

# The Evolution of Organizational Safety Culture: A Theoretical Study

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The study of organizational safety culture can be divided into the static study and the dynamic study. Many of its static studies have been carried out which focused on its definition, structure, construction, assessment and its impact on organizational safety performance. Unfortunately, the dynamic studies of organizational safety culture focusing on its evolution are relatively few, and the satisfying model for the evolution of organizational safety culture based on organizational safety culture itself is still missing. The main objective of this paper is to build a model for the evolution of organizational safety culture based on organizational safety culture itself compared with the existing models for the evolution of organizational safety culture, and a new Safety Culture Maturity (SCM) model in the organization is built. Meanwhile, the routes of the evolution of organizational safety culture are put forward, including the natural evolution and the mandatory evolution.

Keywords: organizational safety culture; evolution; Safety Culture Maturity (SCM)

## 1. Introduction

In the last three decades, organizational safety culture is part of a larger discursive shared by scholars and practitioners in the field of international safety science (Éder Henriqson et al., 2014). And more and more organizations around the world are showing a growing interest in the development of organizational safety culture as a means of enhancing the potential for organizational safety performance (Fang and Wu, 2013; Singer and Vogus, 2013). Overall, it is generally accepted wisdom that a positive and strong organizational safety culture is the fundamental guarantee and dynamic to maintain and promote the safe and sustainable development of an organization. Further, according to the research methodology of safety culture proposed by the author (Wu and Wang, 2016), safety culture should be studied from both static and dynamic aspects. Though the term of organizational safety culture has been widely studied by lots of researchers, unfortunately, since its dynamic researches have not been well addressed, a scientific and satisfying model for clearly formulating the mechanism and process of the evolution of organizational safety culture is still missing.

For many years, numerous studies of organizational safety culture have been carried out from the static perspective, which focused on its definition, characteristic, role, content, construction and assessment, as well as its impact on organizational safety performance (Antonsen, 2009; Guldenmund, 2000; Hopkins, 2006; Dejoy, 2005; Morrow et al., 2014; Tappin et al., 2015). However, because few studies have been conducted that analyse organizational safety culture evolution from the dynamic perspective, and its existing researches studied organizational safety culture evolution according to the changes members' attitudes and behaviors in relation to an organization's ongoing safety effected by organizational safety culture, such as three stages of development of organizational safety culture proposed by IAEA (2002a), models of maturity of organizational safety culture developed by Fleming (2001) and Hudson (2001), as well as a safety culture maturity model for petrochemical companies in Brazil (Filho et al., 2010), no paper proposes a model for the evolution of organizational safety culture based on organizational safety culture itself, the mechanism and influence factors of the evolution of organizational safety culture remain unclear, which leads to the development and assessment of organizational safety culture lacked of realistic theoretical guide. Therefore, unless the

mechanism and influence factors of organizational safety culture evolution are well addressed, a convincing and scientific path to foster a better organizational safety culture is far away to reach.

In order to clearly expound that how the organizational safety culture is formed and developed, the following two key issues are addressed in this study: (1) what the mechanism of the evolution of organizational safety culture should be and (2) what some factors that could have a major influence on the evolution of organizational safety culture based on organizational safety culture itself. In a nutshell, this paper presents a complete model for the evolution of organizational safety culture based on organizational safety culture itself.

## 2. States of organizational safety culture system

Viewing from the history, there is no doubt that any culture is in constant changes, nor is organizational safety culture an exception. According to square matrix of organizational safety culture by the author (Wang and Wu, 2015), organizational safety culture system can be divided into two systems that are the human system and material system. In other words, organizational safety culture should be fostered from the construction of human system (e.g. safety values; safety attitudes; safety behavior norms) and material system (e.g. the material carrier of safety culture; safety image). In addition, with the careful analysis of academic literatures (IAEA, 2002a; Fleming, 2001; Hudson, 2001; Filho et al., 2010) and practical investigation on the development of organizational safety culture, four states in the process of organizational safety culture evolution are proposed according to the similarity degree of human system and the externalization degree of material system, which are messy safety culture, glue safety culture, exterior safety culture and systematic safety culture (shown in Figure 1).

