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Boards of directors' influences on occupational health and safety: a scoping review of evidence and best practices

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Abstract

Purpose – To review the literature and identify research gaps in the role and influence boards of directors of companies have in occupational health and safety (OHS).

Design/methodology/approach – This was done in a scoping review built on a structured search in MEDLINE (PubMed), EMBASE, PsycINFO, Sociological Abstracts, CCInfoWeb, EconLit, Web of Science, CINAHL and gray literature. Citations and reference lists were tracked. Inclusion criteria were publication in English. Exclusion criteria were studies covering companies using subcontractors to arrange OHS, or with <250 employees.

Findings – Forty-nine studies were included. The majority contained empirical data ($n = 28$; 57%), some were entirely normative ($n = 16$; 33%), and a few contained normative claims far beyond empirical data ($n = 5$; 10%). Empirical studies gave no insight into the scope of impact of board activities on OHS, and no studies assess the causal mechanisms by which board activities influence OHS outcomes. Most studies focused on both health and safety ($n = 20$; 41%) or only safety ($n = 15$; 31%). Context might explain the focus on safety rather than health, but is not clearly elucidated by the studies. Several studies are describing leadership behavior, although not framed as such. A narrative summary is presented to facilitate future research.

Research limitations/implications – Future research should include: (1) which board activities influence OHS, (2) how board activities influence OHS, (3) the influence of context and (4) the leadership role of boards of directors.

Originality/value – This study identifies a total lack of research on the basic mechanics of the relationship between boards and OHS.

Keywords Corporate governance, Leadership, Risk assessment, Sustainability, Performance management, Corporate responsibility

Paper type Literature review

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Introduction

There is a growing understanding that operative leadership, from line managers to senior management, plays an important role in occupational health and safety (OHS). For example, line managers have a direct and indirect impact on OHS through the way they assert their leadership and the way they influence the organization of work (Lornudd *et al.*, 2015; Skakon *et al.*, 2010), as well as through how they manage implementation of OHS interventions (von Thiele Schwarz *et al.*, 2016). Nevertheless, they do not act in a vacuum. They are influenced by the larger organization such as the actions of the senior management whom, for example, are responsible for providing resources and setting agendas for OHS (Hasson *et al.*, 2014).

Yet, all of these descriptions of roles and responsibilities focus on operative management (the day-to-day running of a business), rather than strategic leadership and governance; that is, the system by which an organization is directed and controlled. The body responsible for strategic leadership and governance is the board of directors (Boardman and Lyon, 2006). A board is fundamentally responsible for the legal compliance and the long-term value creation of a company and has a substantial influence over a range of organizational processes and outcomes (Dalton *et al.*, 1999; de Villiers *et al.*, 2011; Kor and Sundaramurthy, 2009; Müller, 2014; Sarto and Veronesi, 2016; Stiles, 2001). Board responsibilities are regulated by corporate laws and commonly include (1) establishing a strategic direction, (2) setting standards and values for operations and defining boundaries for operative management, (3) holding management accountable, (4) overseeing internal controls and (5) accounting for owners' and other stakeholders' interests (Boardman and Lyon, 2006). With these responsibilities, a board of directors can be expected to play an important role in the governance of OHS. Yet, knowledge of what role a board of directors plays in OHS is limited and an overview of the literature is lacking.

The aim of this study was to review the literature and identify research gaps in the role and influence boards of directors of companies have in OHS.

Materials and methods

A scoping review was conducted, which uses a wide search string and is suitable to review complex evidence from research literature when highly specific research questions cannot yet be asked (Colquhoun *et al.*, 2014). To adopt a rigorous process of transparency, enabling replication and increasing the reliability, the review followed the five-stage framework by Arksey and O'Malley (2005): Identifying the Initial Research Questions; Identifying Relevant Studies; Study Selection; Charting the Data; Collating, Summarizing and Reporting the Data. OHS was defined as the occupational safety, health and well-being of employees. Because organizations such as Center for Safety and Health Sustainability (2013) recommends OHS as part of a sustainable business practice, OHS is often indistinguishable from occupational sustainability.

Identifying the initial research questions

The initial research questions focused on the boards of directors of privately held companies (i.e. excluding governmental agencies and politically governed organizations), and the intention was to map presumed mechanistic links between board behavior and OHS, and to chart factors distinguishing boards with high employee health from boards with average/low employee health. This proved impossible as none of the sources dealt with mechanisms or contrastive cases. The research question were revised to: What are the research gaps in the role and influence boards of directors of companies have in OHS? The steps below were reapplied (for a discussion on the benefit of allowing revision of research questions, see Arksey and O'Malley (2005)).

Identifying relevant studies

Arksey and O'Malley (2005) suggest that a wide set of search terms should be adopted to obtain "broad coverage" of available literature. The search was revised iteratively, and the search string was designed to cover: health, board governance and company settings. The terms "health" or "board" could not be used alone as it rendered >1 million results. The search string was based on personal knowledge, asking researchers in adjacent fields, searches in gray literature (i.e. Google Scholar; Haddaway *et al.*, 2015) and manual searches of journal shaving published articles of high relevance (Greenhalgh and Peacock, 2005; i.e. *Policy and Practice in Health and Safety* [May 3, 2017], *Journal of Occupational Health and Safety, Australia and New Zealand* [May 5, 2017] and *Journal of Business Ethics* [May 10, 2017]). Initially, a comprehensive search string was developed using synonyms and an expanded thesaurus-based vocabulary. This rendered 127 terms, but was beyond the present study due to time constraints. It was trimmed through iterative revisions and searches with an information specialist. The intention was to keep broader terms, resulting in the final string: ("worker health" OR "workplace Injury" OR OHS OR OHSM OR "work health and safety" OR WH?S OR "occupational health") AND ("corporate governance" OR "strategic governance" OR "board* of director*" OR "board member*" OR "board structure" OR "Chair of the Board" OR "Chairman of the Board" OR "President of the Board" OR "company board*" OR "board meeting*" OR "cooperate strateg*" OR "non-executive director*") AND (compan* OR corporate OR firm* OR business* OR office* OR enterprise* OR conglomerate*). The process is outlined in Figure 1.

