A Preliminary Study on the Cultural Differences between Korean and Japanese Organizations in Nuclear Power Plants

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1. Research Purpose

The meltdowns of the Chernobyl and Fukushima I nuclear reactors are fundamentally linked to their organizational characteristics, as they caused severe social and economic disruptions with equally significant environmental and health-related impacts. This shows that we have to find practical solutions to reactor safety from various organizational standpoints by introducing a systematic approach to the issue of organizational deficiencies and human errors. We posit that one of the fundamental causes of organizational deficiencies can be derived from an organizational culture. An organizational culture has both formal and informal types. Generally, organizational culture refers to the common beliefs, values, norms, symbols, and language systems that organizational members use when they add meaning to their organizational behavior within their specific organizations.

The purpose of this study is threefold. First, we are interested in finding internal contradictions between Korean organizational culture and U.S.-derived organizational safety mechanisms applied to the operation of Korean NPPs (Nuclear Power Plants). We want to discern safety-related problems that are thought to have occurred routinely within the parameters of Korean NPPs owing to the use of U.S. safety mechanisms. Second, we compare the Korean and Japanese organizational culture in NPP mainly on safety and comfort cultures in order to cope with the cultural problems. Third, we want to propose an alternative model of safety mechanisms that are more appropriate for Korean organizational culture, using a system dynamic model that we devised based on empirical observations from the NPPs and factors drawn from the extant literature as compared with Japanese organizational culture.

2. Key Elements within Safety Culture and Comparisons in General

Generally, organizational culture refers to the common beliefs, values, norms, symbols, and language systems that organizational members use when they add meaning to their organizational behavior and organizational symbols within their specific organizations (Hofstede, 1991). An organizational culture has main four dimensions according to its beliefs, values, and norms. American organizational culture can be characterized by a short power distance, individualism, femininity, and low uncertainty avoidance. Korean organizational culture is characterized by a long power distance, collectivism, masculinity, and high uncertainty avoidance.

Therefore, internal conflicts occur when American organizational safety standards are applied to Korean organizations. This discrepancy may cause internal conflicts between the two. "Safety" and "Comfort" are two separate concepts, although they are both closely related to a specific generation's organizational culture. Safety refers to the state of being safe from dangers or threats through an objective measurement of such dangers using advanced technologies. Comfort refers to the state of being safe from dangers or threats through a subjective imagination gained from communication between individuals and organizations.

No matter how safe technologies indicate a reactor facility is, the organizational culture remains in an alert state if the members cannot obtain psychological comfort. If the members easily enjoy psychological comfort despite a technological failure to secure safety, the organizational culture becomes very insensitive to safety. Ideally, it is desirable to create an organizational culture that harnesses comfort only when the technologies say so. However, this is only an ideal situation, as many organizations experience difficulties of inducing this ideal result (Kato, 2011). American organizational culture has a system of securing comfort when technologies say so. This is because members of the organizational, managerial, and individual levels act based on "trust." Korean organizational culture cannot induce members comfort in even when the technologies guarantee it. This is because trust is not reached between organizational, managerial, and individual level members.

For example, although Americans have an individualistic culture, if organizations demand a no-smoking policy, every individual in the organization abides by the rule. In contrast, Koreans sometimes smoke in the public places, despite their collectivistic organizational culture in other cases. This is because organizations and individuals have no trust in each other. In a collectivistic culture, trust between organizations and individuals is usually lacking. The organization should promulgate the fundamental principle of "safety first no matter what" using written documents prepared by managers of the nuclear reactors.

3. A Comparison of Korean and Japanese Organizational (Safety and Comfort) Cultures

Japanese and Korean organizational cultures are substantially different despite their geometric proximity and race similarity, as shown in table 1. In general, Japan has a shorter power distance, higher masculinity, and more individual culture than Korea. Japan also avoids uncertainty more than Korea.

