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Social influence and safe behavior in manufacturing

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ABSTRACT

This research presents a model designed to explore the cognitive and social mechanisms that mediate the relationship between organizational safety climate and safety behaviors. Specifically the presented research demonstrates the usefulness of Sussmann and Vecchio (1982) social influence interpretation of worker motivation to understand safety motivation. Survey data was collected from 428 employees in seven factories within the electronics industry in China. The data were analyzed using structural modelling. The results suggest that factory workers with more knowledge about the products, organization, goals/objectives and customers of the factory engage in safer work behavior. From social influence theory this may be understood as a process of identification, where factory workers through their involvement and increased knowledge of the factory are socially committed and influenced to work safely via their increased attractiveness of membership in the organization. This complements existing research and shows how other types of knowledge not directly related to safety knowledge may be important for improving safe work behavior. Another finding from the presented research indicate that the total effects of a factory workers experience with safety and health problems seems to affect safe work behavior negatively, and that this is caused by a decrease in confidence and abilities to work safely. In relation to practical implications the present study demonstrate how manufacturing managers can purposely adopt value related; identity related and utility related interpersonal influence processes to influence and improve factory workers commitment to work safely.

1. Introduction

The management of workplace safety has major economic and social consequences (Hedelund et al., 2016). When manufacturing managers makes decision related to workplace safety this affects the level of insurance costs as well as accident prevention and incurrence costs (Loeppke et al., 2007). Also the value of the firm, its brand and the productivity of the factory is affected by such decisions (Fernandez-Muniz et al., 2009). In respect to social implications, manufactory managers' decisions related to workplace safety affects the frequency of factory worker accidents as well as workplace incurred illness. More accidents may in turn lead to social decay of workers and to manufacturing processes caught in vicious cycle dominated by a deteriorating safety climate and safety performance. The ability to manage occupational health and safety in manufacturing is therefore increasingly important to society, to operations management and to the supply chain.

Workplace safety has been explored extensively across disciplines (Eid et al., 2012; Fan et al., 2014; Roberts et al., 2001; Weinstein, 1989; Zohar, 2010). Some research focuses mainly on technical and organizational aspects such as improvements in working conditions, safety climate and job design (Liu et al., 2015; Mullen, 2004; Wolf and Sampson, 2007). With a view towards social psychology however research have also explored how human motivational factors and social norms tied to factory workers themselves rather than their work environment may hold great explanatory power when it comes to workplace accidents and injuries (e.g. Fugas et al., 2012; Griffin and Hu, 2013; Hedelund et al., 2016; Mullen, 2004). Moreover some research combines both person and situational considerations to explain workplace safety in manufacturing environments (Christian et al., 2009). This is important since both are vital to the success of production improvement programs (Boudreau et al., 2003). Although research on workplace safety and safety management in production in this way have evolved, more research focusing on how person and situation factors interact to influence safety is needed (Christian et al., 2009). A detailed and structured approach to understand how workers as individuals are differently motivated to adhere to safe behavior within different safety climates and based on both value-related, identify-related and utility-related motivational antecedents is still missing from research. This is the focus and overall objective of the presented research.

The present study contributes by demonstrating the usefulness of the social influence interpretation of worker motivation provided by Sussmann and Vecchio (1982) to the study of safe work behavior. We

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show how the theory proposed by Sussmann and Vecchio (1982) complements the theory of planned behavior as operationalized by Fugas et al. (2012) and others. We show how the different types of motivational antecedents suggested by Sussmann and Vecchio (1982) provide additional structure and insights into the cognitive and social mechanisms that mediate the relationship between organizational safety climate and safety behaviors.

Another major contribution of the present research is that a couple of new antecedents to safe work behavior is hypothesized and tested. First, results from the presented research provide new insights into the relation between factory workers experience with safety and health problems and the behavioral intentions to work safely. The relation was suggested based on the proposition that experience with safety and health problems might have the potential to affect a factory workers core value system. This however seems not to be the case. Results indicate that experience with safety and health problems do not motivate factory workers to adopt less cavalier attitudes towards safety. However, results indicates that experience with safety and health problems may produce less confidence in own abilities to work safely. Results from this study thus indicate that the total effects of a factory workers experience with safety and health problems seems to affect safe work behavior negatively, and that this is caused by a decrease in confidence and abilities to work safely. Second, results from the presented research provide insight into the relation between factory workers knowledge of the factory and the behavioral intentions of workers to work safely. Workers knowledge of the factory is found to hold an especially strong relation to the behavioral intentions of workers to work safely. This may be understood as a process of identification, where factory workers through their involvement and increased knowledge of the products, organization, goals/objectives and customers of the factory becomes socially committed to work safely via their increased attractiveness of membership in the organization (Sussmann and Vecchio, 1982). As the types of knowledge normally explored as related to safe work behavior are closely related to safety procedures and practices, this is a new finding that complements existing research in the area.