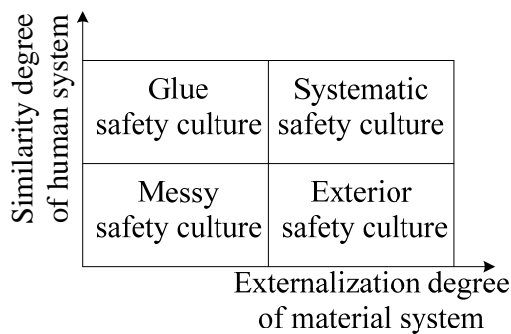


Figure 1. Four states of the organizational safety culture system

### 2.1 Messy safety culture

The key features of the messy safety culture include: (1) different organization's members have different values, attitudes and patterns of behavior that determine organization's safety and health; (2) different organization's members also hold different opinions on the same or similar safety problem; (3) the organization does not have any concrete development targets of organizational safety culture; and (4) the carrier of organizational safety culture is not constructed. Overall, the messy safety culture is recessive and diversified.

### 2.2 Glue safety culture

The key features of the glue safety culture include: (1) organizational safety culture has not exterior expressions; (2) organization's members have a few the same values, attitudes and behavioral norms for safety because they work together for a long time, inevitably, the strong interaction and influence are formed among them, and (3) the visual management strategies are not effectively applied to organizational safety management, and organizational safety image is hard to identified and showed by organization's members and the others. In a word, the glue safety culture is recessive and convergent.

### 2.3 Exterior safety culture

The organizational safety culture in the exterior safety culture state indicates that the organization has a rich exterior surface-structure safety culture and some behavior norms for safety. However, due to the lack of systematic pectionation and deep excavation of organizational safety culture, most of safety culture ideas and behavior norms only stay on the surface, namely, that are more of a kind of packaging and form. Consequently, the critical defect in the exterior safety culture is that organizational safety culture does not take root.

### 2.4 Systematic safety culture

The systematic safety culture is an ideal organizational safety culture, it indicates that the organization's safety ideas and safety behavior norms are recognized and accepted by all organization's members through the full exploring and solid construction of organizational safety culture, and the surface-structure safety culture is in conformance with organizational safety ideas, values and goals. In other words, the systematic safety culture has not only a positive human system but also a strong material system of the organizational safety culture system. Predictably, the systematic safety culture indicates that the goal of falling to the ground of the organizational safety culture has been achieved.

### 3. A new Safety Culture Maturity (SCM) model in organization

Maturity is defined by the relative independence, ability to take responsibility, and achievement-motivation of an individual or a group (Hersey and Blanchard, 1979). According to the life cycle theory of leadership (also known as situational leadership theory) was put forward by Hersey and Blanchard (1979), the maturity of organization's members includes four stages based on whether they have the ability and desirability (motivation) to accept and accomplish the tasks scheduled by their superiors, that are immature stage, preliminarily mature stage, relatively mature stage and mature stage. In the light of that, Safety Quality Maturity (SQM) of organization's members is separated into the above-mentioned four stages based on their safety quality including safety comprehension (e.g. safety values; safety attitudes; safety consciousness) performance and safety behavior (e.g. safety capability; safety habits; safety behavior norms) performance. Similarly, Safety Management Maturity (SMM) in organizations should include four stages referred to above. Based on the above analysis and four states of the organizational safety culture system, Safety Culture Maturity (SCM) curve in organization is drawn (shown in Figure 2).

