On the relation between culture, safety culture and safety management

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Abstract: Safety can be considered an emergent phenomenon, making a systems view imperative if the aim is to evaluate or develop the safety of an entire sociotechnical system. This paper deals with one important component of the systems view – the relation between culture and management. Specifically, we will inspect how the concepts of culture and safety culture can be used in conjunction with the concept of safety management in facilitating a more dynamic systems view on safety. The paper proposes a model of eight cultural archetypes and illustrates how these relate to both safety culture and safety management in organizations.

Keywords: Safety culture, Safety management, Organizational culture, Organizational factors.

1. INTRODUCTION

The concept of safety culture has become established in safety management applications in most major safety-critical domains. We have previously argued that in general, safety culture research and practice has often missed the opportunity to integrate with systemic approaches to safety [20]. The interested reader is referred to [20] for a comprehensive critique of safety culture as representing a systems concept. Safety can be considered an emergent phenomenon, making a systems view imperative if the aim is to evaluate or develop the safety of an entire sociotechnical system [17]. This paper deals with one important aspect of the systems view – the relation between culture and management. Specifically, we will inspect how the concepts of culture and safety culture can be used in conjunction with the concept of safety management in facilitating a more dynamic systems view on safety. The paper proposes a model of eight cultural archetypes and illustrates how these relate to both the safety culture and safety management in organizations.

We will base the following paper on two lines of empirical research carried out in parallel by the authors. The first line of research has focused on safety management in the nuclear power industry. In a recent study we conducted and analyzed thirty interviews with managers and safety experts in the nuclear industry and uncovered a number of dilemmas in safety management that need to be resolved by making trade-offs [18, 19]. The original aim of that study was to inspect safety culture in the Nordic nuclear industry based on the idea of taking a closer look at various tensions among values, goals, etc.. This data will be further analysed in this paper. The second line of research has been carried out in the health care domain, where the authors have developed a methodology for evaluating patient safety in hospitals. Based on these projects the authors have developed a preliminary framework of adaptive safety management [22] which has also been tested in an ongoing research project [16]. In this paper, we utilize the framework to illustrate how safety management, safety culture and organizational culture relate to and influence each other.

2. FRAMEWORKS ON CULTURE AND SAFETY

2.1. Safety culture

The concept of safety culture was born in the aftermath of the Chernobyl accident in 1986, when it became clear that nuclear safety should incorporate more than mere technology. Management systems, leadership and a host of other human related factors such as learning, responsibility, values and

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attitudes were taken into consideration (with varying operationalization's) in safety analyses and development initiatives. The concept of safety culture has today become established into safety management applications in safety-critical domains, such as aviation, nuclear power production, petrochemical sector (including offshore oil production), railways, peacetime military operations, maritime, and mining operations. Overviews of the use of the safety culture concept in empirical research have been provided by [2, 5, 6, 26].

The idea that safety culture somehow represents a systemic and holistic view on safety is seldom explicitly spoken out, but nevertheless seem to linger behind many safety culture discourses. A major challenge is however that such a holistic view on safety culture does not leave anything outside culture – everything becomes included and thereby analytical power is lost. Further, it can be argued that conceptualizing technology in cultural terms refers to the social construction of an objective physical reality, not to the physical reality itself [20]. Thus, in order to understand how e.g. safety management and safety culture relate to each other we need to specify what we mean by culture and how culture relates to the overall sociotechnical system which we are trying to manage [cf. 11]. For example, the value of safety often competes with other values and to understand the significance and specific meaning given to safety values one has to understand the whole structure of values in an organization. If safety culture is treated as a constituent part of a sociotechnical system, the overall system will have emergent properties that cannot be deduced from the study of safety culture alone [20].

We argue that in the debate about contents of safety culture one aspect has been largely neglected; namely the role of the safety management system and associated practices. It is true that one often finds that management attention and support is important for safety culture development, but this is usually portrayed in sweeping terms (eg. as items and factors in safety climate assessments) rather than detailed analysis. In order to develop a more detailed framework for analysis we need to have a model of organizational cultures and their relation to safety.

2.2. Competing Values Framework and Organizational Culture

One way of depicting organizational culture is that it refers to values, norms and assumptions concerning an organization's core task and the correct way of carrying it out, measuring success and interacting with each other while doing the work [23, cf. 11]. Development of distinct organizational culture has been considered a source of competitive advantage and even the key ingredient to success [3, 23].

