Review

Bureaucracy, influence and beliefs: A literature review of the factors shaping the role of a safety professional

David J. Provan *, Sidney W.A. Dekker, Andrew J. Rae

Griffith University, Australia

ABSTRACT

Safety professionals have been working within organizations since the early 1900s. During the past 25 years, societal pressure and political intervention concerning the management of safety risks in organizations has driven dramatic change in safety professional practice. What are the factors that influence the role of safety professionals? This paper reviews more than 100 publications. Thematic analysis identified 25 factors in three categories: institutional, relational, and individual. The review highlights a dearth of empirical research into the practice and role of safety professionals, which may result in some ineffectiveness. Practical implications and an empirical research agenda regarding safety professional practice are proposed.

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* Corresponding author at: School of Humanities, Griffith University, 170 Kessels Road, QLD 4111, Australia.
    E-mail address: david.provan@griffithuni.edu.au (D.J. Provan).

1. Introduction

Since Hale's (1995) reflections on the role of safety professionals in this journal, the safety profession has grown in size, has spread across ever more industries, and has become increasingly bureaucratized on the back of ballooning regulations, organizational processes and a separation or professionalization of the safety role (Townsend, 2013; Dekker, 2014; Pryor et al., 2015; Righi et al., 2015). In the present review, we identify, collate and assess the past 25 years' worth literature on the practice of safety professionals. Consistent with Hale's original intentions, 'safety professional' is used for roles whose primary purpose is to provide safety advice which may focus on specific hazards (e.g. process, transportation, ergonomics, industrial hygiene), or constitute a generalist safety role to coordinate advice and support (e.g. safety management systems, culture, contractor management, emergency response).

The job design, title, objective and 'mission statement of safety professionals varies widely across industries and within organizations. Brun and Loiselle (2002) found more than 100 different titles. Hill (2006) identified no common definition of practice or common terminology to explain what safety professionals do. Even line managers may not understand, nor does the general population (Lawrence, 2008; Ferguson and Ramsay, 2010). The job might involve hazard recognition, evaluation and control (Ferguson and Ramsay, 2010), improving working conditions and compliance (Walters, 1999), ensuring good personal safety decisions (Leemann, 2014), developing safety culture and reducing injuries (Johnson, 2014), influencing managers to improve safety (Borys, 2000), preventing injuries and fatalities (Manuele, 2016), monitoring the organisation's resilience (Woods, 2006) and building safety awareness and infrastructure (Blewett and Shaw, 1996). Given these disparate objectives of safety professional roles within organizations, having a common understanding and evaluation of

safety professional effectiveness remains elusive for both organizations and individuals themselves.

The limited research that has been conducted on safety professionals since Hale (1995) is dominated by studies concerning tasks and education (e.g. Nedved and Booth, 1982; Dejoy, 1991; Brun and Loiselle, 2002; Blair, 2004; Hale et al., 2005; Hale and Guldenmund, 2006; Wu, 2011; Chang et al., 2012). However, within the last five years, some researchers have begun exploring the practice of safety professionals from an organizational and social perspective through the use of ethnographic research methods (e.g. Olsen, 2012; Daudigeos, 2013; Pryor, 2014; Reiman and Pietikainen, 2014). Whereas these studies offer some insights into the variability and complexity of safety work, they provide no consistency in their reflections on, and possible critique of, the expectations and actualities of the role of safety professionals in organizations today.

The present review aims to; synthesize the existing disparate literature on Safety Professionals within organizations, provide practical implications for safety professionals and organizations, and contribute a set of specific questions that the literature raises, but requires further empirical investigation to answer. A comprehensive literature search was undertaken using Science Direct and EBSCOhost as the host databases. Keyword searches used combinations of common terms, for example: 'safety manager,' 'safety practitioner,' 'safety professional,' 'safety officer,' 'safety advisor,' 'OHS Manager.' Google Scholar was used to identify additional cross-discipline literature. Citations and references were then used to probe related publications. The literature review identified approximately 100 publications that contributed commentary, theory and, or empirical research concerning the practice of safety professionals. A thematic analysis was conducted through a social theory lens as organizations are primarily complex human systems. A cognitive map was used to organize these topics into twenty-five factors, eight themes and three categories that relate

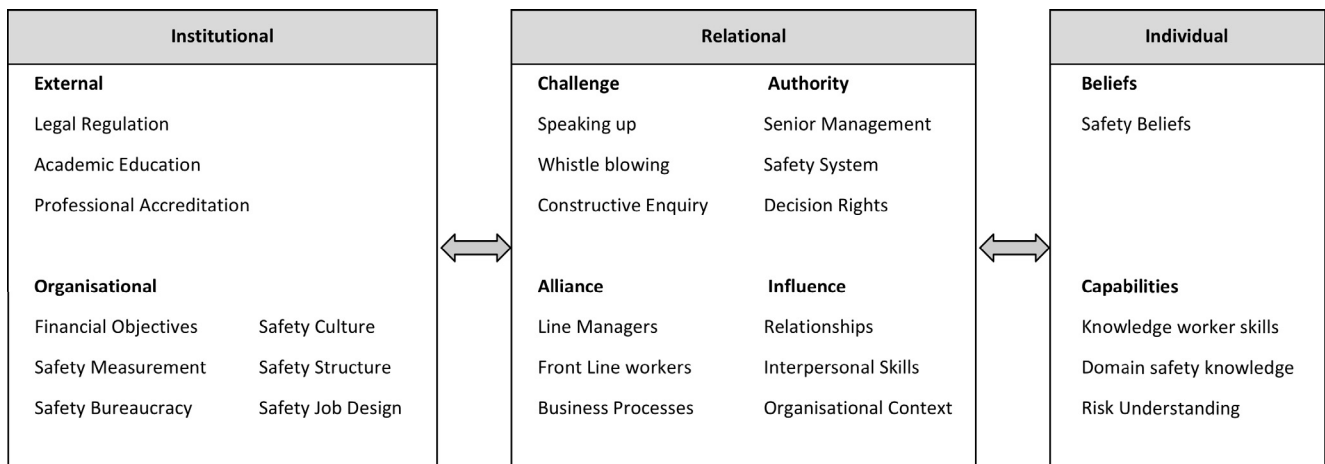| Institutional		Relational		Individual
External		**Challenge**	**Authority**	**Beliefs**
Legal Regulation		Speaking up	Senior Management	Safety Beliefs
Academic Education		Whistle blowing	Safety System	
Professional Accreditation		Constructive Enquiry	Decision Rights	
Organisational		**Alliance**	**Influence**	**Capabilities**
Financial Objectives	Safety Culture	Line Managers	Relationships	Knowledge worker skills
Safety Measurement	Safety Structure	Front Line workers	Interpersonal Skills	Domain safety knowledge
Safety Bureaucracy	Safety Job Design	Business Processes	Organisational Context	Risk Understanding

Fig. 1. Institutional, relational and individual factors shaping the practice of a safety professional.

to and shape safety professional practice (see Fig. 1). The categories were termed 'institutional,' 'relational' and 'individual' to describe the primary association of these factors with either the environment, practice or person. Institutional factors relate to the organization, its social and political context, and how it is managed and operating. Relational factors point to the interaction between the safety professional and other personnel and processes within the organization. Individual factors are internal to the safety professional, their capabilities, knowledge, and beliefs. These categories align with widely used social theory frameworks for 'structure,' 'agency' and 'identity.'

2. Institutional factors

Safety professionals' roles are shaped by the institutions they interact with – government regulators, academic institutions, and professional bodies, as well as the features of the organizations they work within. These factors guide, constrain and enable the formation of a professional identity. Institutional factors form a large part of the theoretical discussion in the literature; however, there has been a limited collection of empirical data relating these to safety professional practice.