Study selection

The search period was set from the inceptions of the respective databases to the date of search (May 18, 2017). Databases were chosen to cover medical literature and business literature: MEDLINE (PubMed), EMBASE, PsycINFO, Sociological Abstracts, CCInfoWeb (consisting of NIOSHTIC-2, HSELINE, and OSHLINE), EconLit, Web of Science and CINAHL. We included all business databases accessible at our institution. Additional databases that was not accessible, e.g. Business Source Complete, might have rendered additional results. Because CCInfoWeb is specific to OHS, searches were made with the sole terms "corporate governance," "board of directors" and "company board" respectively. Additional searches for non-peer-reviewed literature were performed using the same terms in Google (Mahood *et al.*, 2014) and by asking colleagues in the field (Greenhalgh and Peacock, 2005).

The first author did the inclusion assessment based on titles and abstracts. Inclusion criteria were publication in English. Exclusion criteria were companies using subcontractors to arrange and monitor OHS, and studies of companies with <250 employees. As is common in scoping reviews, no other studies were excluded and quality assessment was not performed (Arksey and O'Malley, 2005). Inclusion of non-peer reviewed articles means that the sources could potentially include self-proclaimed studies, especially when no quality assessment is done. However, this may be appropriate when there is a lack of academic research (Mahood *et al.*, 2014). The strength of a scoping review is instead to identify research gaps with no previous research, irrespective of quality. All included studies were tracked using snowballing (Greenhalgh and Peacock, 2005); i.e. forwards (using citation-tracking in Google Scholar between June 1 and 7, 2017) and backwards (using reference lists). This rendered additional studies that were assessed for inclusion. In case of uncertainty assessment of inclusion, the study was included.

Charting the data

A framework by Boardman and Lyon (2006) was used (Table 1). It was published by the UK Health and Safety Executive and originates from consultations with 23 large companies in

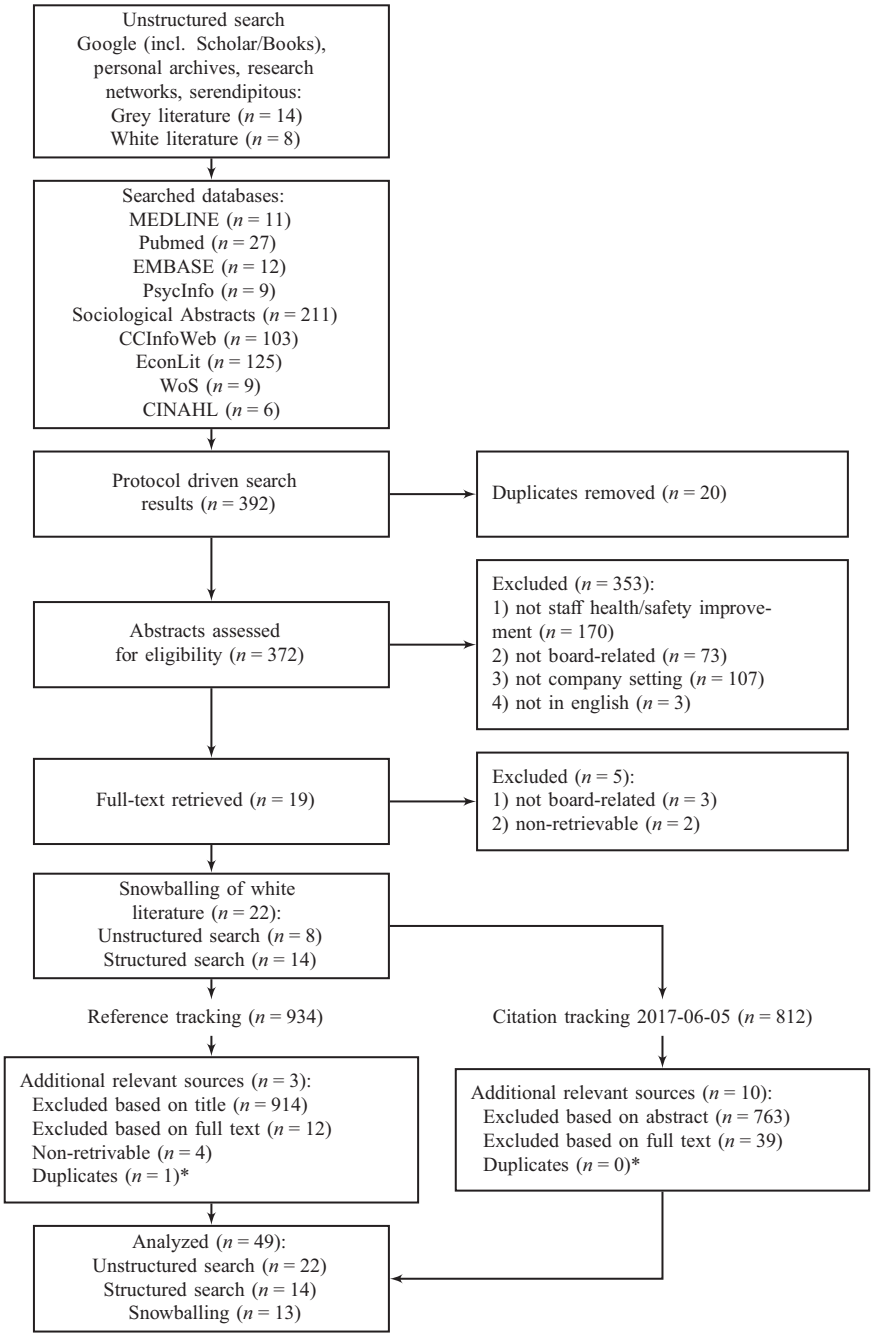

Figure 1.
Flowchart of scoping review

Category	Definition: activities demonstrating that the board . . .
Competence	. . . understands OHS issues and continually develops skills and knowledge
Roles and responsibilities	. . . respects their legal responsibilities and understand their role; including duty to stakeholders and risks OHS issues may pose
Culture	. . . upholds key values and cultural standards by leading from the top, acting as ambassadors, taking ownership, maintaining communication and facilitating openness
Strategy	. . . take strategic leadership of the company, showing responsibility for the agenda and understanding risks and opportunities that might compromise values and standard (i.e. culture)
Performance management	. . . defines key objectives and targets, and creates incentive structures for executives supporting OHS performance
Internal controls	. . . ensure operative risks are managed and controlled and that there is compliance to core standards, as well as enabling auditing or whistleblower functions
Organizational structures	. . . structurally integrate OHS governance into main corporate governance structures, into different sub-committees, or into a separate OHS committee

