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Occupational Health and Safety Management in Organizations: A Review

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In examining the research literature on occupational health and safety (OHS), this paper argues that the growth in the number of specialists in OHS has resulted in an emphasis on policy and practice away from more scholastic concerns previously addressed by academics in the disciplines of psychology and sociology. A hiatus has occurred, and this is evidenced by the general absence of studies in management, even though OHS is increasingly seen as a key operational and strategic concern of business organizations. The authors call for OHS to be placed firmly on the research agenda of management scholars, and advocate the need for greater conceptual development, empirical study and theoretical reflection to complement existing pragmatic concerns of OHS specialists. In this review, the contributions of psychology, sociology, industrial relations and management studies are assessed, and five categories of specialist OHS literature are analysed, namely: prescriptive; systematic OHS management; success based; error and disaster based; and culture, climate and high-reliability studies. The conceptual and methodological limitations of this specialist focus are discussed, and future research opportunities are highlighted, for which the authors argue that management scholars embrace a range of methodological approaches. The authors advocate the value of extended case studies which examine OHS in context and over time in particular workplace settings. There remains considerable scope to develop this field further and, in conclusion, particular attention is drawn to the value of process-oriented contextual approaches for understanding OHS management in organizations.

Introduction

Studies on occupational health and safety (OHS) management have tended to cluster in certain areas during historical periods of time, focusing on, for example, policy and practice, individual characteristics and social relationships, events and incidents of injuries and accidents, and management control and industrial relations (Quinlan *et al*. 2010). Early research by psychologists and sociologists examined individual dispositions and social causes using disciplinary frameworks in developing concepts and theoretical insights into OHS (Dawson and Zanko 2011). These findings were further enhanced by the results of workplace surveys by industrial relations specialists that drew attention to the importance of legislation and innovative non-regulatory as well as regulatory strategies (Nichols *et al*. 2007). Expertise in OHS flourished, and a more pragmatic focus emanated from students and practitioners of OHS who sought practical solutions to real-life problems (Reese 2008). The prescriptive literature now dominates, with a focal point on tools, techniques and practices rather than on definitions or concepts, or any systematic engagement with comprehensive empirical studies that serve to inform theoretical debate (Hughes and Ferrett 2009; Lewis and Thornbory 2010). The consequence of this historical development has been a hiatus in more holistic, multidisciplinary research that combines theoretical concerns with empirical study.

The absence of OHS research in management studies – while understandable, given the specialist emphasis – spotlights this gap in the research agenda which is worth further consideration. Organizational researchers are well placed to take up this challenge in using a more multidisciplinary approach and in applying a range of research methodologies (quantitative, qualitative and mixed methodological approaches) in the study of OHS management in organizations. This is perhaps most evident in the sub-field of human resource management (HRM), in which OHS is not only a major component of the HRM function, but increasingly is associated with the achievement of operational efficiencies and competitive advantage (Boyd 2003). We argue that greater attention needs to be given to the study of OHS by management scholars, especially in areas not being addressed by the more specialist and pragmatic concerns that currently service the field. In developing this argument, we commence with a review of studies in work psychology, sociology and industrial relations. This is followed by a discussion of the general absence of OHS management in the management literature. We then turn our attention to the mainstream OHS literature reviewing: prescriptive, systematic, success-based, disaster-based and the culture, climate and high-reliability studies. Following these reviews, we advocate the need of a more contextually based narrative perspective in furthering the research agenda for OHS management. We conclude by calling for academics within the management discipline to engage more fully with this topic in developing specialist knowledge and theoretical insights.

Work psychology, industrial relations, sociology of work and management studies

Organizational and industrial psychology, occupational psychology, industrial relations and industrial sociology have all contributed to understanding of the structure and operation of organizations and the reasons for workplace injuries and causes of occupational illness. This section outlines some of the major findings and approaches advocated by studies in these areas and highlights the scarcity of research in the field of management.

Studies in work psychology

Following the early research of Heinrich (1931), there have been a number of psychological studies which have identified work as a major cause of psychological and physical ill-health (for example, Kemery *et al*. 1987). Using social psychological theories (Fishbein and Ajzen 1975), a causal relationship was assumed to exist between attitudes and behaviour (McKenna and Hale 1982). Until the 1990s, a dominant view was that, by changing attitudes, safety can be improved and OHS performance enhanced; for example, Donald and Canter (1994) highlight the significant correlation between attitudes to safety and accident rates. As Quinlan *et al*. (2010) point out, early psychological studies tended to focus on a small number of problem areas in which the primary interest was on the individual – in terms of cause and prevention – rather than with the social group or work environment. In this formative work, it was not the system that was deemed to be at fault, but the individual in their failure to take responsibility for health and safety (Glendon *et al*. 2006; Rechnitzer 2001). Solutions were thereby aimed at the individual, promoting stress management guides to support employees in managing their own circumstances, as Hale (1995, p. 235) notes: 'traditionally the occupational physicians and occupational psychologists/personnel experts have based their expertise on the individual'.

The last twenty years have witnessed a distinct movement away from a focus on the individual to a concern with the individual and the working environment in which they find themselves (Cox and Cox 1996; Weyman and Clarke 2003), with an emphasis on causation (Reason 1995) and intervention (McAfee and Winn 1989). For example, in an examination of occupational injuries, Iverson and Erwin (1997) argue that these can be attributed to two causes; namely, the characteristics of the work environment (work practices) and the characteristics of the individual. With regard to the former, initiatives aimed at improving the safety of working environments have achieved some success (Oliver *et al*. 2002, p. 473). whereas on the latter, research on psychological and behavioural characteristics have had mixed results in their attempts to identify factors that predispose an individual towards injury (Iverson and Erwin 1997, p. 113). In studying individual personality traits, Clarke and Robertson (2005, p. 371) found that, while extraversion was a valid predictor of traffic accidents, they could not identify a strong association between personality dimensions and occupational accidents, suggesting the need for further research on the relationship between personality and safety climate. Interestingly, studies have

found that most errors in human judgement do not result in serious accidents and that the rarity of actual accidents further promotes risk-taking (see Barkan *et al*. 1998, p. 140).