Table 1. A Comparison of Korean and Japanese Organizational Culture in NPPs (mainly on safety and comfort)

Nation	A Purview of Safety Culture	A Purview of Comfort Culture
Japan	-Long-term and grandeur organizational aim and vision (carrying out transcendental learning) -Putting emphasis on experience and tacit knowledge	-Incentive system (combination of ideological, evaluative, and self-realizing factors) -Middle up-down management
Korea	-Organizational aim, vision unclear (impossible to carry out transcendental learning) -Neglecting experience and tacit knowledge (inadequate treatment of experienced members; Only the leaders' experiences and tacit knowledge are important)	-Incentive system (only to quick adapters to the environment) -Top up-down management (Top: catalysts for informal subgroups; Middle: engineers of hyper fast environmental adaptation)

Figure 1 shows a comparison of Korean and Japanese organizational culture in NPPs, mainly focusing on safety and comfort cultures. Korea first and foremost should move from a [*Medium Safety + Low Comfort*] Culture to a [*High Safety + Low Comfort*] Culture. Eventually, it should move to [*High Safety + High Comfort*] Culture. To do so, Korea should sacrifice some of its quick adaption policies in favor of experience and tacit knowledge (i.e., a new organizational culture where experienced people become leaders with an emphasis on OJT (On the Job Training) and job rotation, instead of impromptu adaption).
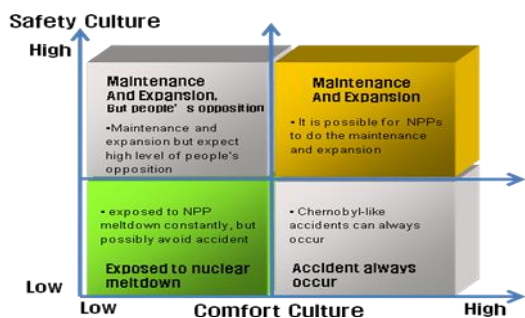

Figure 1. Organizational Cultures in 2×2 matrix

4. System Dynamics Modeling and Analysis of Organizational Culture

NPPs have been moving over a period of many years toward a state of high-risk where almost any change in usual behavior can lead to an accident. SD (System Dynamics) provides a framework for dealing with accident-concluding dynamic complexity, where cause and effect are not obviously related. Figure 2, 3 show examples of causal loop diagram for a SD analysis on an organizational culture along with the *manager's*

responsibility and *suppression factors* in an accident analysis. Figure 2 shows dynamically a relationship between the *management's responsibility and attitude*, *workload affecting by incident*. In this model structure, *Incident rate* resulted from the previous responsibility factor, feedbacks to factors in the sense that higher incident rates raise the level of workload, and adds to the management attitude, which all eventually lower the number of incidents. Figure 3 shows an *effectiveness of the suppression* (i.e., *willingness to report events*) which is affected by factors such as an experience, training effect, manager's effort.
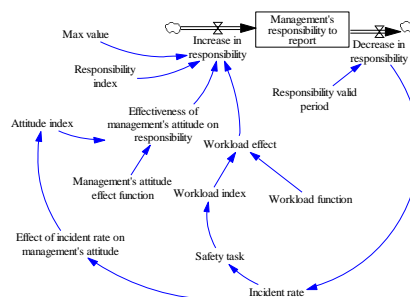

Figure 2. A Causal-Loop Diagram of Organizational Culture (*Management's responsibility*)
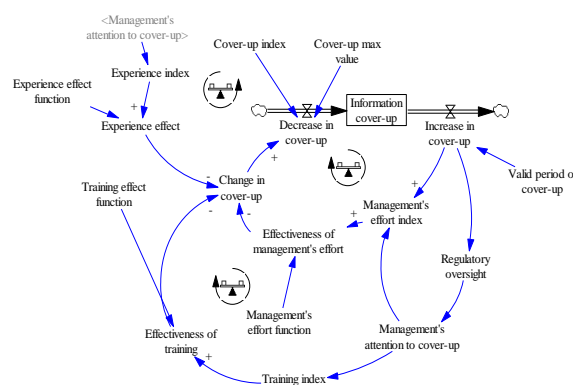

Figure 3. A Causal-Loop Diagram of Organizational Culture (*Information cover-up*)

5. Conclusion

Korean NPPs first and foremost should move from a [*Medium Safety + Low Comfort*] Culture to a [*High Safety + Low Comfort*] Culture, eventually and finally should move to [*High Safety + High Comfort*] Culture. To do so, they should sacrifice some of their quick adaption policies in favor of experience and tacit knowledge (i.e., a new organizational culture where experienced people become leaders with an emphasis on OJT and job rotation instead of impromptu adaption).

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