Quinn and Rohrbaugh [15] have suggested a 'competing values approach' to organizational analysis by application of expert judgments and multidimensional scaling. Their study suggests that 'organizational researchers share an implicit theoretical framework, and, consequently, that the criteria of organizational effectiveness can be sorted according to three axes or value dimensions' (p.369). The first dimension is related to organizational focus '…from an internal, micro emphasis on the wellbeing and development of people in the organization to an external, macro emphasis on the wellbeing and development of the organization itself' (p. 369). The second dimension is related to organizational structure, with, at the one end, emphasis on stability and, at the other end, emphasis on flexibility. The third dimension is related to means-end relationships—e.g. planning and goal setting vs outcomes (productivity). Cameron and Quinn [3] developed these findings into Competing Values Framework (CVF) for assessing and profiling the dominant cultures of organizations.

In CVF, the two core dimensions form four quadrants, each representing a distinct cluster of criteria representing what is seen as good, right and appropriate, i.e., the fundamental values that exist in the organization. Safety can be one value – even if it is not explicitly dealt with in the CVF – but its significance and meaning only manifests in connection with the other values existing in the organization. We will return to this later.

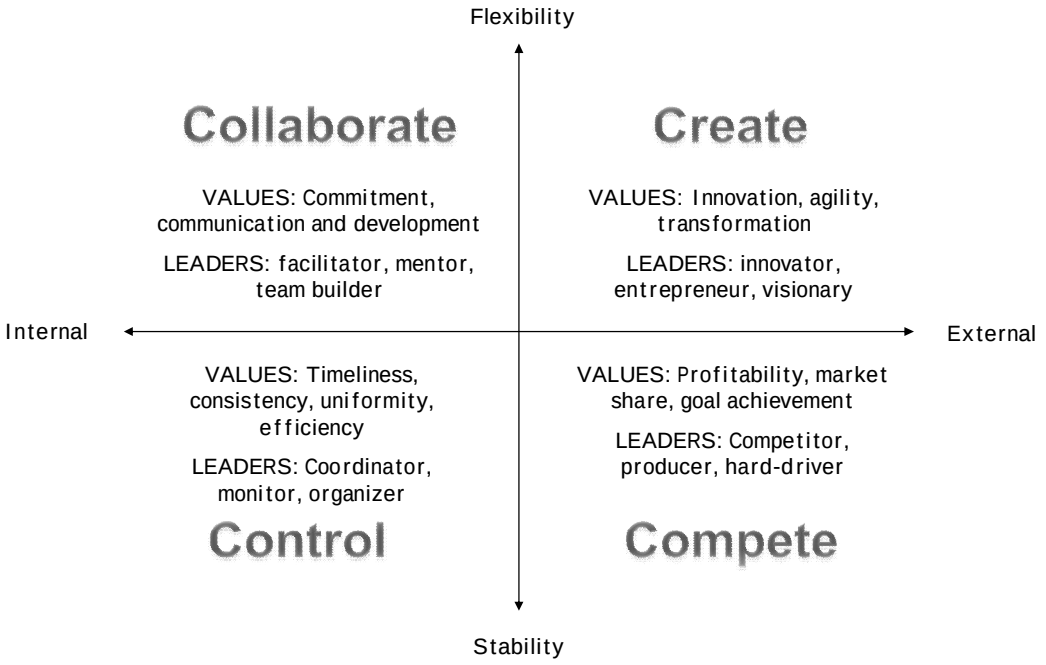

Figure 1: Cameron and Quinn's Competing Values Framework postulates four cultural archetypes with opposing assumptions about success and leadership [3, 14, 15]

The upper left quadrant (Collaborate) identifies value creation and performance criteria that emphasize an internal, organic focus. It is typified as a friendly place to work where people share a lot of themselves, like an extended family with best friends at work. Success is defined in terms of internal climate and concern for people. The organization places a premium on teamwork, participation, and consensus. The lower right quadrant (Compete) identifies value creation and performance criteria that emphasize external, control focus. The glue that holds the organization together is an emphasis on winning. Success is defined in terms of market share and market penetration. The upper right quadrant (Create) identifies value creation and performance criteria that emphasize external, organic focus. The glue that holds the organization together is commitment to experimentation and innovation. The emphasis is on being at the leading edge of new knowledge, products, and/or services. Success means producing unique and original products and services. The lower left quadrant (Control) emphasizes internal, control value creation and performance criteria. The long-term concerns of the organization are stability, predictability, and efficiency. Formal rules and policies hold the organization together. What is notable about these four quadrants is that they represent opposite or competing assumptions. Each continuum highlights value creation and key performance criteria that are opposite from the value creation and performance criteria on the other end of the continuum-- i.e., flexibility versus stability, internal focus versus external focus. The dimensions, therefore, produce quadrants that are also contradictory or competing on the diagonal. [3]