In reflecting on a shift in research focus, Wallace *et al*. (2006, p. 681) note how the old belief that certain individuals were more prone to accidents than others is being replaced by a new position that views human behaviour and unsafe behaviours as 'symptoms and not direct causes'. Research by Zacharatos *et al*. (2005) into the relationship between high-performance work systems and occupational safety also illustrates the importance of organizational factors in ensuring worker safety. They demonstrate how this relationship is mediated by trust in management and perceived safety climate and should no longer be assumed to be 'the primary prerogative of individual workers' (p. 89).

The costs of major disasters such as Piper Alpha highlight the importance of safe management practices, behavioural responses and work climates (Reason 1990, 1995). In discussing the psychological, situational and organizational factors that influence compliant and non-compliant behaviour, Reason *et al*. (1998) spotlight the limitations of the various procedures, rules and regulations that are devised to restrict individual behaviour. Their study also draws out some of the difficult issues in managing safety when success is measured by the absence of damage, lost time injuries or fatalities, and when accidents and near misses are comparatively rare (Reason *et al*. 1998, p. 289). They conclude that there is a need to go beyond prescriptive procedures in developing more social and self-controls.

People's motivation to attend to safety issues can vary over time, as illustrated by the two longitudinal studies of project completion by Humphrey *et al*. (2004). They found that concerns with safety were most in evidence at the start and completion of projects and that there was a noticeable decline in resources dedicated to safety in the middle of projects. There is a focus on task completion during the middle stages, and more risk-averse behaviour is in evidence as a project nears completion (Humphrey *et al*. 2004, p. 17). These studies illustrate the ongoing dynamic between individual behaviour and the place and context under which decisions are made. For example a number of studies have shown how a poor safety climate reduces compliance with safety procedures and, as a consequence, increases accident levels (Griffin and Neal 2000; Hayes *et al*. 1998). In examining these issues over a 5-year period, Neal and Griffin (2006, p. 952) conclude that: 'organizations attempting to improve safety should focus on changing the work environments to motivate people to actively participate in safety activities, rather than simply blaming and punishing individuals who fail to comply with standard work procedures'.

Later studies in work psychology have turned their attention to broader workplace issues, such as the development of safety cultures or climates that promote safe working and reduce accidents (Burke *et al*. 2011). For example, Hale *et al*. (2010) examine and evaluate culture intervention strategies, while Bjerkan (2010) analyses the relationship between culture and climate and occupational accidents. We return to these and other studies in a later section on culture, climate and high-reliability organizations (HROs).

Studies in industrial relations and industrial sociology

Within industrial relations and the sociology of work and health, the focus is not on the individual but in the way work is organized and controlled. In moving away from the highly individualized notions of health, these studies draw attention to the context in which behaviour patterns occur and are reinforced, and to the importance of social relationships. The failure of prescriptive programmes – based around the individual – to effectively deal with problems of occupational illness and injury and the tendency to see the fault as resting in the behaviour of the individual rather than social factors, highlighted the need for broader sociological research. These studies focus on the social causes of ill-health and injury and in particular, on patterns of work and forms of work organization (Dwyer 1991). The negative health effects of non-standard work patterns (including shiftwork and extended hours) have all been well documented and are now regularly taken up by groups that represent employees, such as, trade unions and other work associations.

Within the field of industrial relations, workplace risk is an area of concern that is often highlighted through statistical analysis of workplace surveys. For example, Dennis and Guy (1995) used the 1990 Workplace Industrial Relations Survey (WIRS) to analyse the size of employment unit and injury rates in the British manufacturing sector and found that employees in larger establishments have a lower probability of being injured. One explanation for this is that larger firms may have greater resources to

address these issues and more incentive in being aware that they are more likely to be assessed by health and safety inspectors. Union density has also been equated with levels of workplace risk, as individual employees are less able to bargain over broader safety issues and exhibit less permanency (in changing jobs and employment) than unions who are also better resourced to collect information and negotiate over improvements in safety (see Weil 1999). In a reanalysis of WIRS data, Nichols *et al*. (2007) uncover evidence supporting the claim that trade union involvement and employee representation improves health and safety provision in the workplace. They spotlight the inferiority of unilateral management approaches to OHS and recommend that regulations be strengthened to further promote representation, especially in areas where there is a current absence of involvement (Nichols *et al*. 2007, p. 222). Subcontracting, particularly in smaller site operations, is one area that has been prone to poor representation and one in which a higher concern of hazards has also been noted (Brenner *et al*. 2004). In a study of subcontracting in the UK and Australian residential building industry, Mayhew and Quinlan (1997) found that poorer OHS was related to the high level of subcontracting in this industry. In an examination of subcontracting in US petrochemical plants, Baugher and Roberts (1999) found that contract workers' fear of job loss made them more vulnerable to hazards (chemical exposures and explosions) than direct-hire employees.

It is perhaps ironic that the number of injuries reported in unionized workplaces is generally higher than in non-unionized settings, although this is probably due to more robust accident-reporting systems in conjunction with the greater prevalence of unions in high-risk industries (see Nichols 1997). In the US, Weil (1999) discovered that unions are effective in promoting the establishment of health and safety committees, and Eaton and Nocerino (2000) show how unions can use these committees as a vehicle for significantly improving injury rates at work. In their study of the effectiveness of OHS committees in the public sector of New Jersey, they found that there were fewer reported illnesses and injuries in cases where there is a high level of worker involvement. However, they conclude that committees are not enough by themselves to improve safety at work but, rather, require the involvement and commitment of employers (especially in terms of resource provision) and worker involvement (Eaton and Nocerino 2000, pp. 288–289). These findings align with Markey and Patmore's (2011) 70-year historical analysis of the effectiveness of employee participation in safety committees in an Australian steelworks, where despite significant limitations to effectiveness, major reductions in time-lost injuries were achieved through a 'top-down' approach based on leadership and engaging the whole workforce in OHS improvement.