2.1. Safety profession

Despite some evidence and argument to the contrary (Almklov et al., 2014), the professionalization of the safety role is widely considered necessary for advancing the quality of safety professional practice and improving the regard for safety professionals. Professionalization involves service orientation, a code of ethics, a specialized body of knowledge, academic education and qualification, and continuous learning (Ferguson and Ramsay, 2010). Safety professional certification dates from 1970 in the United States through the American Society of Safety Engineers (Gorbell, 1970). Today there is a global network of safety practitioner organizations and institutes known as INSHPO, and many countries have some form of professional standards and a safety professional certification scheme. In response to the growth in the safety profession, academic education programs for safety professionals commenced in the early 1990s, but with widely varying curricula and differing internship or fieldwork requirements (Marshall and Mackey, 1995; Arezes and Swuste, 2012). Some graduate programs were traditionally entirely technically focused which mirrored the tasks and functions of safety professionals in the workplace as passive advisors on specific safety matters (Nedved and Booth, 1982; Swuste and Arnoldy, 2003; Ferguson and Ramsay, 2010; Wybo and Van Wassenhove, 2015). The literature repeatedly recommends the inclusion of traditional management (i.e. MBA curriculum) alongside risk management, with a focus on; communication, management of change, influence without authority, human behavior, decision-making, negotiation, conflict management, coaching and consulting, as well as safety principles (Marshall and Mackey, 1995; Adams, 2000, 2003; Swuste and Arnoldy, 2003; Ferguson and Ramsay, 2010; Wybo and Van Wassenhove, 2015; Pearson, 2016). In addition to technical, management and interpersonal content, safety programs should include psychology and sociology (Swuste and Arnoldy, 2003; Wybo and Van Wassenhove, 2015). In the mid-1990s only 50% of tertiary safety courses contained psychology units (Taylor, 1995).

The relationship between education, experience, and career progression seems less clear than in many other professions (i.e. engineering, medicine, law, finance). Adams (2000) argued there is a sharp difference between how practitioners and educators view the safety professional role and this is most evidenced by the gap between how professional associations and academic insti-

tutions view safety professional competence, as opposed to the practitioners themselves. In the UK, Smith and Wadsworth (2009) found that while 88% of practicing safety professionals believed that they had sufficient technical knowledge to provide advice, only 21% were degree qualified. Education is not a major determinant of job content, and it seems practitioners with vastly different levels of education from certificate to Ph.D. carry out the same tasks within their organization (Hale and Guldenmund, 2006). As little as 20% of safety professionals are tertiary qualified (Smith and Wadsworth, 2009) and academic programs are not comprehensively reflective of the skills safety professionals require.

Safety professional associations are implementing barriers for entry into the profession based on education and experience. Previously, the requirements varied widely. Fowler et al. (1998) undertook a review of safety professional job advertisements in Australia during 1994–1995 and found that 60% specified tertiary safety qualifications and 73.5% required safety experience. Even if certification of safety professionals is credible evidence of skills and knowledge, Smith and Wadsworth (2009) found that organizations with certified safety professionals had better management of technical issues (e.g. chemicals, stress, vehicles) but poorer overall hazard management. This is consistent with the bias toward academic education and with that of safety certification towards technical competency. Garrigou and Peissel-Cottenaz (2008) studied practicing safety professionals in France where there was no national professional certification program. In this study of 372 participants, the researchers concluded that one-sixth of respondents were in a position of great difficulty in their role, described as professional distress. These findings included the following: 25% had poor cooperation with stakeholders, 36% believed they were not part of an organization that focused on safety, 45% felt isolated, 54% felt their company often compromised on safety, and 44% were not invited to the management committee. Alarmingly, only 2.5% (9 of 372 participants) felt at ease negotiating safety issues with management.

2.2. Regulation

A primary role of safety professionals is to enable their organizations to comply with the law (Olsen, 2014). Increasing goal and risk-based legislation has coincided with a huge increase in demand for safety professionals. Organizations that previously were required only to implement action/state requirements now require expertise to interpret and translate legislation into company actions that demonstrate compliance (Hale et al., 2015). Such regulatory compliance activity increasingly dominates the tasks and activities of safety professionals (Dekker, 2014).

Criminal penalties for breaches of vague and broad obligations (Niskanen et al., 2014), for example: 'ensure a safe system of work' and 'ensure hazards are managed,' coupled with personal criminal penalties, have driven the safety approach of senior management and—consequently—the safety profession. The compliance role of safety professionals has shifted from meeting legal obligations to protecting the company and its officers (Ryan, 1989), which may occasionally be incompatible with the need to engage with regulators. Niskanen et al. (2014) found that safety professionals were less likely than workers to believe that workers should talk freely to government safety inspectors.

The European Network of Health and Safety Professional Organisations (ENSHPO) conducted the largest study on the role and tasks of safety professionals included in the present review. 5495 safety professionals from 12 countries completed a 173-item questionnaire on the range and frequency of tasks performed, hazards advised on and stakeholder relationships (Hale and Guldenmund, 2006). 22 tasks were carried out by more than 60% of safety

professionals in all countries, with the top tasks being: "check compliance with policy and law," "risk assessments," "job safety analysis," and "develop company policy." These tasks provide clear evidence of the significant influence of safety regulation on the role of a safety professional throughout the developed world. That said, many believe that compliance is insufficient to manage safety (Hill, 2006) or has no impact on safety improvement (Shannon et al., 1999). However, this relationship between compliance and safety remains vigorously debated in the contemporary safety literature. Safety compliance activity shaping the role of safety professionals has expanded from its primary purpose to improve safety within organizations to; supporting liability management for company officers and meeting bureaucratic requirements not directly linked to managing safety risks.

2.3. Performance measurement

Saying 'good safety is good business' has become popular (Mottell et al., 1995), based on the belief that minimizing operational risks enhances productivity or protects against financial losses. Swuste (2008) suggests that the relationship between safety and financial performance is not clear, citing the Bhopal Gas Disaster in 1984 and claiming the catastrophic incident left the company financially better off after the incident than while operating the asset. Only one-third of safety professionals believe that safety gets consideration equal to financial objectives (Smith and Wadsworth, 2009). In the absence of safety fitting neatly into a model of competitive profit, organizations stumble to express their safety goals. They may care most about high consequence events but express their goals using largely irrelevant low consequence event counting (Hopkins, 2000; Dekker et al., 2016), leaving safety professionals to reconcile their personal understanding of what is important, their understanding of the organization's financial goals, their understanding of the organization's safety goals, and the formal expression of these. The goal conflict present in safety professional roles is more significant than other professions, which is exacerbated by the on-going debate in the safety literature concerning how to measure safety, and they may be ill-equipped to manage these demands.

2.4. Safety bureaucracy

Safety professionals are central to the development and administration of safety bureaucracies within organizations. These internal organizational safety bureaucracies drive the activities and relationships of safety professional's and further reinforce their beliefs about safety management (Swuste et al., 2014).

Many organizations have developed stand-alone safety management systems structurally separating safety requirements and activities from core business processes and systems (Olsen, 2014). Olsen (2014) conducted a survey of New Zealand safety professional's and found that a significant part of their role included writing safety policies and procedures, documenting and auditing safety management. Some descriptive studies have been conducted into the tasks and functions of safety professional's (Booth et al., 1991; Dejoy, 1991; Brun and Loiselle, 2002). These studies highlight the range of activities of safety professional's that can be linked to core elements of safety management systems, including monitor and prepare reports, inspection and auditing, regulatory compliance, emergency response, incident investigation, hazard and risk assessment, and training.

Safety professionals have become administrators of safety bureaucracies, and their reputation among the workforce has suffered. Cheng et al. (2012) conducted a questionnaire among construction workers ranking 15 management practices that were important to safety performance. Having a 'formal safety organiza-

tion structure' was ranked second lowest with 'safety promotion' ranked lowest. Common bureaucratic safety activities of 'accident statistical analysis' and 'safety audit' also ranked low in importance for safety. This proliferation of bureaucracy has been identified by safety professionals themselves, with too much paperwork being cited as one of the biggest barriers to building an effective safety culture (Biggs et al., 2013). Other studies show that safety professionals rely on bureaucratic processes to exert authority and influence in their organizations (Olsen, 2012; Daudigeos, 2013).

Safety bureaucracies shape the nature of safety professionals' relationships with others in the organization. Through investigations, audits, and non-compliances, companies impose discipline to non-compliant managers and rule-breaking workers (Hill, 2006). Hill (2006) suggests that disciplinary action results in anger, not improvements to safety. Talking about negative things like non-compliance and incidents makes others ignorant, defensive or even hostile towards the safety professional (Saari, 1995). Hale (1995) identified 'control preaching', a role based on the belief that others are unlikely to manage safety on their initiative effectively. This hampers openness and learning. It is hard for line managers and front-line workers to have the confidence and maturity to admit errors when the safety professional and organization condemns any deviance or non-compliance, and only in rare companies can these relationships be maturely handled (Hale, 1995). Moreover, of course, in complex, highly technical organizations, an effective safety professional cannot be a tabulator of statistics, creator of a paper trail of compliance, cheerleader of past safety performance, or a cost center that slows production (Woods, 2006). Bureaucracies are not conducive to empowerment, opportunity, diversity or creativity, which are required to manage emergence and dynamic processes. Deference to the protocol should be balanced with deference to expertise in complex systems (Amalberti, 2013).