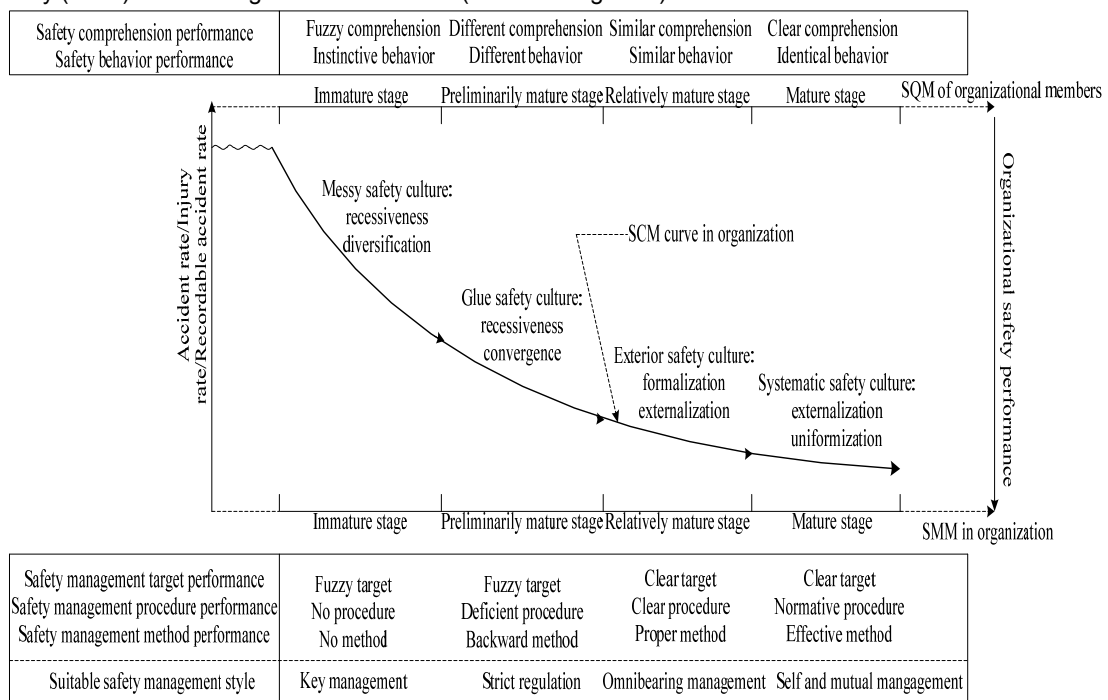


Figure 2. Safety Culture Maturity (SCM) curve in organizations

According to Safety Culture Maturity (SCM) curve, four stages of safety culture evolution seem to occur in every organization. Because safety quality of organization's members and safety management level in organizations would strongly influence the overall level of organizational safety culture, each stage involves a different Safety Quality Maturity (SQM) of organization's members and Safety Management Maturity (SMM) in organizations. In other words, the relationship of Safety Culture Maturity (SCM) with Safety Quality Maturity (SQM) and Safety Management Maturity (SMM) is fully expressed in an organization by Fig.2. Theoretically, the accident rate, injury rate and recordable accident rate decrease, but organizational safety performance rises with the Safety Culture Maturity (SCM) enhanced. The features of each stage are described below. Obviously, they may be used by an organization to diagnose which stage reflects its current state of safety culture more accurately and visually.

At stage 1: (1) the comprehensions of organization's members to safety is fuzzy, the organization sees safety as an external requirement of government, the legal framework and the regulatory bodies, and not as an aspect of conduct that will allow it to succeed. In other words, the organization and organization's members have yet to realize that safety is very important; (2) there is little awareness of the behavioral aspect of safety, safety is just an instinctive needs of organization's members, namely, being aware of safety is placed in the consideration and behaviors of their instinct; and (3) there is no a clear target, procedure and method to guide the organization's safety management, in fact, the organization seriously lacks experience in safety management. Therefore, organization's safety management should be carried out in allusion to serious hazards.