Using data from the 1998 Workplace Employee Relations Survey, Fenn and Ashby (2004) found that unionized organizations with established health and safety committees had higher levels of workplace risk in terms of the reported counts of work-related injuries. They conclude that this higher level of reporting is due to unionization and the effective operation of health and safety committees that have dual roles: first, as channels for complaints and concerns about hazards and unsafe working practices and, second, as a way of securing compensation for a work-related injury or illness (Fenn and Ashby 2004, p. 478). As such, the full reporting of incidents demonstrates good risk-management practice rather than, as might appear on first viewing, that highly unionized firms with operational health and safety committees are higher-risk environments than their non-unionized counterparts. This in turn highlights the need for caution in extrapolating explanations and causality from a simple analysis of raw data on reported injuries and illnesses.

Walters (2004) reviews the role that representative worker participation can play in contributing to better health and safety in small enterprises in Europe. The effective practices for tackling OHS in large organizations are not seen to be transferable to the small enterprise where the organization and culture of work raises a whole set of different issues. For Walters, it is not simply a question of poor management, as other vulnerability factors come into play, such as the psychological insecurity associated with the weakness of organized labour, economic vulnerability and concerns over job security, the lack of regulation and the amount of illegal work that takes place in this sector, the low levels of inspection and enforcement, and the disproportionate representation of disadvantaged groups. He advocates representative participation (see also Walters 2000) and support from employers, trade unions, regulatory inspectors as well as structures and procedures that 'exploit such things as face to face contact and/or support networks in the small business environment to amplify, support and sustain their messages' (Walters 2004, p. 181).

Brooks (2001) usefully captures the changing philosophy behind health and safety legislation from the 1970s to the early 1990s, where the initial focus was on the specification of standards, to the shift towards questions on how best to achieve an acceptable standard of care. This movement from legislative requirements to risk management and best practice guidelines draws attention to the need to evaluate the future potential direction for change. For example, Johnstone *et al*. (2005) examine the implications of the growth in more flexible work practices for employee involvement in OHS. They argue that structural change associated with the decline in union density, the growth in casual and home-based work, and increases in subcontracting have all served to undermine the provision of OHS arrangements (see also Fenn and Ashby 2004; Quinlan and Mayhew 2000; Walters 2001). They contend that there is a need to address these issues in the development of new and innovative regulatory and non-regulatory strategies, such as in the use of mobile representatives to represent workers' interests in these newly emerging forms of small dispersed workplaces, whereas Bain (1997, p. 176) spotlights concern over the tendency for powerful business groups to lobby governments over the so-called 'business constraints' of health and safety legislation'.

The management literature on OHS management

Several years ago, Boyd (2001, p. 439) observed that '[g]iven that health and safety is a key area covered by HRM, it is surprising that it receives minimal coverage (or none at all) in key HRM texts and journals'. Typically, OHS is often treated in the HRM journals as one of a number of HRM variables in studies concerned primarily with other phenomena. For example, in their survey of 39 US services firms (out of a total of 1500 initially surveyed) to assess the effectiveness of high-performance work systems, Varma *et al*. (1999) found that, among a bundle of 11 effective organizational culture practices, improved workplace safety can lead to improved operations; how is not explained. Boselie *et al*. (2003) studied the relationship between HRM and firm performance in three sectors in the Netherlands: health care, tourism and local government. While two of the three dependent HRM performance variables used concerned absence (OHS-related at least in part), the independent variables selected to capture HR control systems did not include OHS.

A major trend in HRM research has been the growing interest in the relationship between strategy and HRM, based on the assumption that human resources and their management contribute significantly to sustainable competitive advantage for organizations. Without exception, OHS and OHS management are excluded from the operationalization of this relationship in terms of policy or practice (Boxall and Purcell 2008; Colbert 2004; Collins and Clark 2003; Hendry 1995; Salaman *et al*. 2005), except as an efficiency rather than effectiveness input (Becker *et al*. 2001), a societal performance indicator (Paauwe 2004) or an input into employee participation (Leopold *et al*. 2005). Thus as Boyd (2003) highlights, OHS remains surprisingly absent from the mainstream management journals and HRM texts.

The social science legacy: blame the victim or blame the system?

The legacy of this social science research is captured in the tendency for psychological studies to 'blame the victim'; for sociological studies to 'blame the system' (see Glendon *et al*. 2006, p. 2) and for management studies to remain largely silent on these issues. We argue that there is an opportunity for management research which is not limited by a narrow disciplinary focus, but is able to provide a robust conceptualization and more holistic framework in studying OHS management in context and over time in organizational settings. There is a need to move beyond piecemeal studies on practice that are theoretically underdeveloped as well as the more theoretically informed psychological and sociological frames which, while providing useful and complementary lenses from which to further identify, recognize and explain issues around health and safety at work, are not sufficient in themselves. As such, we need to examine individuals in work settings, the social relationships that exist at various levels, the workplace and business environment, regulatory practices and daily operating procedures, as well as the tasks and activities that occur within context and overtime. In so doing, we should also pay attention to the sense-giving and sense-making processes that shape behaviours at work in a broader conceptualization of OHS management in organizations. We return to these issues later, but first we review studies within the mainstream OHS literature.

OHS literature

From reviewing the specialist OHS literature, five main categories emerged, consisting of prescriptive literature, systematic OHS management studies, success-based studies, error and disaster-based studies, and culture, climate and reliability studies. These vary greatly in terms of the conceptual depth and empirical understanding that they shed on OHS management. Each is discussed below.