2.5. Safety culture

Reiman et al. (2014) identified eight cultural archetypes and described the potential challenges for a safety professional under each different type of organizational culture. Biggs et al. (2013) related the most common barriers to safety culture as reported by safety professionals are; competing business priorities, production and cost pressure, and workload and time pressure. All aspects of safety management have to exist alongside these real world issues (Biggs et al., 2013). Safety professionals who are not in touch with these cultural challenges easily become isolated. Improving the safety culture of their organization is often described as one of the key roles of a safety professional. Smith and Wadsworth (2009) studied the relationship between safety cultures, quality of safety advice and safety performance. While safety advice was associated with safety performance, there was little association between safety advice and safety climate (Smith and Wadsworth, 2009). This study suggests that safety professionals have no measurable impact on the safety culture within organizations. In a contradicting study, Nielsen (2014) demonstrated that changing the behaviors of a safety organization positively impacts safety climate and reduces injuries. Change in culture can be created and facilitated by altering the safety professional's behavior to be more engaging and participative with line management and workers (Nielsen, 2014).

2.6. Safety structure

The safety professional's role and formal ability to influence within their organization rely on their structural position in the hierarchy (Wybo and Van Wassenhove, 2015). Some organizational structure attributes directly shape the role and effectiveness of

safety professionals including whether they are internal resources or external consultants, organizational proximity to senior management, their formal line of report, and the amount of personnel and financial resources.

Cameron et al. (2013) found organizations that relied solely on external consultants rather than internal safety professional resources had three times higher accident rates. This finding is consistent with previous studies (Hinze, 2002), and Hale (1995) suggested that external resources cannot effectively understand the organizational context or adequately influence company policy. Interaction with the most senior management is necessary (Reiman and Pietikainen, 2014). Galloway (2013) argues that the most senior safety professional should report to the organization's Chief Executive Officer since safety is the 'highest priority,' and Brun and Loiselle (2002) conclude that this recognized hierarchical authority improves the safety professionals ability to influence. This, however, is seldom the case (Pryor, 2014). Most safety professionals have a low level of involvement with senior management, and low attendance in management forums or participation in critical decision-making and planning processes (Brun and Loiselle, 2002; Pryor, 2014).

There is an ongoing debate across industry about whether a safety professional's role should formally report to the line manager that they are responsible for supporting, or through to a more senior safety professional. There are advantages and disadvantages of both organizational safety structures. Woods (2006) suggested that a key aspect of the role of a safety professional was independence. Safety professionals should report outside the operational chain of command, as their role is to challenge assumptions and models of risk held by line management and crosscheck the rationale for decisions (Woods, 2006; Haddon-Cave, 2009). Structural separation limits line management's attempts to dominate, marginalize or 'shunt aside' the safety professional (Woods, 2006). Reiman and Pietikainen (2014) identified that there is a strong possibility for conflict between safety professionals and line management, and while they try to make it work, it is necessary to maintain role independence. Silence on the part of the safety professional can be driven by concerns not to expose a line manager when they report to the person they are advising (Grote, 2015). An independent matrix style of organization with dual authority structures is more likely to accept challenge and leverage it to improve (King, 1999). Cameron et al. (2013) found that the formal authority of the safety professional was related to improved safety performance, and in all cases where safety professionals saw themselves as having authority; they also held a senior position.

The disadvantages of independence and structural separation are that the safety professional may be distanced from daily work and not sufficiently involved in operational decision-making processes as they are happening (Woods, 2006; Reiman and Pietikainen, 2014). Reiman and Pietikainen (2014) identified tensions that exist between different safety functional roles in the organization, for example, OHS and process safety. A formally structurally integrated group of safety professionals is more likely to ensure alignment between all the safety professionals and this synchronization across an organization positively influences overall culture (Wu et al., 2010). In a further study that supports safety professional's reporting outside line management, Hinze (2002) found that sites, where the safety professional reported to the site manager, had on average higher accident rates than those who reported to a more senior safety professional or a head office manager.

On the other hand, a safety professional is a functional role, not hierarchal, and it does not own nor is it accountable for safety (Wybo and Van Wassenhove, 2015). Safety is an accountability of line management, and it is argued that safety resources should be integrated into the line structure to ensure full involvement

with, and support of a line manager's priorities rather than a structurally separate afterthought (Galloway, 2013; Wybo and Van Wassenhove, 2015). Stalnaker (1999) suggests that safety professionals too often don't remember the fundamental relationship between line management and support organizations and when they forget who is supporting whom then problems ensue, and formal reporting relationships can prevent this. Wu (2011), studying Hale's three role types, found that the most common tasks of safety professionals were associated with this role of 'advice coordination,' and the least frequent were those tasks related to 'safety expertise.' This suggests the increasing dominance of safety bureaucracy and line management direction on the role of safety professionals. Further, safety professionals that report to line managers align their goals and activities with engaging and protecting their line manager from the organization's bureaucratic social threats rather than engaging and protecting the worker from safety risk (Watchter, 2011). Regardless of the formal resourcing structures adopted, organizations need to ensure that the voices for safety are loud and able to be heard (Hopkins, 2009).

Safety professionals often have additional non-safety related duties that don't fit elsewhere (Ryan, 1989; Johnson, 2014). This may not be a detriment to safety management. Cameron et al. (2013) found that including environmental responsibility correlated with lower accident rates on site, for instance.

Research conducted in the United States referred to as 'staffing for safety' has shown a direct relationship between accident rates and the ratio of safety professionals to the overall workforce (Cameron et al., 2013). Accident rates reduced in line with an increase in safety professionals up to a ratio of 1:50, however, it is more important what the safety professionals do rather than just increasing the number (Cameron et al., 2013). That said, despite the increase in safety professional resources over the past two decades, Borys (2015) identified only two empirical studies which have demonstrated a strong relationship between safety professionals in an organization and its safety outcomes (Rebbitt, 2012; Cameron et al., 2013). In addition to safety personnel, Woods (2006) suggests that safety professionals should be provided with significant independent funding and resources and the authority to determine how it is invested. He believes that safety investments are most required when line managers believe they can least afford it. Smith and Wadsworth (2009) found that 27% of safety professionals felt that they had no influence at the level that set the safety budget. Safety professionals are often best placed to identify the safety investments required in their organization, however, have little direct control over these decisions.

3. Relational factors

Safety professionals do not make decisions that manage day-to-day operations and therefore needs to establish relationships with people and processes throughout the organization. These relationships enable the safety professional to; understand, determine, and influence the direction of the organization in the interest of safety. Hale (1995) was the first to describe the complex relational dynamics and the nature of the interaction between safety professionals and line managers. However, in the 20 years since this discussion, there is limited research into the practice of the role of a safety professional. There are some descriptive studies of activities (Reiman and Pietikainen, 2014) and a small number of studies that have explored the social aspects of a safety professional's role (Broberg and Hermund, 2004; Garrigou and Peissel-Cottenaz, 2008; Theberge and Neumann, 2010; Daudigeos, 2013; Pryor, 2014).

Line managers within organizations will not make decisions and take courses of action that are unacceptable – or "unsafe."
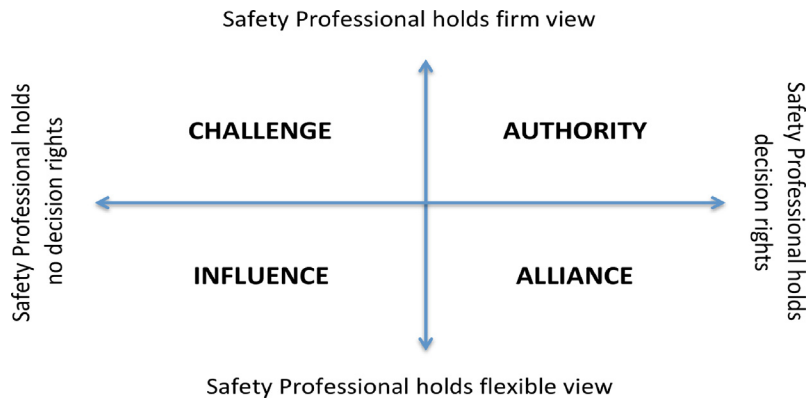
Safety Professional holds firm view

Fig. 2. Relational views of a safety professional towards stakeholders and safety decisions.