These competing elements in each quadrant give rise to one of the most important features of the CVF, the presence and necessity of paradox. CVF emphasizes that successful managers need to work simultaneously with several contradictory logics and shift their dominant value sets when circumstances so require [3, 14].

2.3. Reconceptualization of the Competing Values Framework

In our previous studies [18, 19], we reanalyzed the thirty interviews mentioned in the introduction from the point of view of tensions and competing values. The specific goal of the particular additional analysis was to look at how tensions, competing values and tradeoffs manifest in the management of

nuclear power plants. A second goal was to inspect how existing frameworks, such as CVF, can be used to model the tensions. The analysis identified twelve trade-offs. These were mapped into a framework that combined the Competing Values Framework with the universal value model of Schwartz [24, 25] with some variations made to the combined model. Figure 2 illustrates the main result [see 19].

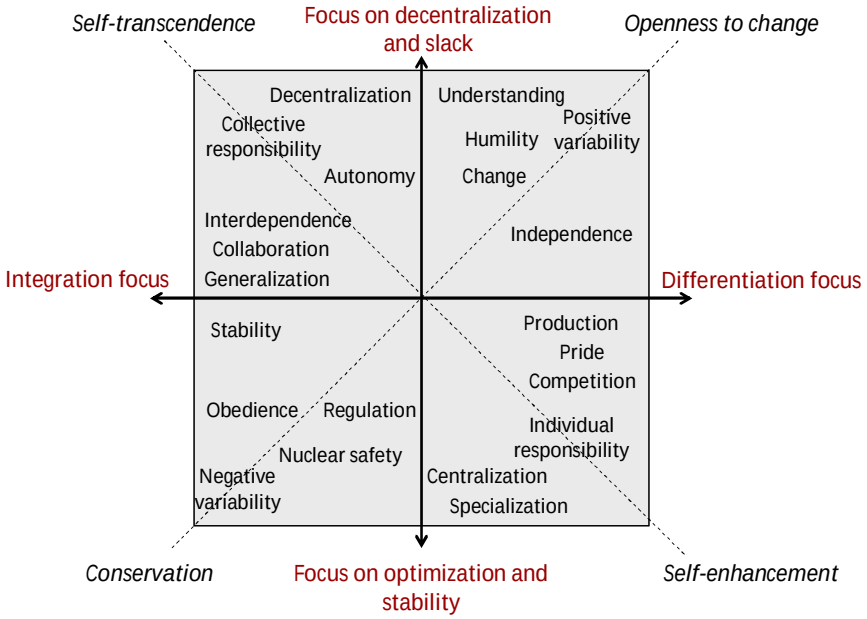

Figure 2. An illustration of the competing values underlying the twelve trade-offs [19]

The framework illustrated in Figure 2 was in later studies [22] expanded into a model of adaptive safety management. This model will be briefly presented next.

2.4. Principles of Adaptive Safety Management

Based on our previous work (see above) we have defined a safety management framework [22]. Figure 3 illustrates the proposed eight principles of managing safety. The underlying idea in the framework is to perceive safety-critical organizations as being complex adaptive systems with inherent features such as emergence, self-organizing and non-linearity [9, 10, 13]. Another underlying idea is that the principles are competing, or even partly in conflict [3, 27], and the managers and other safety professionals have to find the proper way to balance these in daily work.

