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Abstract

How can managers prepare for extreme but exceptional events and for the challenge of managing complexity and uncertainty in their daily business? Confronted with the challenge of achieving high and reliable performance in risk-prone, fast-paced, and unpredictable environments, managers and management scholars can learn a lot from the organizing principles of mindful organizing (MO). MO is based on lessons learned from the high-reliability seeking of organizations such as aircraft carriers and nuclear power plants as well as from the analysis of severe crisis events in these organizations. MO provides the guiding principles and proactive managerial mind-set to build collective organizational capabilities for anticipating the evolution of unexpected events and acting resiliently in times of crisis. The paradigm of MO differs from the rationality-based classical management paradigm, takes the complexity and unpredictability of organizations into account, and puts the design of sensemaking processes at the center of managerial attention. This article explores how the managerial paradigm of MO can be used in action-learning management development programs. I explain how to use the staff ride, a qualitative event analysis focusing on individual and collective sensemaking, to illustrate for managers how unexpected events evolve and how to develop collective patterns of mindfulness.

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There is much that managers can learn from the experiences of those who work in nuclear power, aviation, or wildland firefighting. Organizations in these fields have long been seeking to develop the abilities needed to perform reliably in highly dynamic, risk-prone, opaque, and uncertain environments. The question of how to assure performance under volatile and challenging conditions—be they waves of innovation or unforeseen crises—is no longer a concern only for classic high-risk industries. Nor is it just a matter of viewing a crisis as an exceptional, abnormal, and urgent event (Pearson & Clair, 1998) that is addressed in parallel to “normal” business routines (Roux-Dufort, 2007). Dealing with the unexpected has become a fundamental management challenge that goes beyond the question of how to handle ruptures (Lagadec, 2000) and unceivables (Rosenthal, 2003; Taleb, 2008). Raising awareness of and finding ways of responding to unanticipated occurrences on a daily basis in order to avoid more consequential crises has to be addressed in management education programs in universities, as well as corporate management development programs for practitioners. Issues include

- How can managers be sensitized to the step-by-step evolution of unwanted events and crises?
- How can they learn to cultivate capabilities that allow early detection of sudden changes in their markets, brewing crises, or technical innovations?
- How can they proactively learn to develop collective problem-solving capabilities that assure resilience for a worst-case scenario or an event they cannot even imagine?
- How can they become attuned to the conditions and patterns that breed crisis (e.g., assumption-based behavior and cognitive-biases)?
- What skills and what forms of cooperation are required to remain functional?
- What behaviors can promote leadership under conditions of uncertainty?

This article discusses mindful organizing (MO) as a new paradigm for managing and organizing under conditions of uncertainty. I argue that an action-learning program can help impart the principles of MO. The first

section discusses the concept of MO. Specifically, I consider how MO differs from classical management approaches and how it adds to the crisis management literature. The second section elaborates on how MO can promote management learning. In particular, I explore how the principles of MO can serve as a basis to develop managers and explain how staff rides can introduce them to the new premises of organizing and give them experience in the application of MO.

Mindful Organizing as a New Management Paradigm

MO provides the guiding principles and managerial mind-set to become more proactive and build collective organizational capabilities that anticipate the evolution of unexpected events and promote resilience in times of crisis (Weick & Sutcliffe, 2001). MO focuses on the incubation of unwanted events and crises, long before they occur. It puts the emphasis on designing reliability by recognizing latent failures, deviances, and surprises that foreshadow the development of larger unwanted events. In contrast, crisis management focuses on what happens if these events are not precluded (Boin, 't Hart, Stern, & Sundelius, 2005).