Source(s): Adopted from Boardman and Lyon (2006)

Table 1. Definitions of the categories used to analyze the findings

the United Kingdom. The framework was considered the most suitable based on its high face validity as perceived by the research group. A framework with a stronger theoretical background would have been ideal, but available frameworks of OHS do not cover the relationship of OHS and the board. A narrative summary of all studies was compiled deductively based on the framework, and the summary was used to identify variables for data-charting (Levac *et al.*, 2010): publication year, type of publication, country of study, business sector, area of focus, study type, data source, risk-minimization or benefit-maximization, normative/descriptive/experimental, operative/strategic suggestions, and coverage of the framework. Variables were visualized in tables, pie charts and bar charts and discussed in the research team. The variables were revised iteratively. Several variables were removed because the research team was unable to define the concepts in a way enabling reproducible categorization of the studies. The variables in Table 2 were extracted by the first and last author. Disagreements were resolved in consensus.

Collating, summarizing and reporting the data

The data-charting form was analyzed with descriptive statistical analysis, and hypothesis-driven cross-tabulations were examined and discussed by the research team. The characteristics of the included studies were summarized with descriptive statistics. In addition to describing the research gaps, the present study provides a narrative summary describing the literature thematically. Narrative summaries' are not standard in scoping review methodology but it is provided to facilitate future studies. As no quality assessment was done, the narrative should not be read as a summary of the most qualified knowledge in the field. Instead, it is meant to facilitate generation of hypotheses, interview guides or survey questions.

Results

Descriptives

The rate of publication of articles increased over time and covered a diversity of methods (Number of publications doubling every 3–5 years; Table 2). Half of the sources were peer reviewed ($n = 26$; 53%, Table 2) and most of the sources focused on both health and safety ($n = 20$; 41%, Table 2) or only safety ($n = 15$; 31%, Table 2). The majority of the sources

Table 2. Specific study characteristics of all included studies

Study	Title	Pub year	Type	Location	Sector*	Main focus	Content coverage
Alhadeff CM, da Silva RF, Reis MSd	New procedures of ergonomics design in a large oil company	2012	Peer review: case report	Brazil	Energy	Health	Cu
Blewett V, O'Keeffe V	Weighing the pig never made it heavier: Auditing OHS, social auditing as verification of process in Australia	2011	Peer review: conceptual	Australia	Mixed	Heath, safety	I
Boardman J, Lyon A	Defining best practice in corporate occupational health and safety governance	2006	Non peer-review: report	UK	Mixed	Heath, safety	Co, R, Cu, S, P, I, O
Bunn IWB, Pikelny DB, Slavin TJ, Paralkar S	Health, safety, and productivity in a manufacturing environment	2001	Peer review: mixed methods single case	North America	Consumer discretionary	Heath, safety	P
Burke JJ, Hoitash R, Hoitash U	The heterogeneity of board-level sustainability committees and corporate social performance	2017	Peer review: quant cross-sectional study	USA	Mixed	Sustainability	O
Bryne R	World class health and safety: the professional's guide	2016	Non peer-review: book	International	Mixed	Heath, safety	O
Clarke T	Changing paradigms in corporate governance: new cycles and new responsibilities	2015	Peer review: conceptual	International	NA	Sustainability	S
Clayton AF, Rogerson JM, Rampedi I	Integrated reporting vs sustainability reporting for corporate responsibility in South Africa	2015	Peer review: qual multiple case study	South Africa	Mixed	Sustainability	I
De Wit M, Wade M, Schouten E	Hard wiring and soft wiring corporate responsibility: a vital combination	2006	Peer review: case report	International	Energy	Sustainability	O
Du Plessis J, Hargovan A, Bagaric M	Principles of contemporary corporate governance	2010	Non peer-review: book	International	NA	Heath, safety	Cu, P
Enric Ricart J, Ángel Rodríguez M, Sánchez P	Sustainability in the boardroom: An empirical examination of Dow Jones Sustainability World Index leaders	2005	Peer review: qual multiple case	International	Mixed	Sustainability	O

(*continued*)

Table 2.

Study	Title	Pub year	Type	Location	Sector*	Main focus	Content coverage
Ferguson KI.	A study of safety leadership and safety governance for board members and senior executives	2015	Non peer-review: thesis	Australia	Mixed	Safety	Co, R, Cu, S, P, I, O
Francis S, Talwar R	The role of the board in health and safety management	2003	Non-peer review: article	UK	NA	Heath, safety	R, Cu, I
Gray GC.	The responsibilization strategy of health and safety: neo-liberalism and the reconfiguration of individual responsibility for risk	2009	Peer review: qual single case study	Canada	NA	Safety	Cu
Güler A, David C	A handbook of corporate governance and social responsibility	2010	Non peer-review: book	International	Mixed	Sustainability	R, Cu, I
Hodgins M, Fleming P, Griffiths J	Promoting health and well-being in the workplace: beyond the statutory imperative	2016	Non peer-review: Book	International	Mixed	Heath, Safety	R, Cu
Hughes P, Ferrett E	Introduction to health and safety at work	2011	Non peer-review: Book	UK	Mixed	Heath, safety	Co, R, Cu, S, P, I, O
Hurst R, Vassie L	Designing safety in . . . and keeping it there	2008	Non peer-review: Conference paper	UK	NA	Safety	Co, R, Cu, S, P, I
Joss N, Dupré-Husser E, Cooklin A, Oldenburg B.	The emergence of integrated approaches to worker health, safety and well-being in Australia	2017	Peer review: qual multiple case study	Australia	Mixed	Heath, Safety	Cu
Khushrushahi N	Investor guidance on occupational health and safety in Canada: an overview of corporate best practices	2012	Non peer-review: guideline	Canada	NA	Heath, safety	Cu, S, P, I, O
Klettner A, Clarke T, Boersma M	The governance of corporate sustainability: Empirical insights into the development, leadership and implementation of responsible business strategy	2014	Peer review: qual cross-sectional	Australia	Mixed	Sustainability	S, P, O
Klettner AL.	Corporate governance regulation: assessing the effectiveness of soft law in relation to the contemporary role of the board of directors	2014	Non peer-review: Thesis	Australia	Mixed	Sustainability	S, P, O

(*continued*)

Table 2.