As illustrated in Figure 3, safety managers need to promote safety as a shared guiding principle according to which situational decisions are made in the organization. This means that safety needs to be a shared value in the organization. In order to guarantee organizational cohesiveness and enough order for the system to both act in a structured manner and yet be flexible when needed, leaders have to facilitate interaction, build connections and build an environment which supports interaction. Novelty and diversity is needed to change and develop the organization. Novelty will lead to self-organized order, potentially contributing to the system's survival. However, in addition to disorder and variance safety-critical systems need other means of encouraging self-organizing. Since a complex adaptive organization cannot be fully controlled in the traditional top-down manner, a capability for self-organizing depending on the situational demands is needed. In complexity science, self-organizing is both a hallmark and the key adaptive mechanism of complex adaptive systems but also something that depends on the other characteristics of the system such as competence and situation awareness.

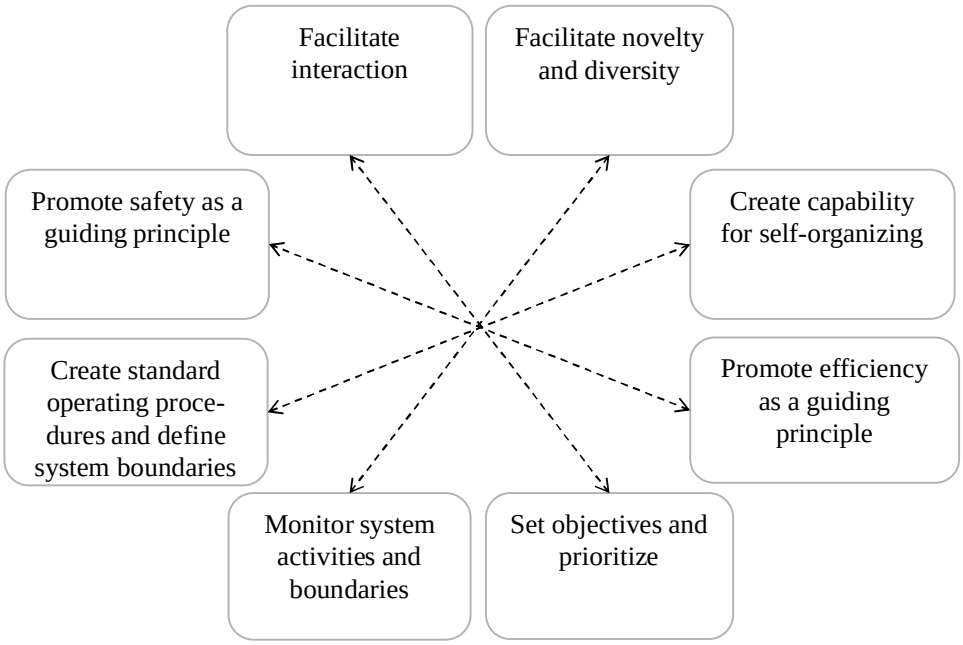

Figure 3. Principles of managing safety in complex adaptive organizations, Based on [22]

In addition to the above mentioned tasks, managers need to optimize the efficiency of organizational activities and promote efficiency as a shared goal. This requirement often manifests as a conflicting demand between efficiency and safety [8] but it is also a question of different time-frames [1], i.e., short versus long term goals. Even though complex adaptive organizations cannot be managed in the traditional meaning of the term, leaders in safety critical organizations still need to set objectives and prioritize. This present another consequence of complexity: the need to simplify and prioritize top-down some issues over others while at the same time facilitate interaction and focus on emergent themes coming from interacting groups. Complex adaptive organizations need explicit monitoring of system activities and their boundaries since they are constantly changing and since the change can also endanger safety if it happens unsupervised. Complex adaptive organizations need explicit boundaries since there are no natural all-inclusive boundaries between the various overlapping human systems. In safety-critical domains there is a need for analysis of risk and development of different types of rules and procedures to minimize risk and define the so called safe operating zone [7].

3. SAFETY MANAGEMENT IN DIFFERENT CULTURES

3.1. Challenges Faced in the Nordic Nuclear Industry

The cultural challenges of managing safety were evident also in our interview data. For example, in our interviews a representative of the nuclear industry contemplated decision making in his own organization:

> 'What I always try to say when it comes to safety culture is that, when we have these project managers who would like to go forward and then we have specialists who make demands … we need to reach mutual understanding. That is the highest level of safety culture, we have it and the regulator has it, that you need consensus … we have this [management group] that includes almost all functions of the organization; operations, engineering, quality, safety … it is very extensive group and it needs to reach consensus on what actions to take. You cannot have solitary decision making in the nuclear domain. It makes us a bit slow. Some complain we have too many meetings, but those are for getting people committed, and finding a

> solution that satisfies everyone … sometimes you need to discuss about issues and have a [face-to-face] meeting; it is quite difficult to put everything in writing'

The interview citation illustrated how the organization in question had created a certain type of culture, which is safety oriented and consensus seeking. This culture has been created by emphasizing safety as a guiding principle and by building an environment supporting the interaction of 'almost all functions of the organization'. This kind of culture exhibits traits of a 'people culture', a 'sustainable culture', and also a bit of a 'uniform culture' (see Figure 4). The interviewee also recognized the tension between their approach and that of a more performance focused culture; 'it makes us a bit slow'.