However, the constructs of "safe" and "unsafe" are subjective rather than objective. So, where there is a possibility that things might be unsafe, there needs to be a process of alignment of beliefs, language, and actions. This social process continues until there is broad agreement that a future course of action is safe. "Safe" is not a standard to be reached; it is a point of consensus among stakeholders.

Reiman and Pietikainen (2014) propose that safety professionals have three key influence mechanisms: safety skills and knowledge (education, experience, operational contextual knowledge), personal orientation and abilities (character, courage, relationships), and organization (formal authority, structure, management systems). Antonsen (2009) identified that the ability to get others to follow the safety professionals advice in a given situation is based on 6 factors (that closely aligns with Ferry, 1987): organizational structures and formal authority, power from knowledge and expertise, control of rewards and resources, coercive power (punishment), alliances and networks (tap into others sources of power, and personal power (charisma, political skill, individual characteristics). Daudigeos (2013) confirmed that safety professionals rely on factors closely resembling the above two studies to establish the power to exert influence in their organization (formal authority of others, external knowledge, control of safety processes and information, and fear of punishment through legal consequences).

The present review identified twelve relational factors categorized into four relational 'views' that describe the nature of the way safety professionals determine their position and how they relate to others: challenge, alliance, influence, and authority (see Fig. 2). One view 'challenge' is that the safety professional is neither part of the decision-making process nor an impartial provider of information - instead, they seek to shift the consensus towards their perspective through outside challenge on behalf of safety. Another view 'influence' also holds that the safety professional stands outside the decision-making process, however, provides information, options, and advice to inform the consensus. The third view 'alliance' is that they are part of the decision-making process and the champions for one end of the spectrum of outcomes, always urging for a consensus with lower safety risk, however, they participate and negotiate with stakeholders until alignment is achieved. The fourth view 'authority' suggests that safety professionals are (or at least should be) the ultimate decision-maker or arbiters of whether a course of action is safe.

3.1. Challenge

"If two people in the same organization always agree, then one of them is unnecessary." – Pater (2006)

A primary role of a safety professional is to challenge the assumptions, priorities, and actions of line management (Woods, 2006) and they have a professional and moral responsibility to "speak up" (Rebbitt, 2013). Organizations have become increasingly bureaucratic with respect to safety management, and this has come at the expense of the culture required for the open expression and consideration of diverse ideas and opinions. Very few hierarchical and bureaucratic organizations tolerate dissent well, and instead value and reward conformity (Haddon-Cave, 2009; Rebbitt, 2013). Rebbitt (2013) argues that this increasing bureaucracy has led to a weakening of business ethics, retaliation towards dissenters and even pressure to break the rules to achieve organizational objectives. The right to disagree is fundamental one without which good business ethics cannot survive (Shahinpoor and Matt, 2007). Bad news is seldom embraced, and managers may even avoid or minimize contact socially and structurally with the safety professional to avoid it (Ryan, 1989). There are three mechanisms for safety professionals expressing challenge; speaking up, whistle-blowing and constructive inquiry.

3.1.1. Speaking up

Speaking up can be considered a core part of a safety professionals role, however, it has not been studied. Investigations into major safety disasters conclude that the safety professional either didn't raise critical safety issues or was unsuccessful in 'being heard' and changing decision-making (Columbia Accident Investigation Board, 2003; Baker, 2007; Haddon-Cave, 2009). Morrison et al. (2011) describe speaking up as a discretionary communication of ideas, suggestions, concerns or opinion about work related issues with the intent to improve organization functioning. Speaking up is necessary for safety as it opens up new perspectives for decision-making and action (Grote, 2015).

It can be personally risky for a safety professional without formal authority to expresses their dissent, and to do so effectively they must obtain and polish interpersonal skills, such as influence and persuasion which is not taught in formal education (Rebbitt, 2013). Rebbitt (2013) suggests that a safety professional should be mindful of the personal impact of the information on line management and their objectives; Is it a threat to them? Does it imply failure on their part? Does it provide them a benefit? There are practical strategies that can be adopted by safety professionals to challenge in less open environments including overtly playing devil's advocate, implying agreement but expressing a different viewpoint, or the use of sarcasm or a joke with an oblique reference (Rebbitt, 2013).

There are several reasons for not speaking up about safety in organizations mainly relating to uncertainty on a personal level. These reasons include status differences, damaging relationships,

feeling of futility, lack of experience in job or the issue, adverse impacts on others, poor relationship with supervisor, fear of punishment, fear of negative label, the conflict between efficiency and safety and time pressure (Grote, 2015). Peer pressure and personal uncertainty are powerful motivators; no one wants to stand out from the crowd and studies have repeatedly shown that less than one-third of people witnessing inappropriate behavior will report it (Rebbitt, 2013).

3.1.2. Whistle blowing

To counteract the bureaucratic pressure not to challenge the hierarchy, the concept of the safety professional as a whistle-blower emerges in the literature (Hale, 1995; Saari, 1995; Antonsen, 2009; Hansen, 2012). Whistle-blowing is an act of voluntary disclosure of inappropriate behavior or decisions to persons in a position of senior authority in an organization (Sexty, 2011). Hale (1995) describes the 'controller' role of safety professionals where they should step out of friendly advisor or support role and condemn unacceptable practices with vigor when necessary. In his discussion of the complex relationship with line management, Hale (1995) suggests that safety professionals may need to learn how to become whistle-blowers. Antonsen (2009) argues that employee safety representatives from trade unions in some countries have been, and are institutionalized whistle-blowers.

Hansen (2011) takes an opposing political perspective and very clearly advises safety professionals to know your corporate culture and do not go over your bosses head. Stalnaker (1999) also argues that safety professionals should not undermine the authority of line management. These views seem to promote the role of the safety professional as being in service of line management rather than in service of safety within the organization.

3.1.3. Constructive enquiry

Rather than formal whistle-blowing processes, safety professionals and organizations should work on developing a culture where clear and open disclosure of concerns is encouraged and occurs (Rebbitt, 2013). He suggests that safety professionals have a role in promoting an open environment through embracing the dissent of the workforce and management toward them. Challenge needs to be done in a constructive manner using an enquirer method (Grote, 2015), and honesty is not a rationale for insensitivity (Pater, 2006). Grote (2015) suggests that inclusive leadership that explicitly values diverse contribution creates an environment of psychological safety for people to take the personal risk required in speaking up. Tong et al. (2015) found that leadership empowerment behavior correlated with a safety professional's psychological empowerment, perceived organizational support, and this, in turn, increased their safety commitment and safety teamwork.

Woods (2006) proposed the metaphor of "cold water and an empty gun" to describe the safety professional that doused the production and cost objectives of the organization due to safety concerns and then didn't have a workable solution to move forward. Safety professionals should offer practical solutions or functional processes to arrive at practical solutions when they challenge line management and are mindful of the production, cost and time objectives of the organization (Rebbitt, 2013). Organizations need to provide clear and comprehensive training on the benefits of challenge, how to challenge and how to receive a challenge to both safety professionals and line management (Grote, 2015).

An important role of a safety professional is to challenge line management and the organization for the purpose of maintaining or improving safety. As safety professionals have increasingly aligned their roles with line management, they have paradoxically weakened the diversity and strength of their voice for safety in the organization. Having conflicting views on safety is a safety resource for organizations, by serving as a kind of requisite variety

that facilitates learning (Antonsen, 2009). Bringing this diversity of viewpoint is the 'informative' (Woods, 2006) role of a safety professional however it is often unwelcome information and creates tension between the line manager and the safety professional.

3.2. Alliance

"None of us are as smart as all of us together." – Greer (2001)

Safety professionals create alliances with people, programs, and objectives of the organization. Safety advice that is positioned in a way that contributes or compliments needs or wants of others in the organization is likely to be received differently than that expressed as a challenge. Alliance is described as a win-win outcome for the safety professional and other people's agendas.