Study	Title	Pub year	Type	Location	Sector*	Main focus	Content coverage
Kruse C, Lundbergh S	The governance of corporate sustainability	2010	Peer review: conceptual	International	NA	Sustainability	P
Leblanc R	The handbook of board governance: a comprehensive guide for public, private, and not-for-profit board members	2016	Non peer-review: book	International	Mixed	Heath, safety	Cu, S, I, O
Lo D	OHS stewardship-integration of OHS in corporate governance	2012	Peer review: conceptual	UK/ Australia	NA	Heath, safety	Co, Cu, S, P, I, O
Locke S, Cross J	Safety reporting to the board	2009	Peer review: qual multiple case study	Australia	Unknown: "technical"	safety	R, Cu, S, P, O
Lunt J, Mike W	Executive engagement: A foot in the door	2016	Non-peer review: article	International	NA	Heath, safety	R, Cu, P
Mackenzie C	Boards, incentives and corporate social responsibility: The case for a change of emphasis	2007	Peer review: qual multiple case	UK	Mixed	Sustainability	P
Minguillón RF, Yacuzzi E	Design of an indicator for health and safety governance	2009	Non-peer review: article	International	NA	Heath, Safety	P
Moore T, Lakha R	Tolley's handbook of disaster and emergency management	2007	Non peer-review: Book	International	Mixed	Safety	R, Cu, S, I, O
Moraru RI, Băbuţ G	On the culture–learning–participation triad in occupational health and safety management	2012	Peer review: conceptual	International	Mixed	Heath, Safety	Cu, P, I, O
Murphy JH.	Corporate board health and safety governance committees: Do they make any difference?	2016	Non peer-review: thesis	Canada	Mixed	Heath, Safety	Cu, P, I, O
Palk GR, Davey JD, Wishart DE, Rowland BD.	Work-related road risks and legal liabilities	2010	Non peer-review: report	Australia	Industrials	Safety	R, O
Peace C, Mabin V, Cordery C	Due diligence: a panacea for health and safety risk governance? Policy and Practice in Health and Safety	2017	Peer review: conceptual	New Zealand	Materials	Safety	Co, S, P, I

(*continued*)

Table 2.

Study	Title	Pub year	Type	Location	Sector*	Main focus	Content coverage
Salvioni DM, Gennari F, Bosetti L	Sustainability and Convergence: The Future of Corporate Governance Systems?	2016	Peer review: qual multiple case study	International	Mixed	Sustainability	R
Sandén Å	The organization of the occupational health service at Götaverken	1976	Peer review: case report	Sweden	Industrials	Heath, safety	S
Schrover A	Ten years SHE-improvements on a chemical and nuclear research-site—Learning drivers	2008	Peer review: Case report	Netherlands	Energy	Safety	R, Cu, I
Siemieniuch CE, Sinclair MA.	Using corporate governance to enhance "long-term situation awareness" and assist in the avoidance of organisation-induced disasters	2008	Peer review: Single case study, secondary analysis	International	Industrials	Safety	S, O
Smallman C, John G	British directors perspectives on the impact of health and safety on corporate performance	2001	Peer review: qual cross-sectional study	UK	Mixed	Heath, safety	R, Cu, P
Spitzeck H	The development of governance structures for corporate responsibility	2009	Peer review: Cross-sectional survey study	UK	Mixed	Sustainability	O
Thompson S, Tan V	Leading from the top to reduce healthcare worker injuries	2016	Non-peer review: conference abstract	Australia	Health care	Safety	Cu
Wang J, Dewhirst HD.	Boards of directors and stakeholder orientation	1992	Peer review: cross-sectional survey	USA	Mixed	Health	R
Waring A	Corporate Governance and Risk Management	1999	Peer review: conceptual	UK	NA	Safety	S
Waring A	Strategies of risk management organisations: a case review	2002	Peer review: qual single case	International	Mixed	Safety	R, Cu, S, P
Webster M, Lunt J	On deaf ears	2016	Non-peer review: article	International	NA	Safety	R, Cu, S, I
Wright M, Marsden S, Holmes J	Health and safety responsibilities of company directors and management board members	2003	Non peer-review: report	UK	Mixed	Heath, safety	R, S, P, I

(*continued*)

Study	Title	Pub year	Type	Location	Sector*	Main focus	Content coverage
	Epworth's workplace safety and wellbeing initiative	2013	Non peer-review: pamphlet	Australia	Health care	Heath, safety	Cu, S, I
	Leading safety: A guide for directors	2015	Non peer-review: pamphlet	New Zealand	Industrials	Safety	Co, Cu, S, P, I, O
	Good Governance Practices Guideline for Managing Health and Safety Risks	2013	Non peer-review: report	New Zealand	Mixed	Safety	Co, R, Cu, S, P, I

Note(s): Table summarizing all included studies. *Sector according to Global Industry Classification Standard. Article: Sources published in journals (with other texts). Report: Sources based on the IMRAD-structure (or similar) but published as a stand-alone source. Pamphlet: Sources without methods section and with a small number of pages. C: Competence; R: Roles and responsibility; Cu: Culture; S: Strategy; P: Performance management; I: Internal control; O: Organizational structure

Table 2.

contained empirical data ($n = 28$; 57%), some were entirely normative ($n = 16$; 33%), and a few contained normative claims far beyond the included empirical data ($n = 5$; 10%). Most of the sources where describing or situated in several different business sectors ($n = 25$; 51%), or did not refer to any sector at all ($n = 12$; 24%). The sources most commonly referred to only one category ($n = 20$; 41%, Figure 2) in the framework of Boardman and Lyon (2006). The median number of categories referred to was three (interquartile range: 1–4). Most sources referred to organizational culture ($n = 27$; 51%, Figure 3) and fewest referred to competence ($n = 8$; 16%, Figure 3).