Prescriptive OHS management literature

Much of the OHS management literature is prescriptive (Smallman 2001; Wallace and Ross 2006). It is populated largely by textbooks directed at students and practitioners in OHS. Consequently, they are not empirically grounded representations of what constitutes OHS management, nor are they conceptualizations that are verified or validated through systematic field study; rather, they are their respective authors' attempts at ordering concepts, tools, techniques, technologies and insights (for example, Archer *et al*. 2009; CCH Australia Limited 2009; Cox and Cox 1996; Ellis 2001; Fuller and Vassie 2004; Geller 1998; Grimaldi and Simonds 1989; Hammer 1985; McSween 1995; Mol 2003; Montero *et al*. 2009; Petersen 1978, 1996; Roughton and Mercurio 2002; Vogt *et al*. 2010). This is also the domain of government prescriptions, codes of practice and advisory pamphlets (such as those put out by the NSW and Victorian Workcover authorities in Australia and the Health and Safety Executive in the UK); national standards promulgated by national bodies (see for example, Australia's AS/NZ 4801 *Occupational Health and Safety Management Systems – Specification with Guidance for Use* and the UK's BSI-OHSAS 18001 *Occupational Health and Safety Management Systems – Specification*); and proprietary OHS programmes and systems, such as DuPont. Fundamentally, they endeavour to tell us what OHS management should be, rather than what it is. For example, Petersen (1978) provides a set of safety management recipes that address safety concepts, managing safety performance, measuring safety performance, motivating safety performance, plus additional safety techniques. Hammer (1985), on the other hand, adopts an engineering approach to safety management with a greater focus on describing specific hazards (such as acceleration, falls, falling objects, pressure hazards, heat and temperature, electrical hazards, fires, explosions, vibration, noise, radiation and toxic hazards) and the technical means for their control. For their part, Grimaldi and Simonds (1989) organize their treatment of safety management in five parts: the advancement of safety, managing and safety management, hazard control technology, human factors and professional areas.

These different OHS management prescriptions are by no means unsophisticated in their analysis. The constituent parts draw widely upon OHS research findings and case examples to describe and explain key points. For example, Cox and Cox (1996) employ a sociotechnical systems approach in their predominantly psychological treatment of OHS management. Ellis (2001, p. xvi) formulates organizational health and safety as 'action by workplaces to improve the health of workers, customers and communities', and seeks to integrate with a risk-management approach for hazard and harm prevention. In a similar vein, Fuller and Vassie (2004) use a general risk-management framework and propose a best-practice approach as a basis for ordering and managing OHS. In recent years, the increasing emphasis in this body of work on risk-management concepts and methods, multidisciplinarity and on a broader, systems approach to understanding OHS and its management, has also been reflected in the other categories of the OHS research literature.

Systematic OHS management studies

Over the last twenty years, there has been a growing body of literature on what appears to be a global trend in the adoption of systematic OHS management (see for example, Bluff 2003; Borys 2000; Frick *et al*. 2000; Gallagher *et al*. 2001; Saksvik and Quinlan 2003; Vinodkumar and Bhasi 2011). According to Frick and Wren (2000, p. 19), systematic OHS management 'aims to identify sources of injury and ill-health early in the production process and to produce countermeasures before injury or ill health occurs'. They view this as an outgrowth of quality management's emphasis on enacted managerial responsibility, as well as integrated, systematic production management. Bluff (2003, p. 1) asserts that effective risk management lies at its core, namely, 'the systematic identification of hazards, assessment and control of risks, evaluation and review of risk control measures to ensure they are effectively implemented and maintained.' Given the acknowledged breadth and looseness of the above definition, systematic OHS management is found in a variety of mandated and voluntary forms and at a number of different

environmental levels (international, national, state, organizational). Bluff (2003, p. 5) identifies how systematic OHSM is variously mandated by public regulation in a number of countries as well as by the European Union under its Framework Directive, and notes how there has been a 'proliferation of corporate systems, proprietary products, standards, guidelines and certification tools'. Given such diversity, it is hardly surprising that systematic OHS management is also difficult to operationalize. Nevertheless, based on a number of standards and guidelines from a number of countries, Bluff (2003, p. 7) identifies a number of core elements consisting of: 'integration of OHSM into other business activities; management commitment; OHS policy; planning and resourcing of OHSM; designation of responsibility and mechanisms of accountability; policy; procedures and documentation; risk management; worker participation; development of OHS competency; reporting, investigating and correcting deficiencies; and monitoring, auditing and reviewing OHS performance'. In a similar manner to Bluff, Gallagher *et al*. (2001) assert that senior management commitment, effective communication, employee involvement and consultation are critical for effective OHS management systems (OHSMS). How this occurs within an organization is not discussed.

From this brief review, it is evident that studies on systematic OHS management largely lack detailed insight into its holistic form and implementation. For example, although the work of Wokutch and VanSandt's (2000) provides an interesting comparison of the DuPont OHS management and Toyota's total-quality-management-driven OHS system, their analysis is limited. The lived experience of those involved in the processes of installing, operating, maintaining and adapting systematic OHS management within the organization, such as senior managers, managers, OHS specialists and other employees, is simply absent.

Success-based OHS management studies

While many arenas in management are concerned, *inter alia*, with explaining the link between success/effectiveness in the particular managerial domain and some aspect of organizational performance (often financial), systematic research into how OHS management contributes to organizational performance, even in terms of OHS outcomes, is somewhat equivocal. Following a database search of empirical OHS management research, Smallman (2001) undertook a literature meta-analysis of 55 from a possible 280 articles selected on criteria that included: an empirical focus, publication in peer-reviewed journals or in well-cited monographs, and published after 1990. He found a distinct bias towards individual workers with only three studies that involved interviews with managers. There was no focus on the strategic or the commercial organizational context of OHS management. Survey-based quantitative studies predominated; case studies were uncommon and multiple methods a 'comparative rarity' (Smallman 2001, p. 397).