Theberge and Neumann (2010) propose five practical strategies for safety professional influence and political manoeuvring all related to alliance with other stakeholders and programs: recognise the agenda and interests of others, identify possibilities for 'goal hooking', attend to the 'soft systems', implement organizational arrangements to advance the agenda, and implement tools that integrate into existing management processes.

The two key groups of stakeholders for safety professionals to situate their advice in alliance with are line management and front-line workers. Greer (2001) suggested that none of us are as smart as all of us together and while safety professionals think they need to have the answers and are the resource for everything concerning safety, many times they do not even know the questions. Safety professionals should engage workers and line managers and seek their advice and active participation in devising solutions which not only improves their quality but also moves the ownership of safety processes from the safety office to work sites (Greer, 2001). Safety professionals need effective facilitation skills to build their methods on the participatory involvement of line management and the frontline workforce (Limborg, 2001). Goal alignment between the safety professional, line management, and the workforce through alliance is important for working together to improve safety. Production goals are acute, 'how much did you produce today?' whereas, safety goals are chronic, 'how many injuries did you have this month?' Line managers expect safety professionals to embrace and contribute to the bottom line performance of the organization (Woods, 2006; Lawrence, 2008; Laduke, 2011; Wybo and Van Wassenhove, 2015). Traditionally safety professionals have taken the role of 'expert' or 'controller' and challenge line management where goal conflict exists. Instead, they should focus on alignment of objective and tasks with line management and the workforce (Hale, 1995).

3.2.1. Line managers

Woods (2006) argues that safety professionals need to contribute to all organizational goals. A safety professional cannot be a safety 'expert' in an organization if they are always troublesome to the business by negatively impacting time and cost (Reiman and Pietikainen, 2014). Adams (2003) suggests that too often safety professionals are focused on being a technical expert with little concern for a management solution, which sees line management view them in terms of regulatory compliance rather than overall business improvement. Too often the advice, actions, and decisions of a safety professional may be seen as antagonistic in that they negatively impact business resources (Bryant, 1999). As a result, many companies prefer a safety professional that maintains a low profile and therefore doesn't interrupt production (Ryan, 1989).

Safety professionals have to learn how to communicate with managers more effectively and develop a detailed understanding of the manager's problems to advise effectively (van Dijk, 1995). Hansen (2011) suggests safety professionals get the 'green light'

by aligning advice with the bosses' priorities and having detailed plans. Safety professional's need to learn how to sell ideas to management and create the business case for safety (Ryan, 1989; Hill, 2006).

In a 24 task questionnaire administered to safety professionals, Dejoy (1993) found that the item rated as lowest importance and the lowest time spent was "developing methods to evaluate the cost-effectiveness of control systems." Safety professionals appear to maintain ignorance and benevolence towards the financial objectives of the organization. Greer (2001) describes this well using the statement 'seek first to understand, then be understood' (Covey, 1989) referring to a safety professional's responsibility to know first and foremost what drives the organization's senior management and work with this rather than against it. The safety professional is regularly out of goal alignment with the organization, and they have created a culture of separateness by implementing programs that do not contribute to the company's financial and production goals (Hill, 2006). Hale (1995) describes an adult – adult relationship between line managers and safety professionals that focus on mutual support and the achievement of common goals. Manuele (2003) agrees with this and describes the goals of a safety professional as; effectively and economically reducing risk, contributing to the organization's goals in addition to safety, and being an active participant in achieving all of line management's goals.

Safety professionals have the opportunity to be change agents that help their organization realize economic optimization and in turn create for themselves the credibility and power to improve safety (Hill, 2006). For themselves, safety professionals who are problem solvers, multi-skilled and demonstrate results that are woven into the organization's financial goals are viewed as a valuable asset (Hill, 2006).

3.2.2. Front-line workforce

Knowing and working with the needs and wants of the front-line workforce is a useful source of alliance for safety professionals and positions their advice with the support of the workers exposed to the safety risks. Safety professionals need to ask more questions because what they believe is unsafe is probably the fastest and most effective way to do work (Walters, 1999). Walters (1999) suggests that understanding the needs and reasoning behind workers decisions is time-consuming, but these workers are also resourceful at bypassing undesirable safety controls. Solutions to a safety concern will always be better if resolved jointly through interactive problem-solving sessions with the safety professional and the front-line workforce with as much latitude and judgment to the worker as possible (Walters, 1999). Safety professionals should treat workers with respect and listen to their safety concerns and solutions in a way that acknowledges the workers like the safety experts that they are (Stalnaker, 1999). Limborg (2001) proposed workers should participate in prioritizing problems to be solved, and a safety professional's solution should always be considered insufficient if front-line workers have not been actively involved in developing, testing and introducing changes.

The body of resilience engineering literature expands this participative strategy of safety professionals to one of enabling and facilitating the adaptive capability of the organization. Woods (2006) proposes that safety professionals seek ways to enhance coordination across the normal chain-of-command and organizational boundaries enhancing resilience and reducing brittleness. Reiman et al. (2014) suggests safety professionals promote novelty and diversity, which leads to self-organised order and adaptation. These strategies will enable the organization to anticipate and recognize issues that are not known or previously experienced (Pidgeon and O'Leary, 2000).

3.2.3. Business processes

Management knowledge and skills are useful for safety professionals to create an alliance between their advice and the people, objectives, and programs of the organization. A safety professional requires both technical and management skills to be effective and they are equally important (Ryan, 1989; Adams, 2000; Leemann, 2002; Swuste and Arnoldy, 2003; Blair, 2004; Wu et al., 2010). However, commonly safety professionals are unable to speak the language of the business (Hill, 2006) and due to a lack of broader management capabilities are isolated from mainstream decision-making (Leemann, 2002). Safety professional's need to understand the business system as a whole and be able to communicate from the unique perspective of senior management (Adams, 2003).

Safety professionals perform below line management's expectations in management skills, strategy and organizational support (Lawrence, 2008): line managers perceive safety professionals as too technically focused, not able to view issues from the big picture, and not able to integrate programs into the organization. Wagner (2010) also found that CEO's felt safety professionals were technically proficient in general safety knowledge but lacked core capabilities around understanding business strategy, change management, and influencing skills.

Safety professionals need skills similar to line management, and traditionally many organizations have recruited safety professionals with a management background (Hale, 1995; Leemann, 2002; Wybo and Van Wassenhove, 2015). Hale (1995) warned that line managers entering safety roles retain the norms of the people they must now 'control,' lacking the independence or credibility to challenge former and future colleagues.

Blair (2004) found that safety professionals reported business acumen as a top competency needed for business survival. However, when Chang et al. (2012) surveyed safety professionals for what was required to achieve greater safety performance, the lowest ranked dimension of tasks was 'apply business principles.' Even if safety professionals must develop management skills to be effective in their role (Adams, 2003), financial and business skills are rarely taught in safety education (Hill, 2006). Safety professionals with management skills can align safety management with the organization's goals, processes and culture as well as manage their teams and resources effectively (Seabrook, 2003).

3.3. Authority

"On issues of risk and safety I think the issue is really power." – Charles Perrow (cited in Antonsen, 2009)

Safety professionals relate to others through the use and leverage of formal authority to progress their firm views about safety. Line management has the authority for most decisions in an organization, however, senior management and safety professionals determine safety processes that bound these decisions. Power is an issue in safety management more relevant than culture (Antonsen, 2009; Dekker and Nyce, 2014). Dekker and Nyce (2014) propose that power is everywhere in safety through the roles of hierarchy (i.e. line management) and elites (i.e. safety professionals). Safety professionals may have the knowledge but not necessarily the power, and conversely, line management has the power but not necessarily the knowledge (Borys, 2000). Borys (2000) argues there is the potential for safety improvements to fall through this knowledge-power gap. A safety professional should enable the safety knowledge of line managers to continuously develop to align knowledge with hierarchical power (Borys, 2000). However, organizations should also ensure that safety professional empowerment and authority does not result in the marginalization of local system specific safety expertise held by the workforce (Almklov et al., 2014). A safety professional's power and authority to exert influence in organizations is an important

and complex issue with advantages and disadvantages for safety management. Except for the study conducted by Daudigeos (2013), there is limited research on safety professional power within organizations.