Many of our interviewees pointed out that they need to balance between conflicting principles in their safety management activities. For example, a nuclear industry representative contemplated the significance of work motivation:

> 'If a person is not motivated, he turns indifferent, and that does not go well together with maintaining nuclear safety. This is also one of the small dilemmas of nuclear power. We need diverse people, but … there has to be control and there is supervision. Some people may be demotivated from the amount of control. Of course some people are motivated by control, but we also need those people who reflect a bit, who want to think a bit wider. So where does the border for the control go when it starts to demotivate. … But of course the processes must be able to handle the issue that somebody is not so motivated. You cannot motivate everyone all the time, we are humans and humans have civilian life worries and other things that surely reflect to work from time to time. … But as I said [earlier], we do not trust in the one individual, rather it is the system, and the redundancies and diversities built into the system, that takes care of nuclear safety, irrespective of what the one individual does.'

The citation illustrates how the manager was considering the pros and cons of a culture that is based on uniformity and standardization, and acknowledged the need to counteract the negative effects of uniformity by diversity and autonomy – and the need to again counteract potential side-effects of individual initiative and relying on people.

The challenge of organizational culture change came up many times in the interviews. An interviewee from the power industry was asked about whether practices are adequately reflected upon in their organization and he gave an answer that implied a both yes and no:

> 'When people have been at work for twenty to thirty years, they don't change anymore. It is really difficult to get anything to change. Yes they [the practices] are reflected upon but to make a change happen is really difficult. Of course we have done a lot here and tried to change things and even succeeded in changing things, but the change happens through change of personnel. So the answer is yes, they are reflected.'

Finally, one interviewee describes how to draw the line between thoroughness and efficiency in decision making [cf. 8]:

> 'And then when everything is taken into account and done and so on, where is the line when you have reviewed enough in order to make a decision. This is continuous discussion that takes place in an expert organization such as ours; what is the adequate level of reviewing so that one dares to make a decision. One should not make too hasty decisions, but it is also safety that one does make decisions and goes forward.'

These empirical examples illustrate, together with section 2.3, how the management of safety is inherently contradictory activity that requires balancing between several competing demands and values. They also illustrate how the particular facet of organizational culture and organizational values called "safety culture" is situated in a space of different value orientations. It seems reasonable, then,

that attempts to diagnose safety culture and manage safety should be sensitive to how individuals and groups in an organization deal with conflicting values. In order to facilitate this, we will next propose a framework of organizational safety culture profiles.

3.2. Organizational Culture Profiles and Their Relation to Safety

In line with the examples in the previous section, we can give labels to eight distinct organizational culture types, or archetypes. We acknowledge that few organizations will fall exactly into any one of the eight categories, but rather exhibit some characteristics of all eight archetypes. Nevertheless, the culture types can be used as a heuristic when thinking about safety management and its relation to culture. The underlying idea is that each cultural type has both pros and cons in terms of safety management. Figure 4 illustrates how the archetypes and show how they are related to the eight principles of adaptive safety management. For example, 'people culture' is related to and congruent with the underlying assumptions of the management principle 'facilitate interaction'.