Narrative summery

Responsibilities

One of the included sources was a survey primarily targeting operative directors in UK companies. Two-thirds of the respondents perceived that OHS was governed from the board level (Wright *et al.*, 2003). The survey results also showed that board-level governance of OHS was more common in top-performing companies. Board-level involvement was motivated by a need for power and control, mandated by legislation or based on a need for corporate

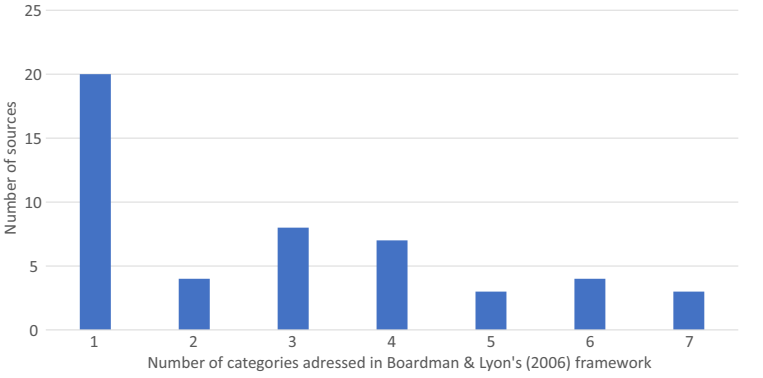

Figure 2.
Sources addressing 1–7 categories from Boardman and Lyon (2006)

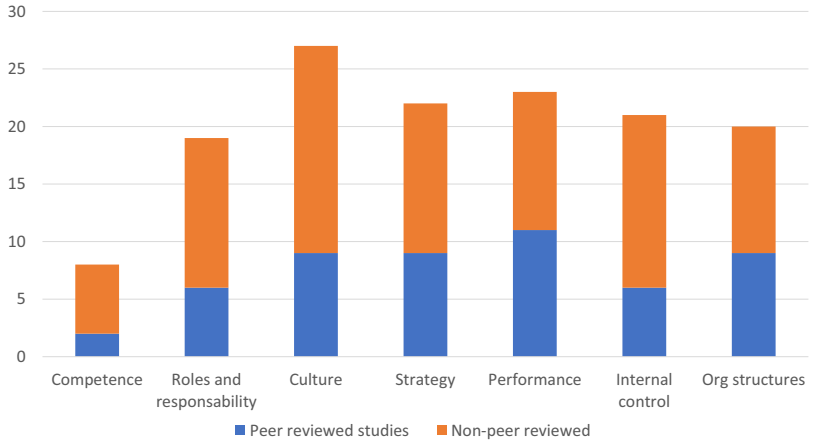

Figure 3.
Sources categorized according to Boardman and Lyon (2006)

governance (Wright *et al.*, 2003). Another source indicated that the reason for boards to get involved with OHS issues went beyond liability and ranged from "duty towards stakeholders" to "pride in achievement" (Smallman and John, 2001). Sustainability reporting forced by legislation increased corporate responsibility in one study (Clayton *et al.*, 2015).

A survey revealed that providing programs for OHS covaried mainly with providing training opportunities for employees and programs to comply with environmental regulations (Wang and Dewhirst, 1992). Boards that delegated OHS considered OHS a less important or purely operational matter, or it was too divergent from other areas governed by the boards (Wright *et al.*, 2003). Other sources conclude that the roles of directors should be determined by the size (Boardman and Lyon, 2006; Ferguson, 2015) and complexity of a company (Boardman and Lyon, 2006).

Suggested overarching categories of the boards' OHS responsibility were planning, delivering, monitoring, and reviewing (Hughes and Ferrett, 2011; Institute of Directors in New Zealand [IOD-NZ], 2013). In one study, safety managers particularly pointed out that the responsibility of boards was not to "drive" safety, but to make sure that managers do so (Locke and Cross, 2009).

In terms of organizing responsibilities, some sources recommend one nominated director be put in charge of developing and monitoring OHS practices (Boardman and Lyon, 2006; Francis and Talwar, 2003; Hodgins *et al.*, 2016; Hughes and Ferrett, 2011; Palk *et al.*, 2010). Eighty-two percent of UK companies with >250 employees had such a person (Wright *et al.*, 2003). For more than half of such nominated directors, OHS was their primary responsibility. Some authors have suggested that the nominated director should be the CEO (Hughes and Ferrett, 2011; IOD-NZ, 2013), whereas others disagreed (Boardman and Lyon, 2006). Although having an assigned "director of OHS" can provide a strong signal that OHS is a prioritized issue (Hughes and Ferrett, 2011), it also risks that person becoming a scapegoat for failures (Francis and Talwar, 2003; Hughes and Ferrett, 2011) or increases the risk of power struggles between board members with different areas of responsibilities (Waring, 2002). Other sources suggested a collective (Ferguson, 2015; Francis and Talwar, 2003; Hughes and Ferrett, 2011; Hurst and Vassie, 2008; Wright *et al.*, 2003) or a distributed individual level of responsibility (Ferguson, 2015; Hughes and Ferrett, 2011; Webster and Lunt, 2016; Wright *et al.*, 2003).

Integration of OHS with other areas of boards' responsibilities was suggested to create synergies and improve knowledge management (Lubans *et al.*, 2009) as well as enable improvement in OHS (Salvioni *et al.*, 2016) and other areas (Güler and David, 2010). On the other hand, such an integration may increase the risk of OHS work becoming completely subsumed by other focus areas (Güler and David, 2010).

Competence

The need for directors to have a basic understanding of OHS (Boardman and Lyon, 2006; Canterbury Rebuild Safety Charter [CRSC], 2017; Ferguson, 2015; IOD-NZ, 2013; Lo, 2012), to develop their skills and knowledge continually (Boardman and Lyon, 2006; Hughes and Ferrett, 2011; IOD-NZ, 2013; Peace *et al.*, 2017) and to know how to measure OHS performance was emphasized (Hughes and Ferrett, 2011; IOD-NZ, 2013; Peace *et al.*, 2017). One guideline suggested that if a clear definition of OHS competence is developed, then it is easier to implement OHS guidelines (Hurst and Vassie, 2008). It was furthermore suggested that boards of directors (Boardman and Lyon, 2006; Hughes and Ferrett, 2011; Moore and Lakha, 2007; Webster and Lunt, 2016), and especially chairpersons (Schrover, 2008), need to understand their legal and formal responsibility. Nevertheless, a Canadian study found no evidence that members of OHS committees had any formal OHS education/qualification, and

its authors argued that such a lack of competence would never be accepted in, for example, a financial subcommittee (Murphy, 2016).