One case study-derived examination of effective OHS that sought to adopt a holistic approach to OHS management was carried out by Dawson *et al*. (1983) in the UK. Using interview, survey and observational data gathered from eight establishments in the petrochemical, chemical and allied industries (and later in the retail and construction industries), they identified a framework for local OHS management strategies that led to improved OHS outcomes. In doing so, they embedded a risk-management decision-making process that takes account of the external organizational context in terms of the regulatory environment and the internal organizational context, significantly identifying the politics of OHS where different interest groups, such as managers, employees, OHS representatives, OHS professionals, have different commitments to OHS. These different groups also have varying levels of power with regard to the human, financial and knowledge resources they are able to marshal for OHS. Consistent with earlier and later studies, senior management were found to be the most powerful and influential players in this regard.

Although the study by Dawson *et al*. (1983) usefully signals the direction that future research should follow, these studies remain the exception rather than the rule, and part of this failing may be due to the disparity of perspectives and the divergence of studies in this research domain.

Error and disaster-based OHS studies

Major conceptual and empirical contributions to a deeper understanding and appreciation of OHS management have emerged from the retrospective study and contemplation of human-made disasters, organizational accidents and critical errors that led to or had the potential to cause significant occupational fatalities in terms of number and prominence. Examples of such disasters include: the 1984 Bhopal pesticide plant disaster in India, estimated to

have killed between sixteen and thirty thousand people in India, and injuring many more (Lapierre and Moro 2002; Perrow 1999; Weick 2010); the Three Mile Island nuclear power plant failure and near meltdown in the USA (Perrow 1999); mining disasters such as the underground coal mine explosion at Moura in Australia, killing 11 people in 1994 (Hopkins 1999c); petrochemical disasters such as the Esso Longford explosion killing two and disrupting economic activity in Victoria, Australia, for some months in 1998 (Hopkins 2000); the BP Texas City refinery explosion which killed 15 employees and injured many more (Hopkins 2010); exploration disasters such as the Piper Alpha oil rig explosion in the North Sea in 1988, where 167 men were killed (Cullen 1990); the loss of the space shuttle Columbia and its seven crew members in 2003 (Columbia Accident Investigation Board 2003), and that of the Challenger in 1986 (Vaughan 1996); and public transport incidents, such as, the Waterfall rail accident in New South Wales, which killed seven people in 2003 (McInerney 2004).

These disasters and accidents are highly prominent in the public gaze and are subjected to government-mandated and funded inquiries and investigations (see for example, Brown 2000). As such, they are generally scrutinized far more deeply and extensively – normally for the purposes of public policy change, prosecution, allaying community concerns and learning how to avoid future recurrences – than any typical university-based study of OHS. Thus, the Columbia Accident Investigation Board's (2003) independent investigation into the loss of the space shuttle *Columbia* included the Board's 13 members plus a staff of more than 120, together with 400 NASA engineers.

Clearly, such investigations provide a source of rich data which permit scholars of OHS to examine and explain issues in the nature of such accidents and disasters that are primarily concerned with management failures (Pidgeon 1997; Reason 1997; Starbuck and Farjoun 2005; Turner 1976). There are a number of key insights into OHS management which have arisen from such studies. First, given the nature of high-risk technologies, there are organizational characteristics of interactive complexity and tight coupling between system components in formal organizations that fail, defeat the safety devices and, consequently, make accidents inevitable and, in a sense, normal (Perrow 1999). Despite the putative limitations of Perrow's normal accident theory, including the types of organization and industry that are a legitimate domain for such accidents, and the difficulty operationalizing interactive complexity and the degree of coupling (see Hopkins 1999a), our attention in understanding normal accidents and accidents in general is drawn to the need to take account of 'the context of errors and failures, thus bringing in the system in which they are embedded' (Perrow 1999, p. 387). In addition, as Hopkins (1999a) observed, normal accident theory has given rise to high-reliability theory, which seeks to explicate what is necessary to achieve very high reliability – through worker autonomy, a questioning attitude, a focus on safety, professionalism and skill levels (Perrow 1999). Second, culture has been widely identified among researchers and within consultancy circles as a significant organizational factor impacting OHS management and the likelihood of disasters or major accidents (Columbia Accident Investigation Board 2003; Hopkins 1999b,c, 2000, 2005, 2010; McInerney 2004; Reason 1997; Vaughan 1996). For example, the Columbia Accident Investigation Board (2003) placed as much weight on the space shuttle programme's history and culture as causal factors as it did on the found physical cause of the accident.

One of the major problems with safety culture (and organizational culture for that matter) is the general absence of agreement on its definition. More prominent among the various treatments, Reason (1997) argues for an informed safety culture underpinned by an effective safety information system which integrates the following four subcomponents: a reporting culture, a just culture, a flexible culture, and a learning culture. Hopkins (2005) extends Reason's concept of safety culture to embrace the notion of collective mindfulness arising from studies of HROs and aligns it with equivalent subcomponents: preoccupation with failure; reluctance to simplify; sensitivity to operations; and commitment to resilience and deference to expertise. He contends that the above concepts as well as that of risk-awareness are interchangeable.