At stage 2: (1) although organization's members have some of the same comprehensions to safety because organization's members worked (e.g. cooperation; communication) together for a long time in an organization, most of the comprehensions of organization's members to safety are different due to the weak construction of organizational safety culture at this stage; (2) different organization's members usually have different performances on the behavioral aspect of safety, the behaviors of organization's members are hard to control for safety, and this aspect is largely missing from safety management; and (3) organization's safety management is not ideal in whole for its fuzzy target, deficient procedure and backward method, that is carry out by learning and imitating other organizations' safety management. Accordingly, organization's members should be strictly supervised as to safety. For example, safety is achieved by compliance with rigid rules and regulations.

At stage 3: (1) an organization and its members consider safety to be an important organization's goal, the most organization's members on the comprehensions of safety are tending to be similar, and their behaviors for safety are also tending to be the same because there is growing awareness of behavioral issues, the organization starts to show its safety culture with the carriers of safety culture (eg. the safety slogans, brochures, songs and microfilms; the organization's internal network); and (2) there are a clear target and procedure for guiding organizations' safety management, and proper methods are used in organizations' safety management. The omnibearing management style is quite suitable for organizations' safety management at stage 3, emphasizes on management for all organization's members and whole process in safety, and communication, education, enforcement and engineering measures to complement each other.

At stage 4: (1) safety is perceived to be an inherent part of the business. People within the organization have a clear comprehension of the importance and necessity of safety, and understand the impact on cultural issues on safety and the importance of unifying their understanding for safety; (2) there is active participation at all levels, the behavioral aspect of safety are basically the same for organization's members, and organization's members can consciously regulate their own behaviors according to the norms for safety and consistently match their words with their actions; and (3) an organization have the clear target, normative procedure and effective method for safety management, there is strong emphasis on improving efficiency and effectiveness. Overall, self and mutual management for safety has achieved at this stage, active capability, helping each other and cooperative learning of organization's members should be made full use of to guarantee safety by organizational safety managers. Pointed out specially, the four stages should not be considered as totally distinct. In addition, ideally, accident rate, injury rate and recordable accident rate decrease, and organizational safety performance increases with the increase of maturity of safety culture (shown in Figure 2).

#### **4. Routes of the evolution of organizational safety culture**

The whole evolution of organizational safety culture includes the evolution of human system (here it mainly refers to the content of safety culture) and material system (here it mainly refers to the form of safety culture) of safety culture. The evolution process of human system of organizational safety culture is characterized by the thinking and behavior of organization's leaders and other members on safety are gradually achieving homogeneity, the evolution process of material system of organizational safety culture is mainly manifested on a step by step process that safety culture is formalized and externalized with all kinds of safety culture carriers.

The evolution routes of organizational safety culture can be divided into the natural evolution and mandatory evolution based on the source of evolution power (Jones, 2014; Mawhinney, 2008). The power of natural evolution comes from an organization's members themselves (eg. changes of safety quality or needs of organization's members; organization development), is the influence of the organization's members on the evolution of organizational safety culture. But the power of mandatory evolution usually comes from the middle and top level managers (including safety managers) within an organization or external environment of an organization (eg. changes of safety values of the middle and top level managers; intervention of safety supervision department of government; the needs of safe development of organization; organization's accidents).

#### 4.1 The natural evolution

In general, the natural evolution means that organizational safety culture is formed and developed in the working together of organization's members. Organization's members usually do not know what or how to do for the safest when they just start a new job or post in an organization, so there are actually a lot of choices they could do regardless of whether it is safe. As time goes by and the work is repeated, they can find an effective way to ensure work safety. And after a long time, they can get a kind of repetitive behavior for safety in the learning and imitating from each other in an organization, and they have their own experiences and opinions on the problem "how and what to do for safety in an organization". Generally, a solution can be taken for granted by all organization's members if a safety problem can be addressed continuously and effectively by applying it.

And through the above process, a system of common safety values, attitudes, beliefs and behaviors can gradually formed in an organization and shared by organization's members, that is organizational safety culture according to the definitions of safety culture put forward by the International Atomic Energy Authority (IAEA,1991), Gludemund (2000) and Hopkins (2006). Additionally, the homogeneity of thinking and behavior of organization's members can strengthen with the increase of maturity of organization. Consequently, the natural evolution is one of the major factors to the formation, inheritance and continuity of organizational safety culture. Furthermore, because the natural evolution can give gradual impetus to the evolution of organizational safety culture, is a gradual process (which can be described by steep type), its evolution speed is low in a short time, but its sustainability is strong.