Line managers, particularly senior management holds high levels of formal and informal power in safety, which can easily suppress the concerns of safety professionals in the organization. This power and accountability dynamic between the safety professional and line management has been further imbalanced by Company Officers due diligence obligations and individual criminal liabilities in all developed countries (O'Neill and Wolfe, 2014). Dekker and Nyce (2014) argue that if there if safety in power than line managers should give more of it to those below including workers and safety professionals who together are most likely the best placed to develop safety solutions. A safety professional needs to develop their formal and informal power and authority to influence and 'talk truth to power' (Dekker and Nyce, 2014). There is vigorous debate in the literature about whether and how much formal authority a safety professional should have. Sources of formal authority that enable safety professionals to make decisions or have decisions made in their favor include senior management, safety systems and rules, and decision rights (formal rights of sign-off and veto).

3.3.1. Senior management

Through their access at many levels of the organization, safety professionals use senior management authority to sanction advice and decisions that apply to middle management and the front-line workforce. Safety professionals get 'buy in' from senior management to strengthen their authority over line management and then further use regulation and audit strategies to influence them (Olsen, 2012). In some cases, safety professionals use a strategy of making line management performance visible to top management (e.g. overdue corrective actions), and base most of their advice on reactive information (e.g. incidents, audits, and regulation change) rather than proactive insights (Olsen, 2012).

3.3.2. Safety systems

Safety professionals use the formal authority of the company's safety systems and rules that they devise and administer to support decision-making in their favor. This source of authority is the practical expression of bureaucracy in the earlier section on institutional factors. Safety professionals rely most on the authority elicited to them and their advice through the organization's safety systems and bureaucratic processes (e.g. safety reporting, incident investigation, and audit) (Olsen, 2012; Daudigeos, 2013).

Olsen (2012) argues that safety professionals have difficulty influencing decisions because they are placed on the sidelines of the organization. While she found that safety professionals have three parts to their role - advising management, safety management systems, and regulatory compliance – their political strategies to influence decision-making in the organization mostly followed and leveraged their available bureaucratic safety processes (Olsen, 2012). Safety professionals use their technical knowledge as power over managers to create dependency as well as maintaining tight control over safety processes (Blewett and Shaw, 1996). In this role, the safety professional can use the safety system to play the role of 'doctor' and the line manager the 'patient' who receives a diagnosis and recommendation without question (Broberg and Hermund, 2004).

3.3.3. Decision rights

Woods (2006) argues in support of the safety professional having sources of formal authority to make decisions about safety investment and to review and approve operational decisions. Cameron et al. (2013) identified aspects of the safety professional's role that resulted in lower accident rates and some related to the authority of safety professionals. Safety professionals that had the authority to give instructions to the front-line workforce had half the accident rate than those who just advise line management. Organizations, where the safety professional vetted and approved sub-contractors as part of their role, had lower accident rates. Cameron et al. (2013) propose that safety professional formal authority and involvement in operational decision-making are the factors that improved safety performance.

3.3.4. Limitations of authority

There is a wide critique in the literature of safety professionals relating to others through formal authority based on two main arguments: less optimal and sustainable decisions and marginalization of local expertise.

Unilateral mandates from a safety professional are usually short-lived, operationally problematic and require constant monitoring (Hale, 1995). This directive approach relying on bureaucratic enablers creates adversarial relationships with line management and the workforce. While consensus and alliance based approaches require more time, they create better and more sustainable long-term solutions (Walters, 1999). Through using formal bureaucratic strategies, safety professionals are not able to convince management that they should increase the safety standards above that required for regulatory compliance and the safety professional mainly works on systems and processes to improve safety (Olsen, 2012). Safety professionals with formal authority over safety decisions may lead to less optimal operational and safety outcomes. Safety professionals should justify their advice and input into organizational decision-making in ways beyond senior management sanctions and safety system requirements.

One concerning potential consequence of a safety professional utilizing formal authority is that the 'knowledge' generated by a safety professional might displace or marginalize existing local or system specific safety knowledge embedded in operational practices (Almklov et al., 2014). Almklov et al. (2014) provide case studies in the marine and rail industries where they observe discourses based on generic approaches to safety management that result in a disempowerment of the workforce and their perspectives. The safety professional has 'model monopoly' over 'safety management' and leads to the worker feeling powerless (Almklov et al., 2014). A safety professional's formal authority and the development of the resulting safety bureaucracy based on generic international standards shifts power and authority from the workforce and even line management towards safety professionals, regulators and third parties to the detriment of front-line system specific safety expertise (Almklov et al., 2014).

3.4. Influence

"A safety professional needs to bring relevant information and be heard by the organization." – Woods (2006)

Safety professionals influence organizational decision-making through providing advice for decisions that others are making, as well as how they create pre-conditions in the organization that influences decision-making without direct involvement. Safety professionals need to know how to navigate the organization and involve and get the support of the right people to influence decision-making (Broberg and Hermund, 2007). Many safety professionals are unclear how to influence others within companies and are frustrated by giving, as they see it, good professional advice that is not followed or implemented (van Dijk, 1995). Swuste and Arnoldy (2003) suggest that the safety professional's personal effectiveness and ability to influence and stimulate others are as important to safety as formal management systems. Wagner

(2010) found that Chief Executive Officers of organizations commonly believe that safety professionals lack the requisite influencing skills and the ability to get things done in their organizations.

The most comprehensive research on safety professional influence was conducted by Daudigeos (2013) to understand how they enact practical agency to maneuver around formal constraints within their organization. The findings of the study conclude that safety professionals rely on 'relational-legitimacy building,' (external networking and references from other organizations) 'unobtrusive influence tactics' (adaptive framing of issues by selectively using managerial, administrative, accounting, legal, technical, and moral arguments to legitimize and promote safety) and 'use of symbolic enablers' (circulating an anecdote that speaks in favor of the practice they are trying to promote and touting the actions of individual managers building 'local heroes'). Internal networking is used to leverage the formal authority of others, which compensate for limitations in a safety professional's formal authority and if the safety professional meets resistance than they quickly change to an argument based on the risk of legal repercussions (this finding is consistent with Olsen, 2012).

The safety professional has a role in undertaking actions that are targeted to create the preconditions and expectations for others to act in a certain way (Reiman et al., 2014) and this fosters positive safety attitudes that stimulate middle managers to apply safety processes (Wybo and Van Wassenhove, 2015). In this way, the safety professional is the teacher of employees and management about safety (van Dijk, 1995). A safety professional can support the ongoing development of open and respectful communication about safety through honest story-telling and personal vulnerability (Forck, 2010). In this way, safety professionals need to be the courageous, open and honest person that they preach about when they talk about safety culture. Blewett and Shaw (1996) found that safety professionals that enabled individuals to make safety decisions and create change for themselves reduced their formal authority over processes but increased their informal socially constructed power to influence.

When safety professionals are unable to influence what they think are the right things for safety due to organizational and social constraints of cost or culture, it can lead to deep cognitive dissonance, guilt, and disillusionment (Watchter, 2011). A survey in the United States identified safety professionals as number 5 on the list of jobs where workers hate their bosses (Johnson, 2014). Johnson (2014) argues that while most line managers do not know what safety professionals do, they do not support, don't listen, reject ideas, and don't want to spend money on safety. Safety professionals complain, vent, insult line managers from a safe distance and consequently 'stress-out.' Two-thirds of safety professional's that reported 'hating' their boss also reported high job stress indicating that extreme frustration festers without resolution when safety professionals have unsatisfying experiences influencing others (Johnson, 2014). Safety professionals influence others through relationships, interpersonal skills and understanding organizational context.

3.4.1. Relationships

The relationship between the safety professional and the line manager making a decision is important for the safety professional's ability to influence decision-making. Who safety professionals are, and the way they engage with others is as important as formal structures (Swuste and Arnoldy, 2003). A safety professional needs to develop credibility and trust within their organization to exert influence (Stalnaker, 1999). Their level of credibility and trust are determined by line management and the worker's perceptions of, knowledge and expertise, openness and honesty, and concern and care (Peters et al., 1997).

Two studies have been conducted into trust between safety professionals and others in the organization. Pryor (2014) studied the relationship between safety professionals and line managers and found trust to be a key factor in their level of influence. She found that trust from a line manager's perspective takes time and is based on the safety professional's track record, technical knowledge, interaction with others and personal attributes. These personal attributes include, being upfront and honest, not playing politics, straight talking, sorting the 'wheat from chaff', handling pressure, taking control in crisis, showing initiative, calling the shots, personal grunt, a positive 'can do' approach, being a good communicator, and high emotional intelligence (Pryor, 2014).