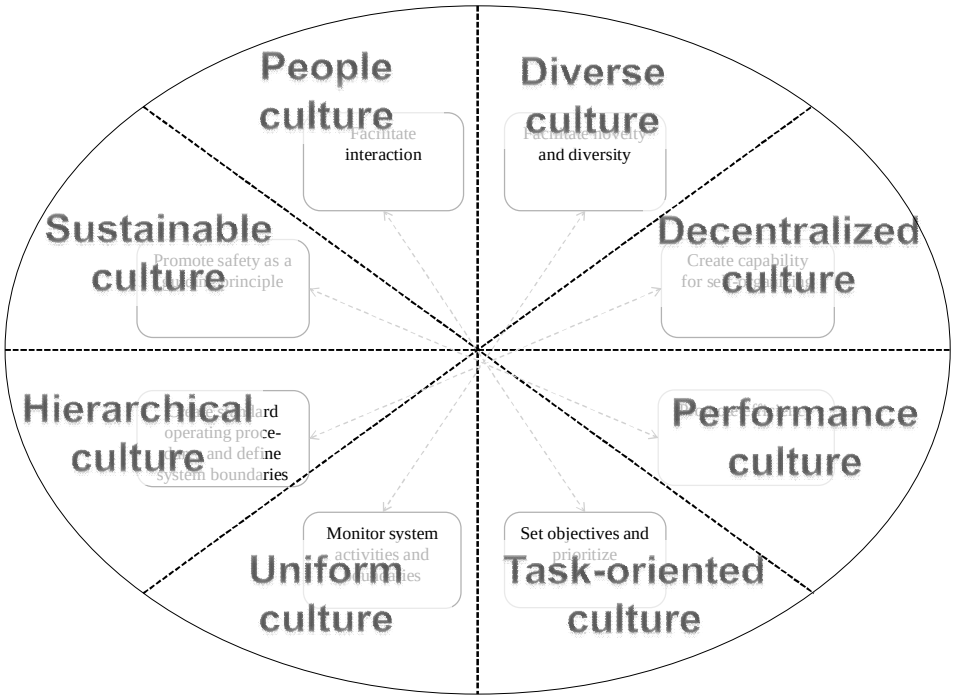

Figure 4. Certain cultural profiles are in line with certain safety management principles [based on 3, 19, 22].

It is important to note that these cultural types are seldom organization wide. Often there are subcultures in organizations and different units and departments can exhibit very different cultural characteristics. This in turn sets further challenges for safety management; what is valued and perceived as important and normal in one unit may not be so in the other department. Safety managers needs to adapt not only based on the external requirements and company culture, but also based on local cultures at different departments, work sites, plants etc.

Table 1 provides a brief description of each culture archetype together with a hypothesized safety manager role that would fit in the culture. Detailed description of the eight proposed cultural archetypes is beyond the scope of the current paper, but they offer a tool for abstracting the dominant culture pattern in each organization under study. Similar to the Competing Values Framework, we do not expect any organization to exhibit characteristics of one archetype only, but rather from all in a certain degree. On the other hand, these competing archetypes can cause tensions that require solving in the organization.

Table 1: Cultural archetypes and the perceived value of safety

Culture type	Brief description	Perceived value of safety
Sustainable	An organization that values long term goals, trust and interacting with personnel and the outside world. Collaboration partners (contractors, regulators, universities etc) are considered important stakeholders.	Safety is an important long-term requirement for a sustainable organization. Safety culture is viewed as a shared vision of safe future, a shared long-term value (an end-state).
People	An organization that values people and personal relations. Trust, transparency, equality, information sharing and collaboration are emphasized. Government institutions, trade unions, and adult educational centers are considered important stakeholders.	Safety is something that is important to personnel wellbeing. Safety is the organization's intellectual capital. Safety culture is viewed as a shared value of the importance of safety.
Diverse	An organization that nourishes novelty and diversity. Multiple and different opinions are tolerated and even embraced. New ideas and solutions are experimented. Universities, consultants and research institutes are considered important stakeholders.	Safety equals positive variability. Safety can be a hindrance to innovation, but innovation and diversity can also contribute to safety. Safety culture is viewed as a mindset supporting requisite variety and safety imagination.
Decentralized	An organization that is constantly evolving and adapting to situational circumstances. Few standards and written rules dictate behavior, and autonomy, initiative and decentralized decision making are valued.	Safety equals adaptability. Hazards that threaten safety create the boundaries that should not be crossed. Safety culture is viewed as a reminder of the safety boundaries and provider of a few simple rules that guide action.
Performance	An organization that values production, speed, keeping of schedules and efficiency. Shareholders are considered an important stakeholder group.	Safety is a prerequisite to operations but also a hindrance to efficiency. Safety is sometimes seen as "necessary evil", something that costs money without providing anything in return. Safety culture acts as a counterforce to production pressures.
Task-oriented	An organization that values productivity and effectiveness. The organization is goal-focused. Customers are considered the most important stakeholder.	Safety is important insomuch as it connects to the task the organization is carrying out, or if the customers require it. Unless customers strongly require safety efforts the commitment to safety can remain superficial.
Uniform	An organization that values consistency, stability and uniformity. The way of doing things is as important as the end result. Technical institutions, standardization agencies and auditing companies are among the key stakeholders.	Safety equals reliability, meaning that things are done in a similar manner and they produce a similar outcome. Safety culture acts as a shared response repertoire. Safety culture provides a uniform response.
Hierarchical	An organization that values hierarchy, rules, standardization and centralized decision making. People are expected to follow the rules and carry out their work within predefined roles and responsibilities.	Safety equals robustness, meaning that the organization is able to anticipate and respond to contingencies without challenging the status quo. Safety culture acts as a barrier against contingencies. Safety culture is viewed as something that should not change.