#### 4.2 The mandatory evolution

The natural evolution of organizational safety culture is an intrinsic and dynamic process. Inevitably, safety values, beliefs and norms of organization formed in the natural evolution of organizational safety culture, which could be eventually influenced by the external environment condition. Due to the competition on safety among organizations, the needs of safe development of organization, the organization's accidents and the requirements of national sustainable and safe development, organization could inevitably reflect on its safety thinking, norms and values, etc. The management of organization would focus on changing the organization's concept and behavior on safety because they do not suit with demand for safe development of organization and external environment.

In this case, the organization in general tend to be trying to break the natural evolution process of organizational safety culture and force to change the original organizational safety culture to adapt to the new environment and safety requirements. Specifically, advocating the new safety concept, adjusting the developing goal of safety culture, redesigning the organizational structure and reengineering safety business process would be done by the organization. A top-down enforced change to the original organizational safety culture is the mandatory evolution of organizational safety culture. Apparently, the mandatory evolution also is a main reason for the evolution of organizational safety culture. Furthermore, because the mandatory evolution can give radical impetus to the evolution of organizational safety culture, is a fairly radical process (which can be described by gentle type), its evolution speed is high in a short time, but its sustainability is weak.

#### 4.3 Comprehensive discussion

According to evolutionary theory (Chopard et al, 2000), the evolution of system is often characterized by randomness, systematisms, uncertainty and causality, and it's the same for the evolution of organizational safety culture system. Although the otherness and variability of between organization's members could lead to the evolution result of the organizational safety culture system obtained with uncertainty, some characteristics of organizational safety culture surviving from the screening mechanism that have some inertia to keep the stability and heredity of organizational safety culture.

The natural evolution of organizational safety culture emphasizes that organization's members play a leading role in the evolution of organizational safety culture, which means that organizational safety culture is formed and developed by individual and team learning on safety in the organization's division and cooperation, so it is a bottom-up evolution mechanism for organizational safety culture. Relatively, the mandatory evolution organizational safety culture emphasizes that some adjustments to the evolution paths of organizational safety culture are made by the management of an organization based on the external environment and new safety requirements, is a top-down evolution mechanism for organizational safety culture. To sum up, the two complement each other and work together to promote that the organizational safety culture is evolved from one state to another (their relationship can be abstracted as shown in Figure 3). And because of their existence, organizational safety culture could not only maintain consistency by the natural evolution, but also adapt to the changes of environment in an everchanging internal and external environment.

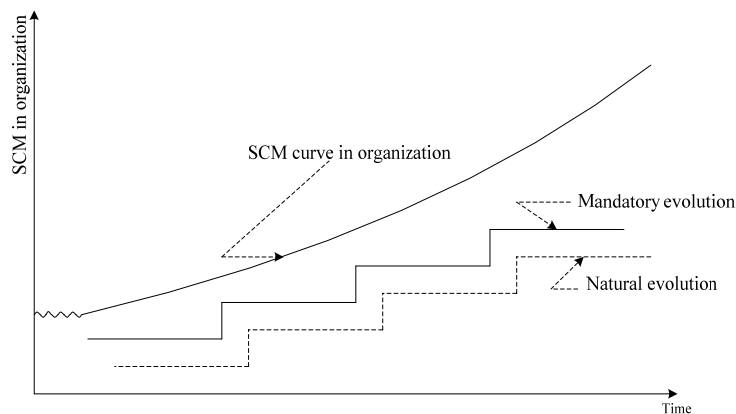


Figure 3. Forms of organizational safety culture evolution

### Acknowledgments

This study is supported by the Key Project of National Natural Science Foundation of China (No. 51534008).

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