



A cross-sectional study of factors influencing occupational health and safety management practices in companies



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ABSTRACT

Companies need to ensure a functioning occupational health and safety management (OHSM) system to protect human health and safety during work, but generally there are differences in how successful they are in this endeavor. Earlier research has indicated that factors like company size, safety culture, and different measures of financial performance may be related to the quality of OHSM practices in companies. Therefore, the aim of this study was to investigate whether these factors are associated with OHSM practices in companies. A postal questionnaire was used to collect data from a sample of Swedish manufacturing companies, and complementary data regarding the companies were retrieved from a credit bureau database. The statistical analysis was performed with ordinal regression analysis using generalized estimating equations. Different predictor variables were modeled with OHSM practices as the outcome variable, in order to calculate *p*-values and to estimate odds ratios. Company size, safety culture, and creditworthiness were found to be associated with better, as well as worse, OHSM practices in companies (depending on directionality). Practical implications for industry and future research are discussed.

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1. Introduction

1.1. Occupational health and safety management

Companies are obliged to manage risks and hazards in the workplace in order to protect human health and safety (OSH Act, 1970; SFS, 1977; 89/391/EEC). Risks need to be systematically assessed, analyzed, and corrected. If a risk cannot be corrected right away, an action plan must be established and later followed up upon. Companies differ in how successful they are in achieving a functioning systematic occupational health and safety management (OHSM) system (Duijm et al., 2008; Nordlöf et al., 2015b). Functioning OHSM practices in companies save lives and protect health in organizations all over the world (Arocena and Nunez, 2010). Swedish national data suggest that about 50% of companies have an ongoing, systematic OHSM (Swedish Work Environment Authority, 2014, 2012, 2010). Several factors have been proposed to explain why companies struggle in having functioning systematic OHSM practices. Among these are lack of commitment

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(Arocena and Nunez, 2010; Biggs et al., 2013; Fernández-Muñiz et al., 2007a), lack of knowledge (Salminen, 1998), lack of financial resources (Larsson et al., 2007; Salminen, 1998), and lack of formalized routines (Arocena and Nunez, 2010; Holte and Kjestveit, 2012), as well as letting OHS take a back seat to productivity and profitability (Duijm et al., 2008; Karlun, 2004; Nordlöf et al., 2015a). Many of these factors tend to inversely correspond to the size of companies, in that smaller companies struggle more than larger ones (Champoux and Brun, 2003; Hasle and Limborg, 2006; Wilson and Koehn, 2000), and thus, company size is considered a proxy variable for the factors mentioned above (Beer, 1964; Nordlöf et al., 2015b). Indications in earlier studies suggest that the prevalence of different OHSM practices tends to increase with company size (Sönderstrup-Andersen et al., 2010; Torp and Moen, 2006; Saksvik et al., 2003), but further research is necessary to demonstrate the proposed association between company size and OHSM practices (Nordlöf et al., 2015b).

There is also some earlier evidence that research results may differ depending on how occupational health and safety (OHS) performance in companies is measured and evaluated (DeArmond et al., 2010; Holte and Kjestveit, 2012; Nordlöf et al., 2015b). It is presumably a significantly different measure to obtain information on factual circumstances regarding the management of OHS than to obtain personal views of respondents regarding the matter

(DeArmond et al., 2010; Nordlöf et al., 2015b). Facts about which OHSM practices are implemented and functioning within an organization constitute arguably different information than, for instance, an individual's perceptions of his or her own work situation, or someone's personal views on whether OHSM practices are sufficient or not.

1.2. Safety culture

The concept of safety culture is often used to illustrate that there are social processes in organizations that help or hinder certain behaviors or outcomes regarding OHS (Antonsen, 2009; Choudhry et al., 2007; Edwards et al., 2013). There are shared values and norms (culture) among humans that are learned through socialization in the workplace (Cialdini and Trost, 1998; Giddens, 1989; Mullen, 2004). Culture is, however, one out of several factors that influence behavior (Myers et al., 2014). The aspect of culture at a workplace that concerns health and safety, risks and hazards, is hence called safety culture (Antonsen, 2009; Nordlöf et al., 2015a). Earlier research has linked safety culture to accidents and safe/unsafe behavior (Brown et al., 2000; CAIB, 2003; IAEA, 1992; Watson et al., 2005), and safety culture is assumed to be associated with OHSM practices in companies, but this needs to be investigated further to establish a relationship (Cox et al., 1998; Fernández-Muñiz et al., 2007a; Guldenmund, 2010). Safety culture in organizations has previously been studied using questionnaires (perception surveys), or with qualitative and ethnographic methods, as well as by investigating accidents (Hopkins, 2006). To date, several different safety culture questionnaires have been employed in research and organizational development (Choudhry et al., 2007; Hopkins, 2006). Furthermore, a consensus has started to form around which primary factors (indicators) of a positive or negative safety culture are the most relevant (Choudhry et al., 2007; Frazier et al., 2013; IAEA, 2002; Walker, 2008), for example, management commitment, employee involvement, risk acceptance, and productivity pressure.