Culture

Several sources highlighted the importance of organizational culture in OHS governance (Boardman and Lyon, 2006; CRSC, 2017; IOD-NZ, 2013; Lo, 2012; Kelloway *et al.*, 2017; Locke and Cross, 2009; Moore and Lakha, 2007; Smallman and John, 2001; Thompson and Tan, 2016; Waring, 2002) and described culture as a matter in which boards of directors should give endorsement (Hodgins *et al.*, 2016; Joss *et al.*, 2017) take ownership and become ambassadors (Alhadeff *et al.*, 2012; Boardman and Lyon, 2006; Ferguson, 2015; IOD-NZ, 2013; Lo, 2012). One longitudinal case study supported that increasing board members' awareness and understanding of safety culture is indeed related to improvements in OHS (Thompson and Tan, 2016).

Boards can establish a safety/OHS culture by creating a safety/OHS vision (CRSC, 2017; Ferguson, 2015; IOD-NZ, 2013), safety/OHS policies (Ferguson, 2015; Francis and Talwar, 2003; Epworth, 2017; Moraru and Băbuţ, 2012), and by integration of OHS at all levels of a company (Moraru and Băbuţ, 2012). Furthermore, a safety/OHS culture can be facilitated by requiring that employees comply with laws and regulations, ensuring employees report incidents, encouraging participation in OHS discussions, adopting a "safety first attitude" (IOD-NZ, 2013; Schrover, 2008), holding managers accountable (IOD-NZ, 2013), encouraging openness (Webster and Lunt, 2016), responding to reports and performance measures (Wright *et al.*, 2003) and celebrating good OHS performance (CRSC, 2017; Hughes and Ferrett, 2011). Overall, boards should recognize the importance of board members' actions in engaging and supporting workers in OHS (Francis and Talwar, 2003). One paper criticized the extensive responsibility placed on the employee when leading OHS by culture (Gray, 2009).

Strategy

Although it has been pointed out that OHS strategy should go beyond reactive risk management and what is mandated by regulation (Klettner *et al.*, 2014; Leblanc, 2016),the literature on OHS strategy often concerns risk mitigation (e.g. Waring, 2002). It was suggested that the strategy should focus on proactive planning and iterative revisions of plans to identify and manage risks before they occur (Hughes and Ferrett, 2011; Sandén, 1976; Thompson and Tan, 2016; Webster and Lunt, 2016). That is, OHS failure was usually seen as a threat to *daily* operations and productivity. Even though this may often be the case, major accident hazards or health hazards (such as railroad accidents or asbestos exposures) could threaten the existence of an organization and thereby be considered strategic rather than operational risks (Klettner *et al.*, 2014; Waring, 2002).

It has been suggested that to form a strategy responding to internal and external risks and opportunities, a coherent, integrated understanding of risks (OHS, major hazards, fire, and security) and plans, as well as an efficient management processes, is required (Boardman and Lyon, 2006; Waring, 1999). This includes risk assessments of financial cost cutting (Lo, 2012), allocating sufficient resources for OHS issues and operations (CRSC, 2017; Hurst and Vassie, 2008) and treating employees as a long-term strategic resource (Clarke, 2015). A strategy could also include plans for recruitment (e.g. when appointing senior managers; Hughes and Ferrett, 2011) and plans for both internal (Hughes and Ferrett, 2011) and external communication (CRSC, 2017; Ferguson, 2015; Khushrushahi, 2012), including reporting on OHS in CSR reports and annual company reports. Furthermore, having a continual improvement approach focusing on the entire life cycle of the company was emphasized (Locke and Cross, 2009; Siemieniuch and Sinclair, 2008).

Performance management

Several sources suggested that boards should set key objectives, performance indicators and incentive schemes related to health and safety (Boardman and Lyon, 2006; Bunn *et al.*, 2001; CRSC, 2017; Ferguson, 2015; Lo, 2012; Moraru and Băbuț, 2012; Waring, 2002). Performance indicators, which include a mix of leading and lagging indicators (Ferguson, 2015; IOD-NZ, 2013; Khushrushahi, 2012), should be a mix of strategic-, outcome- and process-based measures (Khushrushahi, 2012). Strategic measures that were mentioned include safety performance and culture (Ferguson, 2015; IOD-NZ, 2013); outcome measures include absences from work (Hughes and Ferrett, 2011), accidents at work, injury and illness rates, severity of injuries, and near-miss reporting (IOD-NZ, 2013; Khushrushahi, 2012); OHS process measures include training measures, employee perception surveys (Khushrushahi, 2012), and reports on employees' training progress (Hughes and Ferrett, 2011). Overall, several sources suggested mixing quantitative and qualitative indicators, covering tangible and intangible aspects (Hughes and Ferrett, 2011).

Boards should create OHS incentive structures for senior management (Boardman and Lyon, 2006; Klettner, 2014; Leblanc, 2016). A performance measurement system should pay attention to the potential trade-off between OHS and other indicators such as financial performance (Kruse and Lundbergh, 2010; Mackenzie, 2007), between different regulations (Du Plessis *et al.*, 2010) and between what is easy to measure and what is important to measure (Locke and Cross, 2009).

Lastly, it is suggested that the performance of boards should also be evaluated (Minguillón and Yacuzzi, 2009), including presenting data on their safety leadership (Ferguson, 2015) or the general organizational OHS performance (Hughes and Ferrett, 2011) to shareholders and investors.

Internal controls

Some studies concluded that boards should oversee how organizations manage OHS, particularly how risks are controlled (Boardman and Lyon, 2006; Ferguson, 2015; Francis and Talwar, 2003), including operational risks (Ferguson, 2015; Moore and Lakha, 2007), catastrophic accidents, health claims and legal risks (Moore and Lakha, 2007), and psychosocial and physical risks (Thompson and Tan, 2016). The system for internal control should be harmonized between different divisions of an organization and with its performance management system (Lo, 2012), possibly contributing to the establishment of an OHS culture by making managers (CRSC, 2017; Thompson and Tan, 2016) and executives (Murphy, 2016) accountable for risks and ensuring compliance with regulations (Boardman and Lyon, 2006). Internal control systems have several pitfalls that should be managed (Blewett and O'Keeffe, 2011).