A third insight from these studies, is the explicit acknowledgement that there is an ongoing and dynamic tension between production and protection, where for many organizations the goals of production (e.g. efficiency, profits, share values, market growth, returns on investment) clearly predominate, often at the expense of OHS (Hopkins 1995, 2005; McInerney 2004; Perrow 1983; Reason 1997). This was confirmed by Goh *et al*. (2010, p. 21) in their causal loop analysis of the Beaconsfield Gold Mine disaster in Tasmania, Australia, which found a

vicious cycle leading to organizational accidents arises where 'production pressure promotes management focus on production which can distort risk perception and lead to a further focus on production'. The production versus protection tension is often manifested in the play of power between the interest groups involved (for example, frontline operators, line supervisors, senior management, OHS committees and OHS specialists), the outcomes of which determine how resources are allocated. It is in this product-market/OHS context that the preferences and commitment of senior management influence the allocation of resources and the emphasis placed on OHS, and as such, they are often critical players in hindering effective OHS (Hopkins 1995, 1999b).

A fourth insight draws attention to the role played, not only by frontline operators in terms of their active errors or violations in accident causation but also, to what Reason (1997) refers to as 'latent conditions' (similar to Perrow's (1983) organizational context). These latent conditions range from gaps in supervision, maintenance failures, unworkable procedures, shortfalls in training, that can 'combine with local circumstances and active failures to penetrate the system's many layers of defences' (Reason 1997, p. 10).

The investigation of major accidents and disasters has led to a focus on future prevention through various risk-management techniques and approaches. Prominent among these have been the development of standards in numerous countries for the auditable design and operation of occupational health and safety management systems (OHSMS) that were initially driven by the findings of the inquiry into the Piper Alpha oil platform disaster (Cullen 1990; Hudson 2000). Moreover, investigation, analysis and theorizing about disasters and major accidents have highlighted the value of exceptional cases as a source for insight and learning. However, these exceptional cases are unfortunate events with negative consequences which, *post hoc* and among other things, emphasize errors, violations and failures in OHS management in relation to the particular event, and assume that if they were addressed in some way that the event would have been averted. They tend not to be explicitly concerned with OHS management in general. Consequently, while these studies do not provide a holistic insight into OHS management, they do draw attention to the often critical role of management (their actions and omissions) in relation to OHS. More recently, the risk-management approach has been accompanied by a call for the inclusion of prescriptive technical rules for operational decision-making in hazardous industries where industry good practice is agreed, where there is a regulatory need for higher performance standards and where no level of risk is acceptable (Hopkins 2011).

Culture, climate and high-reliability studies

In contrast to some of the earlier workplace studies, the more recent material on culture and safety highlights the importance of context (Mearns and Yule 2009, p. 472) and the work group (Bjerkan 2010) in analysing the determinants of safety performance. For example, in examining the relationship between occupational accidents and safety culture and climate onboard Norwegian offshore oil production installations, Bjerkan (2010, p. 446) notes how there has been a shift from the traditional view of industrial accidents that focused on technology and individual human failure (see Reason 1990) towards a broader understanding that recognizes the importance of the relationship between the social and physical environments. Culture, climate and local work practices are all seen to contribute to the development of a healthy and safe environment that supports the well-being of employees.

A raft of significant contributions to the OHS management literature have been made by social science scholars concerned with safety culture (e.g. Clarke 2000, 2003; Cox and Flin 1998; Guldenmund 2000; Hale *et al*. 2010; Jeffcott *et al*. 2006; McDonald *et al*. 2000; Specht *et al*. 2006), the related area of safety climate (e.g. Clarke and Ward 2006; Flin *et al*. 2000; Fuller and Vassie 2001), and high-reliability work organizations (e.g. Weick and Sutcliffe 2001). The problems of operationalizing safety culture means it is often conflated with safety climate (Hale 2000; Mearns *et al*. 2003; Williamson *et al*. 1997). For example, Guldenmund (2000) recognizes that the two concepts are poorly defined, their relationship is unclear, their construction and aetiology are confused, and that there is no integrating model for managing these issues in organizations. Interestingly, Bjerkan points out that, while industry regulations require oil operators on the Norwegian Continental Shelf (NCS) to create a culture/climate that sustains a Health, Safety and (work) Environment (HSE): 'it is not specified what this culture/climate concept should entail, thus allowing for variations in the interpretations' (2000, p. 446). This confusion is further exacerbated by the plethora of definitions and conceptualizations of culture in the mainstream literature.

Many leading scholars in the field agree that culture is made up of more visible artefacts and 'espoused' or 'conscious' values as well as the deeper layer of underlying assumptions – the more unconscious values and beliefs (Hofstede 1998; Schein 1985). Although differentiation between the two concepts is often unclear (Glendon and Stanton 2000) organizational culture has tended to be used more broadly than climate, with the latter being used as more of a localized snapshot of employee's attitudes and perceptions. From analysis of the responses to 27,739 distributed questionnaires to employees working on platforms within the Norwegian offshore oil sector, Bjerkan (2010) argues for the need for further research to examine workplace attributes and management practices that influence safety culture and climate as determinants of occupational accidents.

The results from the study spotlight the importance of examining the differences within different workgroups, as there were substantial variations, indicating a need to tailor interventions to deal with HSE issues related to specific groups (Bjerkan 2010, pp. 472–473).

In a study on the role of national culture in determining safety performance, Mearns and Yule (2009) also found that more localized factors such as the efficacy of safety measures and the perceptions of managements' commitment for safety had a greater influence on workforce behaviour and accident rates than did national culture. This study is seen to support previous work comparing offshore safety among Norwegian (1138 employees) and UK (622 employees) offshore workers (Mearns *et al*. 2004).

A further study highlighting the importance of contextual differences among seemingly similar cultures was conducted by Spangenbergen *et al*. (2003), who examined Swedish and Danish construction workers on a joint-venture project to build a 16-km road/rail link between Denmark and Sweden. They found that Danish workers had approximately four times the lost-time injury rate of their Swedish counterparts. These differences were explained in terms of: (a) broader national factors, for example, Swedish workers pay for the first day of absence off work and are provided more formal training through a structured apprenticeship programme (macro-level elements); (b) organizational factors, for example, Danish workers are remunerated by a piecework system and tend to have employment linked to projects on a temporary basis (meso-level elements); and (c) work group factors, for example, the continuous employment and formalized training of Swedish workers created an attitude to work different from that of their Danish counterparts, who relied on practical on-site experiences and advice from other team members. The authors show how factors at various levels interact in shaping behaviours and also, how countries that would be seen as culturally similar can experience very different outcomes in terms of lost-time injury rates and attitudes to work.

