INTRODUCTION

As modern societies become more risky (Beck, 1992), we observe an increase not only in the research interests but also research findings in the field of safety culture. In particular, there is a lot of researches about the safety culture in risky organizations (Cox et al., 1998; Diaz and Cabrea, 1997; Thompson et al., 1998).

Risky organizations are those which have higher possibility of accidents or which expose workers to a potentially harmful work environment. The increase in academic interest and empirical studies on the safety culture of high-risk organizations are the results of both practical and theoretical concerns. In practical terms, poor safety cultures contribute to accidents at risky organizations. Cox et al. (1999) showed that the Chernobyl nuclear accidents were the result of a lax safety culture at the power station. Also, the Columbia Accident Investigation Board (2003) concluded that the Columbia shuttle accident was the result of a poor safety culture at the National Aeronautical and Space Administration (NASA). In theoretical terms, accidents in a poor safety

THREE COMPETING PARADIGMS:
VERTICAL AND HORIZONTAL INTEGRATION OF
SAFETY CULTURE RESEARCH

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Many researches have been generated on the safety culture in high-risk organizations. Despite the number of studies, however, there is a lack of good models that incorporate different theories and methods of safety culture.

This research presents an integrated model to explain safety culture and to confirm the model by empirical analysis. This paper consists of two parts: First, after reviewing the existing researches on the safety culture, we propose an integrated model of safety culture that includes, vertically, three competing paradigms to explain safety culture – (a) risk perception paradigm, (b) managerialism and (c) organizational culturalism – and, horizontally, designed causal paths that include deep, mediate and outcome variables. Then we discuss the strength and weakness of each competing paradigm. Second, by using survey data comprising the responses of 862 employees at nuclear power stations in Korea, we test the causal paths and integrated models of three competing paradigms.

We empirically confirm the validity of the integrated model, which includes, vertically, theoretical paradigms and, horizontally, causal paths. This integrated model could contribute to establishing a more balanced scheme of safety culture at risky organizations.

Key Words: safety culture, theoretical paradigm, causality, risk perception, managerialism, organizational culturalism
culture occur not only as a result of mechanical failure but also because of human error and organizational failure (Gordon et al., 1996; Weigmann et al., 2002).

Although there are numerous studies about safety culture, there are few models that incorporate the theoretical and practical causes of accidents. Hence, our research presents a model that integrates three competing theoretical models as the vertical dimension, and a two-step causal path as the horizontal dimension.

This paper consists of two parts: First, after reviewing numerous studies of safety culture, we suggest an integrated model of safety culture that includes, vertically, three competing paradigms for explaining the safety culture – (a) risk perception paradigm, (b) managerialism, and (c) organizational culturalism – and, horizontally, a causal path that includes deep, mediate, and outcome variables. We discuss the strength and weakness of each competing paradigm.

Second, by using survey data from 862 employees at nuclear power stations, we test the integrated or causal path model.

THEORETICAL BACKGROUND

The Issues and Limits in Former Safety Researches

There is large body of safety researches (Cheyne et al., 1999; Clarke, 2000; Cox et al., 1998; Diaz and Cabrea, 1997; Griffin and Neal, 2000; Mearns et al., 2000; Thompon et al., 1998; Zohar, 2000). However, the number of studies does not reflect theoretical development in the field. Many scholars have commented that there are few good models for safety researches (Choudhry et al., 2006; Cooper, 2000; Glendon & Stanton, 2000; Parker, 2006; Pidgeon, 1998; Sorensen, 2002).

The lack of theoretical models may result from the conceptual ambiguities of safety research. Clarke (2000) argued that because of the conceptual ambiguity and weak empirical validation, there is no body of consistent results in safety research.

We believe that this conceptual ambiguity stems from two reasons: first, the lack of a conceptual model or dimension – vertical axis in our terms (see Figure 1) – and, second, the need for an elaboration of a causal model – horizontal axis in our terms (see Figure 1).

Guldenmund (2000) said that to understand safety culture, a discussion is needed of the dimensionality of theoretical concepts and causal models.

Former studies in safety culture have the following two weaknesses. First, existing safety researches have not suggested integrated theoretical or paradigm-based models that include different theoretical models of safety culture. Although there are many studies to confirm the validity of individual variables in safety culture – i.e., safety awareness, safety responsibility, safety motivation, management safety commitment – they have not developed a broad model to explain the whole story of safety culture. For example, to explain accidents at a nuclear reprocessing plant, Lee (1998) suggested factors such as job contentment, satisfaction with rewards/ praise, satisfaction with work relationships, trust in the workforce, personal understanding of safety rules, and safety actions. However, there is no comprehensive model to incorporate each variable. Hence, what is needed is a theoretical model of the paradigm-based dimension to incorporate the many variables of safety culture.

Of course, as argued by Guldenmund (2000), in spite of researchers trying to identify various dimensions of safety culture, there has not been much effort to establish relationships between them. Choudhary et al. (2006) said that although numerous studies have tried to build a comprehensive dimension for safety culture, few of the models include the heterogeneous components of safety culture in one model.

There are few studies to clarify the boundaries between attributes of individuals, groups, and organizations that compose the hierarchical layer of explanations, for which we set up the vertical axis in our research model. Since numerous studies have set up the safety culture as a composite of factors without specifying various dimensions of the safety culture, they have not explained the hierarchical or vertical relationships among those factors.

Second, there is to a large extent no clear causal model that develops distinctions between deep and shallow determinants and outcomes (i.e., the three step causal model in our study). Guldenmund (2000) argued that the conceptual chaos in safety research largely is the result of the characteristics of safety culture in which the causes and effects are inherently intertwined. His analysis demonstrates that causal models of the safety culture are unsatisfactory to the extent that they do not embody a causal chain but rather identify broad