Several studies recommended that internal control should be based on regular reports to the board (Lo, 2012; Lunt and Mike, 2016). Reports should be produced by internal as well as external personnel (Khushrushahi, 2012). One source recommended independent reviews twice a year (IOD-NZ, 2013). Others suggested reports on OHS at every board meeting (Hughes and Ferrett, 2011), monthly (Ferguson, 2015), or as soon as something had happened (Ferguson, 2015; Hughes and Ferrett, 2011). Some sources suggested reports in the form of audits or reviews (Hughes and Ferrett, 2011; IOD-NZ, 2013; Moore and Lakha, 2007; Moraru and Băbuț, 2012) or diligence reports (Ferguson, 2015; Peace *et al.*, 2017). Such reports could include trends in OHS indicators, statistical data, a detailed description of OHS in one business unit (changed to another unit for the next month), details on major risks, reporting according to a certain theme (such as safety culture, vehicle risks or plant maintenance; Peace *et al.*, 2017) and relating indicators to comparable industries (Güler and David, 2010; Hughes and Ferrett, 2011; Webster and Lunt, 2016). One study found, based on self-reported data, that

60% of boards in UK companies with >250 employees discussed health and safety quarterly and 74% used audit reports (Wright *et al.*, 2003). Several sources also recommended that board members inspect sites (CRSC, 2017; Ferguson, 2015; Hughes and Ferrett, 2011; IOD-NZ, 2013; Schrover, 2008). One source stressed the importance of senior management and workers reflecting and learning together (CRSC, 2017).

Structures

Several sources suggested OHS governance should be integrated into existing governance structures (Boardman and Lyon, 2006; Lo, 2012; Moraru and Băbuţ, 2012; Siemieniuch and Sinclair, 2008), which could facilitate organizational links between strategic, tactical and operational levels (Moore and Lakha, 2007). In line with this, it was recommended that OHS be integrated into existing subcommittees, rather than establishing a separate OHS subcommittee (Hughes and Ferrett, 2011; Khushrushahi, 2012; i.e. a subgroup of a board of directors with extended responsibility for OHS, with or without non-board members or independent advisors (CRSC, 2017)). Other sources instead argued for specific OHS subcommittees (Boardman and Lyon, 2006; Hughes and Ferrett, 2011; Locke and Cross, 2009). It was suggested that such subcommittees may be particularly relevant for large companies (CRSC, 2017), or companies with diverse (Ferguson, 2015) or high-risk operations (e.g. the mining and oil industries, which have long traditions of health and safety committees and are statistically more likely to have one; Murphy, 2016). A subcommittee of general sustainability was the most common structure among top companies measured by Dow Jones Sustainability World Indexes (Enric Ricart *et al.*, 2005). In a selection of high-income countries, 25–40% of publicly listed companies had an OHS board committee (Murphy, 2016). A study of firm performance found that subcommittees with specific performance outcomes achieved better results than broader sustainability committees (Burke *et al.*, 2019). Another study could not find conclusive evidence that OHS committees improved OHS, although 90% of members of the committees were convinced that they did strongly improve OHS (Murphy, 2016). Finally, one study found that corporate responsibility subcommittees are increasing in frequency and that companies with such a subcommittee rank higher on the Corporate Responsibility Index (a summative index based on a questionnaire about management practices; Spitzeck, 2009).

Subcommittees have been suggested to play an important role in creating an open culture (Khushrushahi, 2012), and their assessments can be an important motivator for executives to engage in OHS (Murphy, 2016). In practice, OHS committees (in Canada) have shown a mix of monitoring/reviewing and developing/recommending functions (Murphy, 2016), including supporting implementation in the day-to-day operations (Palk *et al.*, 2010).

Rather than a subcommittee of a board, a joint OHS committee (e.g. a safety forum) was also suggested. This is defined as a forum where workers and managers discuss challenges, audit scores and adverse events as well as raise concerns and identify and recommend best practices, which will in turn be communicated as recommendations to the board (Byrne, 2016; Siemieniuch and Sinclair, 2008). An additional way of structuring OHS is a "cascading safety committee structure." This means a formal hierarchical structure of several safety committee levels between a board and employees, facilitating information flow and informal discussion about rendering safety (Ferguson, 2015). Building a hierarchical structure can be done using several levels of organization, such as having a CSR committee oversee an executive committee that in turn oversees a planning committee that manages an OHS panel with operational working groups (De Wit *et al.*, 2006), which contrasts with the open structures and idea of OHS champions with direct links to their respective boards.

Discussion

Forty-nine studies were included in the review. Overall, there seem to be an agreement that boards of directors play an important role in OHS. The literature mostly focused on the boards' role in organizational culture, whereas the role of the competence of boards of directors was least discussed. A board's role was addressed more frequently in relation to safety than to aspects of employee health. Many of the studies were descriptive or normative rather than explanatory. In essence, the empirical findings contain descriptions of directors' attitudes and self-reported board activities: *Competence* literature covers the specific knowledge required and presumed effects of competence. The literature on *culture* is highly focused on how to define and capture culture and suggestions of structural changes or activities to create specific types of culture. In *strategy*, lack of OHS is seen as the threat to daily operations, and the literature focuses on connecting strategy to risk and long-term planning. *Performance management* concerns the design of specific indicators. *Internal controls* focuses on risks and reporting structure. *Structure* focused on integrating OHS work versus establishing separate OHS committees, and suggested effects on OHS performance.

The framework provide strong claims of recommendations of best practice (Boardman and Lyon, 2006, p. 39). We could not find any convincing sources that back those claims. While the findings align with assertions put forward by Boardman and Lyon (2006) they give limited insight into the scope of impact and the causal relationship between board activities and OHS outcomes. The literature's treatment of competence and structure suggests causal mechanisms but do not present studies were causality can be assessed.