1.3. Financial performance

There is potentially a multitude of factors in companies that may be associated with functioning OHSM practices (Arocena and Nunez, 2010; Hasle and Limborg, 2006). Company size and safety culture could be two, as discussed above, and financial performance of companies could be another.

Financial performance of companies is often assumed to be associated with OHS adjustments in the workplace in general (Kelloway and Day, 2005; Rose et al., 2013; Salminen, 1998; Tompa et al., 2010), and sometimes to OHSM practices in particular (Larsson et al., 2007). The assumption is that if humans operate in a good work environment that is safe, healthy, ergonomically sound, creative, and so on, these beneficial factors will be reflected in the financial performance of the company. It is not easy to demonstrate such a relationship, and the direction of causality could be debated: Do already financially prosperous companies more easily designate resources for a functioning OHSM, or do OHSM investments/costs pay off in a manner that serves the ability of the whole organization to achieve more profits? Both scenarios could be accurate, and the chain of causality may be cyclical.

Earlier studies have, it seems, not explicitly investigated the possible association between financial performance of companies and OHSM practices as outcome.

1.4. Research focus and aim

To protect human health and safety in the workplace, it is essential that companies handle risks and hazards systematically;

still, many companies struggle to achieve the requirements. It is important to better understand which factors play a part (and to what extent) in functioning OHSM practices.

The aim of this study was to investigate different factors (e.g., company size, safety culture, and financial performance) that may influence occupational health and safety management practices in companies.

2. Methods

2.1. Study design

This study has a cross-sectional design, and data were collected with a postal questionnaire sent to manufacturing companies with 10 employees or more, in a Swedish county. Questionnaires were to be answered by one manager and one safety delegate per company. Complementary data concerning the companies were retrieved from a credit bureau database (UC.se, 2015). The statistical analysis was performed with ordinal regression analysis using generalized estimating equations (GEE).

2.2. Measures

2.2.1. OHSM practices

No generally established instrument to measure OHSM practices was found when reviewing the literature. We therefore designed this measure by reviewing legislation and earlier studies, and extracting from them the essentials of OHSM (e.g., AFS, 2001; Battaglia et al., 2015; Fernández-Muñiz et al., 2007b; SFS, 1977; 89/391/EEC). We formulated 13 items regarding different OHSM practices, which were to be answered with *yes/no/don't know* (Appendix). The items were together calculated as a joint index by summing the number of yes answers to produce the outcome variable OHSM practices.

2.2.2. Safety culture

Safety culture has been investigated with questionnaires in several earlier studies (Choudhry et al., 2007; Hopkins, 2006). In our survey of the literature we uncovered no safety culture instrument that effectively produces one global safety culture measure for analysis. We therefore decided to formulate items on primary factors for safety culture that together formed an index to use as a predictor variable. By systematically going through literature and earlier questionnaires, we found 13 primary factors that are most commonly used to indicate the state of safety culture in an organization (e.g., Antonsen, 2009; Choudhry et al., 2007; Frazier et al., 2013; IAEA, 2002; Nordlöf et al., 2015a; Ostrom et al., 1993; Walker, 2008). We then formulated items, expressed as statements, for each of the primary factors (Appendix). The items were to be answered using a Likert-type scale with the alternatives *yes, absolutely/yes, partly/no, not really/no, not at all*.

2.2.3. Work environment priority

To measure perceived priority of the work environment we used items developed by Nordlöf et al. (2012). In that study 42 items were used to measure a broad spectrum of primary factors related to perceived work environment priority in companies, which formed seven different indexes. To reduce the number of items in the questionnaire, we reformulated the seven indexes into seven items to use in this study. The items were written as statements and were to be answered using the same Likert-type scale as used for the safety culture items (Appendix). The seven items were together calculated as an index in order to produce the predictor variable work environment priority.

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