Conchie and Burns (2009) studied workers trust in information sources and the resulting impact on workers safety behavior. Workers trusted the safety professional more than their project manager, supervisor, and workmates when it came to communication about a safety risk and self-reported that their intention to change risk related behavior was greater following communication from safety professional than communication from other sources (Conchie and Burns, 2009). These findings are similar to a study conducted in Australia that found safety professionals have the strongest influence on site safety, followed by supervisors, then workmates (Dingsdag et al., 2008). Conchie and Burns (2009) conclude that the three-dimensional model of, belief in knowledge and expertise, open and honest, caring and concerned for others, does influence the level of trust in the safety professional.

3.4.2. Interpersonal skills

Safety professionals are unlikely to be able to develop long, trusting relationships with each of the line managers making decisions within the organization. The relationship divide may be able to be bridged by a safety professional with well-developed interpersonal skills that can create a constructive trusting environment in a first-time conversation. A safety professional requires a broad and well-developed set of interpersonal skills to be effective at influencing others (Swuste and Arnoldy, 2003). Swuste and Arnoldy (2003) suggest that these interpersonal skills include communication, negotiation, facilitation, problem-solving, decision-making, and assertiveness. The technical skills of a safety professional can be considered necessary threshold competencies. However, it is their interpersonal skills that are the differentiating competencies between effective and ineffective safety professionals (Leemann, 2005). A safety professional should present organizational facts and scientific evidence to support their advice (Johnson, 2014) and do not stretch the truth to have influence (Stalnaker, 1999). Communication skills are essential, but without credibility, they are not enough (Hill, 2006).

Except for the Chief Executive Officer, a safety professional has to be able to communicate effectively with a more diverse stakeholder group than any other role in the organization, including senior management, line management, employees, professionals, contractors, and regulators. The communication ability of a safety professional is the most important capability in determining their effectiveness in their role and ability to influence others (Stalnaker, 1999; Seabrook, 2003; Blair, 2004; Pater, 2006; Peters and Peters, 2006). Blair (2004) found that safety professionals rated 'communicating effectively' as the highest rated competency for their success. Communication skills enable a safety professional to influence others and effectively tackle the difficult situations in the workplace without becoming defensive including dealing with conflict, mediating tensions, speaking truth to power, neutralizing resistance and confronting unacceptable behavior (Pater, 2006).

Pryor (2014) found that the main reason for senior management to replace and restructure the role of safety professionals is that they do not have the interpersonal skills to influence at a senior level. A safety professional needs to bring relevant information

and have themselves heard by the organization (Woods, 2006). Clear communication skills that include the ability of the safety professional to talk the language of business are critical (Adams, 2003) however, training in such skills is missing from most courses and workplaces (Taylor, 1995). Veltri (1992) suggested that improving the effectiveness of safety professionals' communication with senior management would enable safety to move from bureaucratic compliance with regulation to influencing creating and sustaining strategic value.

Swuste and Arnoldy (2003) argued that personal influence skills are the most critical for a safety professional and they must understand: competition and cooperation, dealing with high-pressure, changing others perspectives and generating collective ownership. Peters and Peters (2006) also believe that personalities involved in safety decision-making will prevail over poorly presented and communicated analytic logic. Negotiation skills are useful for the safety professional as compromises and trade-offs are customary in all organizational systems (Peters and Peters, 2006). Safety professionals themselves identify interpersonal skills, such as communication, negotiation, and understanding human behavior as some of their top self-defined training needs (Garrigou and Peissel-Cottenaz, 2008).

3.4.3. Organisational context

Safety professionals need to intimately know how their organization functions, including organizational behavior, structure, budgeting, planning processes (Swuste and Arnoldy, 2003). However before safety professionals can get things done formally, they need to know the informal organization - the people, political interrelationships and underpinnings (Hansen, 2011). A safety professional needs to figure out what is happening within the organization at any point in time, from the concerns of senior management to the daily challenges of frontline work. The safety professional needs to at all times maintain a 'finger on the pulse' of the organization to provide useful and credible advice (Saari, 1995; Woods, 2006; Hansen, 2012).

Organizational knowledge and operational context enable the safety professional to advise and provide support as and where it is needed in a practical and effective way. Safety professionals that focus on incidents will never understand what works in normal situations and thus they need to be experts in daily work as much as the exceptions (Saari, 1995). Swuste (2008) argues that 'you will only see it if you understand it' and thus a safety professional will unlikely be effective until they understand the organization, the work, and the technology intimately.

4. Individual factors

The individual safety professional influences the performance of their role through who they are, what they know, and their career experiences. These four individual factors are: safety beliefs, domain safety knowledge, knowledge worker skills, and risk understanding are categorized as relating to either the beliefs or capabilities of the safety professional.

4.1. Safety beliefs

A safety professional's values, background, education and work experience shape their beliefs about safety, organizations and human behavior (Swuste et al., 2014). Safety professionals predominately believe in traditional approaches to safety management and focus their advice on improving bureaucratic compliance as well as the safety behavior of line managers and front-line workers (Saari, 1995; Brun and Loiselle, 2002; Broberg

and Hermund, 2004; Hill, 2006; Hollnagel, 2009; Olsen, 2012; Walter, 2012; Swuste et al., 2014; Manuele, 2016).

Hill (2006) suggested that safety professionals predominately focused on traditional safety management approaches, as they believed that "if it ain't broke don't fix it." By continuing to do the same things, safety professional's maintain their role authority and security through their understanding and competence in these methods (Hill, 2006). Hollnagel (2009) described the process where, 'what a safety professional looks for is what they find' regarding their beliefs about how to manage safety, for example, non-compliance with systems, unsafe behavior, uncommitted leadership, or poor culture.

Safety professionals are united in their belief that the human dimension (rather than technical or organizational) takes precedence for safety improvement efforts (Brun and Loiselle, 2002). Brun and Loiselle (2002) found that safety professionals see safety as an individual responsibility and a question of attitude and behavior, so they argue it is important to modify human behavior through precise work methods. Manuele (2016) stated that safety professionals have to battle the human element and those that are willing to take a risk with their safety. Safety professionals believe that people are the problem when it comes to safety management and this belief extends to workers, line management, senior management and often other safety professionals.

Olsen (2012) found that in addition to the human dimension, safety professionals are also very focused on the organizational dimension of management systems and compliance. In a survey of safety professionals in the United States, Walter (2012) identified training, additional resources and improved management support as the key things needed to improve safety to respond to the problems with worker competence, cost, and management commitment. Safety professionals believe that the following human and organizational improvements will improve safety: employee accountability and 'buy-in,' communication, online safety software, safety incentives, detailed workers compensation data, more safety equipment and more time (Manuele, 2016).

Despite the changing revelations in safety science, Swuste et al. (2014), found in a study of safety professionals in the Netherlands that human failure remained the dominant explanation for accidents. Professional publications write about accident proneness theory and company programs and safety promotions focus on topics like; instructing workers in safe procedures, more safety training, and communication about unsafe behavior (Swuste et al., 2014). This strategy focuses all safety attention and intervention on the 'user,' not the technology, workplace or organization (Broberg and Hermund, 2004).

Swuste et al. (2014) argue that safety professionals do not keep up with academic developments and are not continually researching and learning about safety. For example, the Heinrich Accident Triangle is still used in the professional domain, even though it has repeatedly been disproven academically (Swuste et al., 2014). Safety professionals believe that workers and line management are the problem and safety improvement interventions should be targeted at these individuals, through compliance with systems, behavioral programs, and safety training.

Safety professional's promoting programs to influence worker behavior is cheaper than modifications to plant or changes to the organization, and due to the institutional and relational factors described in this paper, safety professionals may not have sufficient influence to deliver more systemic improvements (Swuste et al., 2014). Safety professionals resort to safety promotion activities and other low impact strategies that do not create an impost on the organization's resources or objectives, however, nor do they improve safety (Saari, 1995).

Reiman and Pietikainen (2014) identified four dimensions of beliefs that influence a safety professionals approach to their role

as well as safety management; organizational, information and uncertainty, human behavior, and safety models of accident causation. The safety professional is seen as self-serving by measuring and advising based on their career background, industry experience or best practice instead of what the organization wants and needs (Galloway, 2013). New scientific findings in the safety science literature are hard for practicing safety professionals to handle, and they challenge their long-held beliefs about safety and their professional role (Swuste et al., 2014).