These studies point to the importance of examining the contextual conditions of work and the problems in trying to operationalize and explain safety performance simply in terms of culture or the more grounded concept of climate. This position is supported by the work of Weick (2010, p. 544) who, in reflecting on his earlier work on enacted sense-making in the Bhopal disaster, argues for a more contextual analysis in which to 'represent the situation that is present at moments of sense-making'. He notes how enactment is now viewed as just one of the properties of sense-making, with the others being social context, identity, retrospect, reliance on cues, ongoing experience and updated plausibility. He argues that the realities of operators at the moment of sense-making are mixtures of these elements:

> As the runaway chemical reaction unfolded there was little communication among the six people on the crew (social context). There was also resignation to a low status position in a neglected plant (identity), unease that what had been occurring that evening was not right (retrospect), malfunctioning gauges (cues), continuous rumbling sounds that got louder and odours that got stronger (ongoing), explanations of the odours as insect spray (plausibility), and little immediate action other than a tea break to follow-up on the cues (enactment). (Weick 2010, p. 544)

This work and the development of high-reliability theory in the 1980s (Perrow 1984) usefully developed the concept of 'collective mindfulness' (e.g. Cox *et al*. 2006; Klein *et al*. 1995; Ramanujam and Goodman 2003; Roberts and Bea 2001; Roberts *et al*. 1994a,b). High-reliability organizations, such as nuclear power plants and offshore drilling operations that experience lower than expected error, and therefore accidents, are seen to exhibit mindful processes which include: a focus on failures; a reluctance to simplify interpretations; a commitment to resilience; and sensitivity to operations and deference to expertise through a flexible decision-making system (Weick and Sutcliffe 2001). For example, in a study of transient reliability in the production of dynamic non-events among wildland firefighting crews,

Weick (2011) highlights how making sense of a situation provides more opportunities for assessing potential options than making a decision does. He argues that in situations such as firefighting, where the unforeseen and unpredictable occur, sense-making rather than decision-making enables greater flexibility and speed in tackling a dynamic and changeable situation. While recognizing that decisions are still ultimately involved, sense-making is deemed more important (Weick 2011, p. 23). In other words, while we develop categories and procedures to help coordinate activities, we must be careful not to give away collective mindfulness, which may be essential in achieving higher levels of safety performance. As Weick (2011, p. 25) states: 'decision making is not what HROs are most worried about. Instead, they are more worried about making sense of the unexpected'.

Towards a contextually based narrative perspective on OHS management

In a reflective piece on studies carried out in a number of HROs, LaPorte (2011, p. 60) suggests that increasing social complexity renders past explanatory theory of declining use under today's conditions. He argues for the need for further deep contextual studies of a qualitative nature that embrace what he (LaPorte 2011, p. 61) and Rochlin (2011) refer to as 'embedded observation', where researchers spend extended periods of time observing an organization (what Burawoy (1998) refers to as the extended case study). LaPorte argues that it is only through this type of detailed longitudinal fieldwork that how things happen in practice and how employees are situated within their culture can begin to be uncovered. For example, in a study of a large electrical utilities company, researchers noticed how the many thick manuals that guided procedures and were located in the operations room were rarely used or even opened by operator staff (Rochlin 2011, p. 16). Their detailed observations are thus seen as central to making sense of what was happening in relation to reliability performance and safety.

We would also stress the importance of localized contextual studies and the problems with generalizing across sites or over time. In calling for a more holistic approach to OHS management, we advocate the need for further studies of this type which also accommodate temporality, in being process-oriented while combining elements of narrative analysis to further understanding of OHS management. Scandinavian discussions on working environment may shed some light on how this can be accomplished. In Scandinavia, the concept of working environment was taken up in the 1970s to focus attention on the workplace rather than the worker. Attention was given to collectivist OHS approaches in terms of policy and regulation as well as on working conditions rather than the behaviour of individuals at work (Quinlan 1993). In the 1990s, however, there was a shift towards individualization, which is captured in the concept of Workplace Health Promotion (WHP) and has been gaining momentum in Europe (European Network for WHP 2004). In the Danish context, Kamp (2007) explains how in the 1990s WHP was viewed as an 'individualistic competitor to OHS' and how some critics were concerned that it might authorize employers to get involved in employee behaviours outside the work environment; whereas, others saw the potential for WHP to reassert the importance of OHS to the working lives and health of employees. As Kamp (2007) explains:

> The dominant understanding of health is medical- . . . but also humanistic conceptions coexist . . . At one pole WHP is conceived of as expert-driven initiatives aiming at changing employees' lifestyle – doing more exercise, stop smoking, drinking, and eating less and healthier. In this way the attention is taken to individual preconditions and behaviour rather than to working conditions . . . At the other pole WHP means initiatives that aim at improving employees' possibilities to gain authority in their working life . . . This is more in line with discussions on 'quality of working life', and 'democratization of working life'. (p. 2)

In drawing on critical discourse analysis (Fairclough 1995), Kamp identifies a medical discourse (where health is defined as the absence of sickness, and the focus is on treatment) and a humanistic discourse (where the focus is on prevention and quality of life issues). She demonstrates how a number of competing narratives (storylines) have developed around discussion and debate over what constitutes WHP and concludes that the emergence of an integrated concept – which is concerned with changing both lifestyle and the working environment – holds promise in relation to the renewal of the field of OHS (Kamp 2007, p. 15).