Table 2 illustrates how the different culture types relate to different safety management roles and what kind of challenges safety manager can encounter in a given culture. Both Table 1 and 2 are based on our empirical research [see above, and 19, 16, 22] as well as findings on organizational culture and

safety culture by [1, 3, 23]. However, they are still simplifications and cannot be taken as validated statements but rather as heuristics and hypothesized cultural assumptions, values and norms. Whether a given statement is valid in a specific organization is always an empirical question.

Table 2: Culture affects what kind of safety management is easily accepted and what is resisted

Culture type	Culturally accepted safety manager role	Potential safety challenges
Sustainable	Mentor who reminds people of the importance of safety and acts as an example of a safety-conscious employee. Long-term safety investments are considered acceptable.	Acute tasks are easily neglected in 'sustainable culture'. The lesser importance placed on effectiveness and efficiency can also in some cases have negative safety effects, e.g. if it affects the financial situations of the company.
People	Facilitator who provides support and participates to discussions but lets the personnel decide. People-centered and "soft" management style is expected.	It is not always easy to get 'tough' decisions through in a people culture. A demanding management style may be considered threatening and safety manager can find it difficult to require specific actions.
Diverse	Innovator who brings forth new ideas and who accepts diverse views (and diversity in general) from the personnel. Personal management styles are tolerated but uniformity and constraints are discouraged.	Constant changes and lack of uniform practices can cause anxiety for ordered safety managers. Diversity of people, opinions, practices and ways of working can be a source of risk that is difficult to manage without shared guidelines.
Decentralized	A broker (or a visionary) who provides views on hazards, safety and ways of working, and develops the organization actively, and together with different personnel groups. Autonomy and initiative is expected from both managers and personnel.	It can be difficult to standardize activities across the entire organization since there are multiple autonomous units in the culture. Autonomy can also promote risk taking. Safety manager has a lot of work in keeping up with developments in different units.
Performance	Producer who delivers safety results efficiently and on schedule. Actions that happen fast and are not expensive (or cost-benefit ratio is highly positive) are considered most acceptable.	Safety work is not easy to translate into quarterly performance targets. This easily leads to selection of short term acute tasks that can be completed quickly to the detriment of more strategic long term safety development.
Task-oriented	Hard-driver who listens to how customers view safety and requires that the organization delivers as high (or low) safety as the customer wants. Management style puts task first and people second.	If the customer is not interested in safety issues, it is very hard for the safety manager to get safety improvements made. Also, the lack of people focus can cause stress and decrease wellbeing among the personnel, which affect safety negatively.
Uniform	Monitor (or a stipulator) who checks that everything is in order and points out potential sources of negative variance in performance. The most familiar management style is impersonal and distant.	It is difficult to get ideas accepted if they cannot be applied to the entire organization at the same time. New ideas are easily resisted since variance and novelty is associated with negative events in 'uniform' culture.
Hierarchical	Coordinator (or a specifier) who handles resources and provides clear rules on how to act in different situations. Autonomy or initiative is not expected from managers or personnel.	Personnel expect clear guidance from the safety manager. Ambiguous instructions or giving freedom of choice to the personnel can be felt as anxiety provoking by them. Novel situations easily paralyze the personnel in 'hierarchical' cultures.

Tables 1 and 2 can be used in summarizing the results concerning an organization's dominant culture and comparing it with the organization's, and its managers', salient safety management principles (see also Figures 3 and 4). Differences in profiles may imply challenges in terms of striving to change the company culture or adjusting safety management to better fit the company culture. Often there is a need to conduct a mixture of both approaches.