Further, the one-sided focus on safety poses a challenge to theory and practice. Work-related health issues are increasingly dominated by psychosocial health issues (Irastorza *et al.*, 2015). In order to understand how boards can influence psychosocial health, it may be assumed that the board's role in safety also applies to psychosocial health issues. However, fundamental differences exist between safety and psychosocial health issues. For instance, an injury can more often be directly associated to a single event, and the outcome in terms of lost time due to injury is easily measurable. Psychosocial health issues are, in comparison, less direct and more complex in that they can depend on a number of organizational or personal factors (Adriaenssens *et al.*, 2015; Theorell *et al.*, 2015). That makes it harder to identify causes, and outcomes might lag substantially (i.e. risk factors might have effects several years later when employees display ill health). In addition, chronic musculoskeletal disorders are insufficiently researched in the material and they can have similarly complex mechanisms. This further underlines the importance of mapping the specific mechanisms by which the board influence specific components of OHS. Psychosocial health issues and chronic musculoskeletal disorders might require a different domain of knowledge, as well as skills in handling complex organizational causal links.

The reason for extensive focus on safety in the literature might be historic. Safety has been an important focus for OHS practice and research in high-risk industries such as mining and oil and gas (Klettner *et al.*, 2014). The reason might also be risk aversion (i.e. the main motivation for boards is to avoid catastrophic events that might threaten the existence of an organization (Waring, 2002), or negatively influence company reputation (McLaughlin, 2016)). In a broader sense, the historical influence on the literature highlights the potential impact of *context* on studied mechanisms for board influence on OHS. The general effect of context is not addressed in the sources.

Furthermore, the findings on *culture* suggest that a board's role in OHS is not exclusively about governance but also includes activities best described as leadership (e.g. conducting site inspections (CRSC, 2017; Ferguson, 2015; Hughes and Ferrett, 2011; IOD-NZ, 2013; Schrover, 2008), encouraging openness (Webster and Lunt, 2016), and supporting workers in OHS (Francis and Talwar, 2003)). If these activities are fully reframed as leadership by applying modern leadership theory, several questions arise that warrant further exploration.

Based on the analysis above four fundamental research gaps will be addressed: (1) Which board activities can influence OHS? (2) How (i.e. through what mechanisms) do board activities influence OHS? (3) How does context affect a board's influence on OHS? (4) Which role does a board's leadership play? We recognize that the lack of research is massive and there are certainly additional research gaps present.

Which board activities influence OHS?

The board activities found in this review makes intuitive sense and originate from descriptive case studies and normative assertions. However, the findings provide no insight into to what extent the activities actually influence OHS outcomes. It could be argued that describing useful board activities is not that difficult; the true challenge is to identify the activities that add substantial value to OHS. A better understanding of the influence of board activities on OHS could add to a theoretical understanding of a board's role in OHS and be of practical use, guiding the prioritization of board activities. Thus, a need exists for empirical studies that further investigate behaviors and attitudes of board directors. Such studies should clearly describe the board activities and what outcomes the activities have on leading, lagging and end-outcome indicators.

How do board activities influence OHS?

Scarce empirical evidence shows the mechanisms through which boards of directors influence outcomes. Given the governing role of directors, it could be argued that they have little direct influence on OHS outcomes. The suggestions made in the findings is rather to influence OHS indirectly through culture, internal control, performance management and organizational structures. Analyzing mechanisms connecting activities to outcomes is recommended for understanding complex relationships in organizational research (Dalkin *et al.*, 2015; Greenhalgh *et al.*, 2004; Pawson *et al.*, 2005). Future research should therefore look deeper into the mechanisms of how and why boards influence OHS outcomes. As the field has moved forward, the aspect of why has been explored since the search date of the present review (e.g. Lornudd *et al.*, 2020). However, additional studies are needed to assess the transferability of such findings.

How does context affect a board's influence on OHS?

A better understanding of mechanisms could give insights into how board activities influence outcomes in context and might enable transferability of findings between contexts. Three aspects of context are relevant for this review. Firstly, the unique context of every organization could hinder one set of best practices from being applicable to all organizations. Rather, a context specific best practice needs to be adopted. This further emphasizes, the previous suggestion to analyze underlying mechanisms. Secondly, this review identifies that many included studies are based in contexts in which safety is highly prioritized compared to other OHS issues. Future studies should increase their focus on board influence on complex health issues. Thirdly, social and technological development changes the context of companies, potentially influencing how mechanisms of action are enabled or mediated, and even the kind of OHS issues the board might have influence on. This mandate specific questions such as boards influence on work-home segregation or smartphone use during leisure.

Which role does a board's leadership play?

The leadership activities identified above have the function of leading by example and influencing the organizational culture. By analogy, a successful line manager can be expected

to exercise management in combination with leadership (Larsson and Lundholm, 2010). The suggestion that boards can, and should, combine governance and leadership has some support in previous research. For instance, Ferguson (2015) suggested a link exists between board leadership on safety and a strong safety culture. Another study has suggested that board members who are health professionals positively influence hospital performance, possibly due to a better understanding of organizational context and having credibility when leveraging support for new policies (Veronesi *et al.*, 2013). A study published after the completion of this review suggests that the proportion of women on the board affects corporate sustainability disclosures (Zahid *et al.*, 2019) , aligning with gender socialization theories suggesting that proportion of women would have an impact on OHS. However, the theoretical and empirical underpinning is largely absent in the sources identified in this review. The following investigations could be suggested: how leadership styles of boards influence OHS, which factors balance governance and leadership, and what processes boards use to develop leadership behavior.

Limitations

The study selection was done by one person (first author), potentially affecting reliability of inclusion. Nevertheless, the last author independently assessed the validity of the results.

We did not include search terms representing under-categories of OHS (e.g. ergonomic and psychosocial health). This may explain why only 4% of the publications were found to focus on health exclusively. This calls for caution in generalizing the results.

The study included non-peer-reviewed publications (e.g. internal company guidelines and external policy recommendations). The majority of these were from English-speaking countries. Other countries likely have recommendations in other languages, which implies that English-speaking countries are overrepresented.

Finally, as the number of publications was growing exponentially additional literature undoubtedly has been published since the search was performed.

Conclusions

Current evidence indicates that boards of directors might influence the OHS outcomes of companies. Suggested board activities are largely normative, based on regulation, and the current understanding does not enable prioritization of board activities. Empirical data gives some insight into case-specific board activities, but is skewed toward safety and methodological shortcomings, substantially limiting transferability. Context-dependent best practices might be a feasible approach. The research on board influence on OHS is in its infancy, and this review suggest that additional research is needed on which board activities influence OHS, how board activities influence OHS, the influence of context and the role of the board of director's leadership.

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