This study draws attention to the influence of narratives in shaping understanding and interpretation in the field of OHS. Key stakeholders can construct and

transform storylines and, in this case, develop a concept that attempts to combine elements from two contrasting discourses. Second, it highlights the importance of the subjective – of the individual experience – in a field that has largely taken a regulatory and collectivist approach. Third, it raises questions about the boundaries of responsibility for individual health and the maintenance of healthy working environments. Moreover, as MacIntosh *et al*. (2007, p. 207) highlight, there are situations where attempts to improve organizational health may 'produce inadvertent and detrimental effects on individual health'. They forward a process view of health and criticize the tendency within the literature to view it in terms of snapshot 'states'. As such, health is seen as ongoing and emergent, reflecting the way in which individuals experience and make sense of their interaction with other people and their working environment (MacIntosh *et al*. 2007, pp. 207–210).

We contend that there is value in building on these insights in constructing a research agenda for OHS management that combine elements of narrative analysis with the processual perspective. As we have shown in this review of the literature, there are a number of different interpretations on what constitutes OHS and its management, and the multi-authorship of OHS highlights the polyvocal nature of the narrative (Barry and Elmes 1997; Rhodes and Brown 2005). In studying OHS management in context and over time it would be possible to analyse emerging OHS stories and to identify one or a number of narratives and how they interact and shape individual and collective experience of OHS in organizational settings (Boje 2008). This refocusing would link with the growing interest in narrative approaches in studying organizations (Gabriel 2000) and, in particular, in the way multiple authors compete in the development of storylines which serve to shape collective identities and shared experience (Dawson 2003). The polyvocal character and emergent nature of these processes complement contextually based longitudinal studies which seek to examine the complex and muddied dynamics of change. As Buchanan and Dawson (2007, p. 13) argue, by combining these elements, we not only get better insight into sense-making and sense-giving, but also into 'the broader context in which the stories both account for and shape the processes of which they seek to make sense'. Processual research can thus be used to accommodate the collection of individual and group narratives over time, and these in turn could be analysed in relation to the sense-giving and sense-making of OHS management, and the way in which alternative views may compete and be re-written in the light of ongoing interactions and contextual change. The overall aim is to accommodate multiple stories in the pursuit of a more comprehensive understanding, rather than reconstructing a one-model account of OHS.

In taking this position, there is no need to reconcile different and/or competing voices into a supposedly authentic account. Those who seek to manage and direct OHS, those who experience and seek to make sense of OHS practice, and the researcher trying to analyse interview, observational and documentary data, all have their own stories to tell. As such, there are multiple authors who script stories, often with the intent to influence others and to get their own worldview heard. For example, stories can have a causal intent, and those managing OHS may script stories that promote the development of OHS in certain preferred directions. Thus, by combining processual research techniques that can reveal contextual dynamics over time with a narrative perspective that also emphasizes the contextual, temporal and multi-authored properties of OHS, we can gain further insight into and knowledge of the theory and practice of OHS and its management.

Conclusions

Research on OHS management in organizations has tended to follow either a more pragmatic specialist route concerned with prescribing ways of doing OHS and best management practice, or a more theoretical base from earlier research largely grounded in the disciplines of psychology or sociology. Studies within the more traditional social science disciplines have been concerned with the development of concepts that are theoretically robust: for example, within psychology the focus has been on developing theories at the level of the individual, whereas sociological studies have placed more emphasis on social relations and systems of management control. However, this earlier focus has lost impetus with the segmentation of discipline focus and the growth in more pragmatic specialist interests in the field of OHS. For example, much of the more grounded industrial relations research draws on empirical data in assessing OHS in the workplace and the effectiveness of systems and management action or inaction in response to their legal obligations, whereas, within the specialist OHS literature, a high proportion of

studies have focused on the tools and techniques for solving problems and an identification of best practice guidelines.

While there is a large body of work that covers a range of important areas and concerns in relation to OHS management; it remains disparate and fragmented. This hiatus needs addressing through examining OHS within management and, in particular, in relation to HRM. Important questions remain underresearched, such as: How is OHS conceived and understood in organizations? What are the links between OHS and HR strategies? Is OHS important in the management of internal/external relationships? Further, questions that address the role of OHS in the management of supply chains, the place or absence of OHS in the development of business strategy, and how OHS management relates to issues such as corporate social responsibility are some of the areas worthy of further research.

As an eclectic discipline, management is particularly well placed to address these gaps through broader social science frameworks in the design of research, the collection and analysis of data, and in furthering theoretical insights which can also contribute to the existing body of specialist knowledge. Quantitative, qualitative and mixed methodological approaches can all contribute to developments in the field: for example, survey questions which relate to the extent and type of management and HR involvement in OHS and how this has changed over time, as well as more detailed observational research on how these activities are carried out *in situ*, in addition to study designs that collect data on how OHS activities are perceived and evaluated from different perspectives both within and outside organizations. In short, there is enormous scope to develop this field and, within these broad opportunities, we draw particular attention to the need for a more holistic approach which takes seriously the temporal developments of OHS and the contextual conditions under which OHS philosophies and systems emerge, are shaped, redefined, replaced, enhanced and developed. In line with Boin's (2006, p. 259) assertion, 'we should perhaps ask if practitioners may not be ahead of the game'. A major challenge is to present a thick processual description of what constitutes effective OHS management, one that takes account of and captures true complexity (Smallman 2001) and the nuances of the salient multiple narratives and lived experiences of those engaged in and influenced by OHS, and one that 'recognizes subjective dimensions and cultural values and . . . shows a scepticism about human-made systems and institutions, and emphasizes social bonding and the tentative, ambiguous nature of experience' (Perrow 1999, p. 328).

A key conclusion from this review is that, while OHS management has been 'missing in action' in leading HRM and management academic journals, opportunities exist for management scholars to take up the challenge of researching OHS in developing approaches that are better able to explain OHS in organizations and their changing business environments.

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