We argue that it is possible to create a general frame of reference for selection of effective leadership practices by considering the principles and the culture types depicted in this paper. The specifics of selecting the most appropriate safety management strategy lies outside the scope of the current paper, but some factors of importance can be postulated: The current level of safety will most likely influence what type of actions should be taken and how they should be carried out [1]. Also, 'safety culture' maturity, here defined as how safety values are perceived in the organizational hierarchy of values (cf. Table 1) affects both the possibilities for action as well as what should be done. The core task of the organization sets both possibilities and constraints for safety. The inherent hazards differ between various industries, and those set specific requirements for safety management actions. Finally, the culture of the organization is an important factor to acknowledge in safety management, as illustrated in this paper.

It is important to remember that safety management should never focus only on culture but also on the structural aspects of the organization (division of labor, technology, instructions, etc) as well as work practices and personnel issues in general (competence, understanding of hazards etc). Safety emerges from all the elements of the sociotechnical system, not only from safety culture.

Sometimes leadership guides, for example, in the nuclear industry differentiate safety related leadership from production related leadership. There are probably many pragmatic reasons for doing so, and as we have also argued, safety and production can be in conflict. However, we propose that the conflict is not so much a matter of different leadership than different situations. Correspondingly, different situations require different type of leadership and the true quality of leadership is in recognising the type of leadership required at any given moment.

Pidgeon and O'Leary [12] call for 'safety imagination' to overcome the rigidity in beliefs about risks. They write: 'Avoiding disaster … involves an element of thinking both within administratively defined frames of reference (to deal with well-defined hazards that fall within an organization's prior worldview) and simultaneously stepping outside of those frames (to at least consider the possibility of emergent or ill-defined hazards that have not been identified in advance – or which perhaps fall outside of an organization's strict administrative or legal remit)' [12, p. 22]. Adaptive safety management should seek to benefit from the cultural characteristics of the organization yet transcend them and seek to dip into other belief systems to overcome excess rigidity – to maintain cultural adaptive capacity.

It can thus be argued that there is a further meta-dimension in addition to the eight principles – dimension of dynamic (or adaptive) versus static leadership. A dynamic leadership is able to shift from one principle to another based on the situational circumstances at hand. A static leadership is stuck in one role and is unable to adapt even when circumstances change. An adaptive leader is able to balance between different management principles [3, 4], and thus may overcome some of the blind spots created by the organization's dominant culture.

The safety management principles and the culture profiles depicted in this paper can help us in understanding the dual role of managers as both creators of culture [cf. 23] and agents of culture. Safety managers simultaneously lead and influence the system and act in the system. This means that safety managers need to balance not only between different safety management principles but also between actions targeted towards creating preconditions for others to act in a certain manner, and actions that manifest this type of wanted behavior – sometimes going against the dominant values of the culture in question. For example, a manager can on the one hand define system boundaries and create rules and standard operating procedures for the personnel to follow, and on the other hand

himself obey the rules and boundaries of the organization. On the other hand, a safety manager who perceives their organization as too proceduralized and dependent on written instructions and guidelines may decide to introduce some variance in the system by provoking discussion on hazards, potential blind spots as well as the role of rules in general. Changing cultural values is slow, and usually requires change in other elements of the sociotechnical system as well. The safety manager needs to work with all the elements, including but not limited to working with safety culture.

4. CONCLUSION

We can conclude the relation between safety culture, organizational culture and safety management by the following definitions:
- Safety culture refers to shared safety values and assumptions about safety
- Organizational culture refers to shared values, norms and assumptions concerning issues such as leadership, effectiveness etc. Some of these values and norms deal with safety and form the above mentioned safety culture, a subsystem of the organizational culture.
- Safety management needs to take put the safety values into the context of other values and shape the culture as well as practices, structures and technology to better facilitate overall safety. This requires trade-offs as well as adaptation to situational circumstances

Thus, culture defines how safety management is carried out, yet safety management should aim at influencing the culture by contextualizing safety as a value, reflecting the potential cultural blind spots and simultaneously building on the strengths of the culture.

The models presented in this paper may help in identifying the dynamics and specific values of the culture in question, and in defining how to proceed with increasing the importance of safety in the culture and other organizational preconditions for safety.

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