspectives appear not to be appropriately addressed in cross-cultural practices where a diverse workforce is employed and where organizations inherently engage a 'one size fits all' approach to business practices, including those associated with risk management.

To describe how this applies in the broader perspective, Reason (1997 & 2006) identifies the philosophy of human factors human abilities and characteristics as they affect the design and operation of equipment, systems, and jobs which is infinitively linked to the interface of global operating and safety systems. The human factors component is what Reason (1997 & 2006) suggests is the underlying basis from which most organizational accidents and incidents occur. Moreover, Weber & Hsee (1998) underscore this concept more generically as applying across various industry types such as the finance industry. For example, various fiscal predicaments have been prompted by inappropriate financial monitoring, assessment, and controls. In this sense, and in support of Weber & Hsee (1998), the issue of how behavioral processes may be influenced in organizational environments to enhance safety and risk-management strategies is to examine cultural perceptions to risk judgment, perception, and decision-making with particular attention to the perception of risk associated with cross-cultural differences.

While these notions of effective risk management may be applied to a variety of high-risk environments and industries, the appropriate research setting for the future studies would engage a multinational high-risk industry organization with an ethnically diverse workforce. This could be represented with examples from high risk industries such as aviation to illustrate

the anomalies and voids in practice with respect to articulating and applying an international safety risk-management standard. As most high risk industries have global operations, there may be a useful platform to establish relationships between a risk and an SMS, and the components that may influence such a system in the form of culture and values, adaptability, EI, and perception. The opportunity of measuring such correlations is based on the variety of departments and workplace environments that are actively involved in high-risk type tasks performed by a culturally-diverse workforce. Such is clearly apparent in the airline industry.

7. IMPLICATIONS FOR THEORY AND PRACTICE

This article offers several courses of action to gauging an individual or team's adaptability to a culturally different environment that may provide the precipice for understanding value systems and cultural norms in the development of safety risk management systems and operating procedures. These safety risk management value systems will create competencies in safety risk perception and judgment that may be gauged and developed from the initial recruitment and selection processes for new candidates to an organization; through to the organization's existing employees and teams so as to allow standardization in appropriately detecting, preventing and addressing risk type conditions that may cause an accident or incident. The application of these philosophies may be applied to a variety of high-risk industries while they also serve to support fiscal, social, and moral objectives.

The potential contributions from this article put forward to managerial practice suggests a form of certainty to the vague descriptions put forward in the benchmark of an international safety

risk management standard outlined in ISO 31000:2009. In a global business environment, where diversity in the workplace is common both at home and in cross-border operations, managers may be better prepared for aligning values and perceptions, while also detecting and addressing misperceptions to a shared mental model of safety risk management.

CONCLUSION AND FUTURE RESEARCH DIRECTIONS

The notions presented suggest that to effectively adapt to a diverse organizational setting involving safety risk management, a number of considerations must be addressed that center on risk perception, CQ and EI. Adapting culturally with an appropriate degree of EI may merit an aligned perception of risk together moderated with the culture and values of the organization to promote efficient and effective outcomes. Albeit in context it may be that the culture of the organization may not be the best fit when applying their risk-management template and therefore this article has considered key variables such as CQ, EI, team and individual task performance, and risk perception and how this may have a significant influence in the development and application of safety risk management objectives by a high-risk multinational organization.

Douglas and Wildavski (1982), Earle and Cvetkovich (1997), Slovic and Peters (2006), and Bontempo et al (1997) provide some key examples in probing the relationship of risk, perception, and culture; complemented by Earley and Ang (2003) to highlight the need to be able to adapt culturally so as to gauge an aligned perception and understanding of the environment. These propositions, when collectively poured into the melting pot of an

organization engaged in high-risk activities, indicate that values and perception are important in the effective management of safety in local and cross applications for, as Reason (1997, 2006), and Dekker (2002, 2006) assert, organizational incidents and accidents are linked not only to the behavior of the individual or team, but also to the systemic conditions of the organization based on its priorities and values.

Hence this article sets out a number of propositions intended to provide a causal link to detail the relationship between an effective safety risk management template based on international standards such as the ISO 3100:2009 (Risk management principles and guidelines) (ISO, 2009) and the possible key influencing variables as determined from the past literature on CQ, EI, task performance and competence, and safety risk perception. From theoretical and practice standpoints, the interrelationships between these variables, once measured, can be applied to workplace and organizational settings where the culturally-diverse workforce requires the ability to perceive, detect and address risk with positive outcomes.

Drawn from the theories on relevant research to safety risk perception behavior, the integrated model developed in this article, which is grounded in well-established culture and behavioral theories and supported by anecdotal evidence can be extended to include other paradigms. The usefulness of the integrated conceptual model should require further evaluation by operationalizing the paradigms and constructs and empirically testing them. Future research may seek to adopt temporal contrast strategy, to identify the changes in the cultural characterization of the employees as they co-evolve with their organization culture over a period of time. Future studies may extend the model to test synergistic relationships to support

the notions of risk perception in the workplace across broad spectrums of high risk industries employing multi-ethnic groups on a global platform. Nevertheless, this proposal will focus on the alignment of risk perception of multi-ethnic 'shop floor' employees and management groups to their respective risk and safety management systems.

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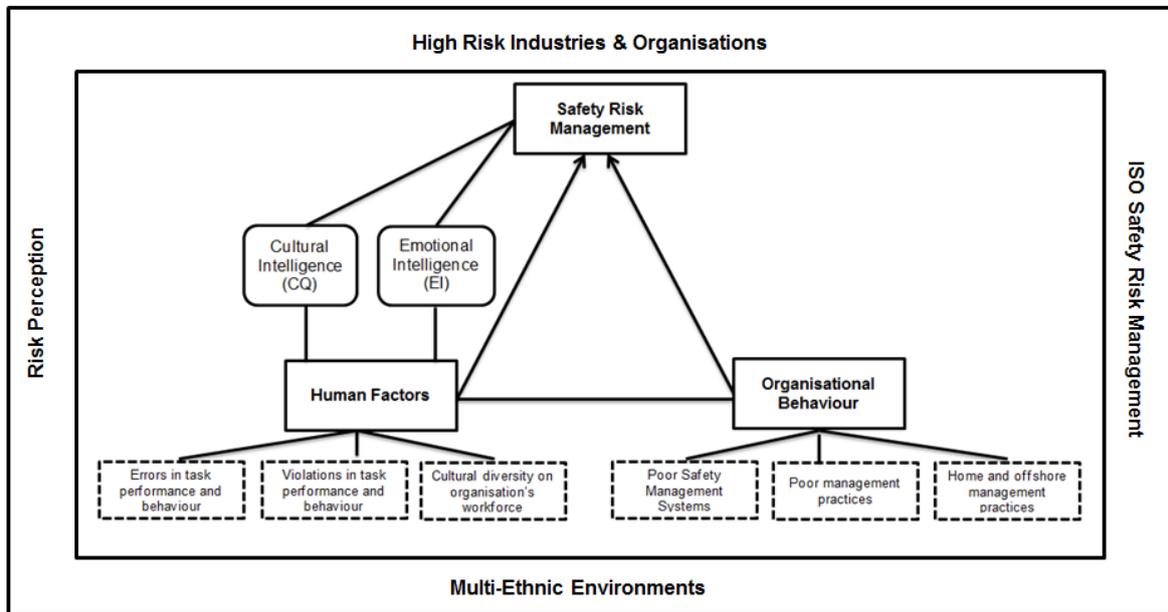
Figure 1. Contextual domains to safety risk management