This study adds to manufacturing managers' decision making and more generally to safety management practices by suggesting that managers should include considerations as to how their employees can be influenced to avoid engaging in intentional unsafe work behavior by providing them with value-related, identity related and/or utility related incentives. Findings suggest that including such considerations will prove helpful when designing safety performance improvement strategies. Specifically this study shows how manufacturing managers should consider involving manufacturing workers when it comes to providing them with more knowledge of the products, organization, goals/objectives and customers.

The remainder of this paper is structured in the following way. First, in the next section the theoretical background is provided. Then the research model and hypothesis is developed. This is followed by a description of the research method and a presentation and discussion of the results. Finally, conclusions are presented as well as limitations and directions for research.

2. Complementary explanation of unsafe behavior

Workplace safety is concerned with the study of the antecedents of safety performance in the work place (De Koster et al., 2011; Pagell and Gobeli, 2009; Vinodkumar and Bhasi, 2011). Safety performance in turn is the extent to which companies are able to prevent accidents and errors from happening (De Koster et al., 2011), and may be affected by a multitude of factors. E.g.: management commitment to safety or safety climate (Brown et al., 2000; Zohar, 2010); degree of workplace pressure (Prussia et al., 2003); the implementation of hazard reducing systems (De Koster et al., 2011); clarity in relation to managerial accountability for safety (Pagell et al., 2014) and the degree of openness about errors (McFadden et al., 2009). These are therefore all potential safety management mechanisms that are practices, roles and functions associated with remaining safe. There have been numerous attempts to identify specific safety management practices that predict safety performance (Vinodkumar and Bhasi, 2011). Thus literature has explored complementary explanations as to the origins of safety performance and unsafe behavior.

One set of explanations originates from the system itself and how it is designed. The assumption is that system design directly affects safety performance and that management therefore needs to focus carefully on process and manufacturing system design in order to maximize safety performance (Roberts, 1990). Normal accident theory provides a coherent model of system failure and offers insights into the reliability and safety of high consequence technical systems (Wolf and Sampson, 2007). Normal accident theory predicts that those systems having the characteristics of complexity and tight coupling are most at risk of system accidents (Perrow, 2011; Wolf, 2001).

Another set of explanation are the organizational practices put in place in order to enhance reliability and avoid accidents. High reliability theory predicts that organizations that seeks to know what they don't know and consistently communicates what the organization seeks to do and try to get everybody to communicate with each other about how they fit in the big picture will achieve a higher safety performance (Roberts et al., 2001). Within high-reliability organizations, employees have learned how to manage errors and risk in a way that has made them remarkably accident-free. Organizational practices are made that promote a higher attention to detail due to a focus on potential failure (Weick and Sutcliffe, 2001). Such a mindset allows individuals to collectively recognize and respond to error signals in their environments during the earliest stages of crisis development (Crowe et al., 2017). Previous research has explored different types of organizational practices promoting increased levels of safety performance (e.g. Allen et al., 2010; Nesheim and Gressgård, 2014; Skjerve et al., 2011; Størseth and Tinmannsvik, 2011). Some research explores after-action reviews and learning as important organizational safety management practices (Allen et al., 2010: Størseth and Tinmannsvik, 2011). Others highlight knowledge sharing mechanism as central to safety management. Nesheim and Gressgård (2014) for instance identified work experience, training, intrinsic motivation, job autonomy, location, and management support as influencing the level of knowledge sharing behavior, which again affects knowledge exploitation related to safe work conduct.

Safety climate and safety culture is generally accepted as another very dominant set of explanation that contribute to explain safe and unsafe behavior (e.g. Cooper and Phillips, 2004; DeJoy et al., 2010; Guldenmund, 2000; Kwon and Kim, 2013; Liu et al., 2015; Mearns et al., 2003; Mearns et al., 2013; Tharaldsen et al., 2008; Zohar, 2010). There are many definitions of safety climate, but in most it is broadly understood as the sum of employees' shared perceptions of the policies, procedures, and practices relating to safety in their work environment (Zohar, 2010). An important question forming employees' safety climate perceptions is whether safety is an organizational priority in relation to other organizational goals, such as productivity or efficiency? (Mearns et al., 2013). Safety climate is therefore related to how employees perceive organizational priorities (Liu et al., 2015; Vinodkumar and Bhasi, 2011).

Yet another set of explanations to the origins of safety performance is employees' safety motivation (Larsson et al., 2008). Here safety management is concerned with providing deliberate designed employee incentives to enhance their safe work behavior. This recognizes that management has a major role in motivating employees to work safely (Griffin and Hu, 2013), and a set of different motivational mechanisms have been explored (e.g. Dejoy et al., 2010; Griffin and Hu, 2013; Hedelund et al., 2010; Hedelund et al., 2016; Kvorning et al., 2015; Neal et al., 2000; Neal and Griffin, 2006). Griffin and Hu (2013) explored the role of monitoring, inspiring, and learning as three key mechanisms to motivate safety compliance and safety participation. In