4.2. Domain safety knowledge

Safety professionals require advanced domain safety knowledge acquired through academic education and industry experience. The technical skills required by safety professionals have been documented by the International Network of Safety and Health Practitioner Organisations (INSHPO) and are based on the current role responsibilities and hazards managed by safety professional's (Pryor et al., 2015). Technical Skills enable safety professionals to advise their organization on their known safety hazards as well as to establish effective safety management processes.

Safety professionals need specific technical safety competencies due to the organizational and regulatory complexity of safety management in modern organizations (Wybo and Van Wassenhove, 2015). Many line managers are unfamiliar with the technical aspects of a safety professional's role so rely on them to have and maintain technical competence (Leemann, 2002). The safety professional role is not the place for on-the-job technical training (Leemann, 2002).

4.3. Knowledge worker skills

Safety professionals can be considered knowledge workers that provide their expertise to support organizational decision-making that solves problems and improves safety. Their effectiveness relies on their skills in the search, retention, and retrieval of safety information. Safety professionals should maintain currency and accuracy of technical information, which includes the latest academic research and practical industry application and innovation.

As safety professionals participate in and advise on a wide range of issues it could be expected that they would rely heavily on external information, and keep up to date with academic and technological advancements (Yang, 2012). Yang (2012) proposes that sourcing and critically evaluating information sources to solve daily problems is a critical competency of a safety professional. Safety professionals should apply rigorous standards of research to practical observations and conclusions (Metzger, 2011; Yang, 2012; Wybo and Van Wassenhove, 2015). Leemann (2014) proposed a mindset of mastery for safety professionals, to pursue the mastering of safety skills and knowledge. He calculated that under the 10,000 h's rule for mastery, the safety professional spending 4 h a day, 250 days a year would take ten years to obtain professional mastery. Safety professionals should be knowledgeable of current developments in safety science, seek mastery in their professional practices and be factual in advice, requests, and recommendations.

Safety professionals should say no to and stop everything that has no scientific basis, and ruthlessly pursue priorities that do (Leemann, 2014). Many of the institutional and relational factors described in this paper that potentially limit the effectiveness of safety professionals may be overcome with a scientific knowledge worker approach to their role and the advice they provide organizations.

Safety professionals have historically, and still currently rely on old, erroneous or incomplete information (Ryan, 1989), out-dated beliefs (Walter, 2012) and refer to lay theories and folk models of human behavior (Reiman and Pietikainen, 2014). Dejoy (1993) found that the second lowest amount of safety professional time was spent on the task of "conducting research studies into technical safety problems." Laduke (2011) requested safety professionals stop doing a number of things which have no empirical basis and that undermine the profession's credibility: children's safety poster contests, celebrating good injury management that lowers statistics, comparing organizational incident rates to industry averages that ignore human suffering, and 'blame the worker' mind control behavior based safety programs.

Safety professionals need to never stop learning (Metzger, 2011; Pearson, 2016). The safety professional is a knowledge worker and has to continuously keep acquiring new knowledge, or they become obsolete (Manuele, 2003). Hill (2006) argues that knowledge is not information - information is what is in the newspaper, knowledge is gained through formal education and its practical application. Safety professionals should be able to cite research and best practice alongside their requests, advice, and recommendations (Hansen, 2012; Johnson, 2014).

4.4. Risk understanding

Safety professionals require an expert critical understanding of the nature of risk – how it emerges, changes, and is understood, mitigated and monitored within organizations. This risk competence of safety professionals will ensure that their advice, influence and the allocation of organizational resources is directed towards the most important safety improvements for the organization. Safety professionals need to be experts in risk, including both the technical assessment as well as the social construction of risk (Saari, 1995; Pearson, 2016).

A safety professional needs to understand that risk and safety are not rational processes from identification to evaluation, to prevention and overdone rationalism may lead to totally false recommendations (Saari, 1995). Saari (1995) suggests that safety professionals should focus on the effectiveness of preventative measures and not the size of the risk. Safety professional's need to use their technical knowledge as a basis for risk assessment as well as know what works socially within their organization (Saari, 1995).

5. Conclusion

Safety professional practice is influenced by twenty-five institutional, relational and individual factors that combine and re-combine to determine the nature and practice of their role within organizations. Thus the role of a safety professional is socially and organisationally complex. Except for the study conducted by Hale and Guldenmund (2006) with 5495 participants in 12 countries, there is a dearth of reliable empirical research on safety professional practice within organizations. This lack of research may be resulting in their reduced effectiveness at improving safety, thus exposing the working population to a greater risk. This risk can be evidenced by fatality rates in most of the developed world not declining over the past five years (Borys, 2015; Manuele, 2016) which suggests there is an opportunity for new theories and models of safety professional practice.

5.1. Practical implications

The following practical implications provide a platform for safety professionals and their organizations to review their current approaches.

(1) Increasing goal based regulation and company officer liability management have driven growth in safety compliance activity that dominates the tasks of safety professionals. This type of 'controlling' activity (i.e. systems, reporting, investigation, and audit) negatively impacts; relationships, the focus on safety risk, and the achievement of the cost and production objectives of line management and the front-line workforce.

(2) There is a significant range of safety professional job titles and job designs, which lead to confusing individual objectives and evaluations of their performance. Organizations lack clarity on their safety goals more broadly and the specific role of the safety professional in achieving them.

(3) Safety professionals can influence the safety culture of their organization through the way that they conduct themselves in open, engaging and participative ways with line management and the front-line workforce.

(4) Organizational safety structures and resourcing levels impact safety performance measured through injury rates:
   a. Internal resources are more effective than external resources (i.e. consultants)
   b. Interaction with senior management and participation in management forums is necessary
   c. Accident rates reduce up to a resourcing ratio of 1:50 (safety professional to workforce) in operational environments (i.e. construction) however what they do is equally important
   d. Accident rates can double when site-based safety professionals formally report to site management, as opposed to an off-site senior safety professional, as acute production and schedule pressures can compromise their role.
   e. Accident rates reduce when additional responsibilities (i.e. environment) are added to a safety professional's role.

(5) Centralized organizational safety structures increase role independence and safety organization alignment, however, reduces operational involvement in decision-making, the effectiveness of interpersonal relationships and line-management influence.

(6) Safety professional 'whistleblowing' to senior management within organizations, damages relationships and is unlikely to lead to positively influencing safety outcomes. Organizations should foster an environment that values 'challenge' and the open raising of concerns enabling safety professional to be supported and rewarded for expressing differing viewpoints.

(7) Safety professionals that align safety objectives and activities with other organizational strategies, targets and business processes are effective at stewarding and sustainably improving safety.

(8) Safety professionals need to effectively communicate with, and support all of the objectives of line management and the front-line workforce, facilitating alignment between parties.

(9) Safety professionals relying on authority (derived from the formal role, senior management or safety systems) to influence safety is less effective with both line management and the front-line workforce than alliance based relational strategies.

(10) Effective influencing requires safety professionals with; strong inter-personal relationships built on credibility and trust, advanced communication skills, and expert organizational knowledge and operational context.

(11) Safety professionals believe in traditional approaches to safety that is focussed on improving; human behavior (of line management and the front-line workforce) and organizational safety systems.

(12) Safety professionals require expert level; domain safety knowledge, knowledge worker skills and a critical understanding of the technical and social nature of risk.

5.2. Further research

Future research should focus on empirically understanding the complexity of safety professional roles and practice. The review raises two specific questions, that require further empirical investigation to answer, and the results of which would enable the design of experimental research.

(1) How do the role shaping factors identified in this review interrelate to influence safety professional practice?
(2) How can the effectiveness of safety professionals be evaluated?

In 1978, the Commission of the European Communities stated that safety professionals must have: technical knowledge of the company's field of activity, analytical skills, the ability to synthesise and sell as personal qualities that facilitate interpersonal relations, cooperation and teamwork, and a general knowledge of psychology, sociology, and management (Brun and Loiselle, 2002). This framework is almost 40 years old and based on the relational and individual factors identified in the literature since, contains a more complete model of the capabilities required by safety professionals than more recent descriptions. It seems we have advanced little in our understanding of safety professional practice in almost 40 years. Subsequent partial models of 'safety professionalism' and 'safety education' may have resulted in degradation of safety professional effectiveness over recent decades.

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