MO is based on lessons learned from highly reliable organizations, such as aircraft carriers or nuclear power plants, as well as from the analysis of severe crisis events in these organizations. With its roots in quality control, the question of reliability broadened in scope in the 1980s. In light of the first major crisis events resulting from complex technologies and infrastructure systems (e.g., Chernobyl in 1986), the awareness of risks amplified (Beck, 1992). Reliability no longer was seen as an internal question involving products and production that could be traded off with other organizational values such as efficiency or velocity (Schulman & Roe, 2008). It became a topic of public interest – a question of survival. The first studies that connected human and organizational factors (Reason, 1972) were followed by numerous case studies of major disasters such as the Three Mile Island nuclear incident (Perrow, 1984), the explosion of NASA's *Challenger* and *Columbia* space shuttles (Vaughan, 1996), the Tenerife air crash (Weick, 1990), and the Mann Gulch forest fire (Weick, 1993). Other research focused on incidents or operations in varied high-risk organization (HROs) such as air traffic control systems (LaPorte, 1988), naval aircraft carriers (Rochlin, LaPorte, & Roberts, 1987), nuclear power operations (Bourrier, 1996; Marcus, 1995), and hospitals (Vogus, Sutcliffe, & Weick, 2010; Weick & Sutcliffe, 2003). HROs have in common the need to perform dependably

under very trying conditions, given no tolerance for failure (their first trial could be their last), demands for both high efficiency and robustness, and an unforgiving political/public environment.

Two major streams of work have influenced the research on HRO. Following a technological–structural perspective, normal accident theory comes to the somewhat pessimistic conclusion that the coexistence of high interactive complexity and tight coupling in the system limits the conditions for reliability, despite the management practices in place (Perrow, 1994). High reliability theory (HRT) concentrated on HROs—some aircraft carriers, nuclear power plants, or air traffic control centers—that were able to achieve remarkably reliable performance (LaPorte & Consolini, 1991; Roberts, 1990, 1993; Schulman, 1993; Weick & Roberts, 1993). According to HRT, structural, managerial, and cultural characteristics in these organizations serve to buffer the risk of unpredictable consequences described by Perrow.

Weick, Sutcliffe, and Obstfeld (1999) systematically reviewed case studies and the underlying premises of HRT research. They explained that whereas early HRT focused on the total elimination of error, the absence of trial-and-error learning, a needed buffering from environmental influences and a singular focus on safety, later versions of HRT viewed errors as inevitable events and recognized the need to facilitate trial-and-error learning. They discussed the importance of exogenous influences such as regulations and public perception on reliability, as well as the ability of HROs to pursue and balance multiple objectives such as safety and efficiency (Weick et al., 1999). Given these developments, the definition of high-reliability organizing changed over time from a more output-oriented definition (Roberts, 1990) to a more input- and activity-driven definition (Weick & Sutcliffe, 2001).

High reliability is no longer seen as a static characteristic of an organization. Instead, creating reliability is considered an ongoing effort. Reliability and safety are dynamic nonevents that constantly have to be fostered (Weick, 2011). Reflecting this process-oriented perspective, recent versions of HRT prefer using the activity-oriented gerund “high reliability organizing” or “high reliability-seeking organizations” rather than the fixed noun of high-reliability organizations (Vogus & Welbourne, 2003). Reliability in organizations is not achieved by a set of stable routines and concepts, but by a set of cognitive processes of perception and collective sensemaking. These activities of MO (Weick & Sutcliffe, 2001) result in a distinctive quality of organizational attentiveness and responsiveness that creates reliability. Weick et al. (1999) call this quality “collective mindfulness.” Principles of mindfulness on the individual level (Langer, 1989) are translated to the group level. Collective mindfulness comes from interaction patterns that help individuals to develop, refine, and update a shared understanding of a situation, to sense

and react to early signals. Although MO practices may look very different from organization to organization, they tend to include a sensitivity to operations in the here and now, a preoccupation with failure and even small deviations and a reluctance to simplify interpretations. If something goes wrong, practices of MO migrate decision taking to the location with the greatest knowledge or best overview in that specific situation—regardless of the existing hierarchical order in normal times. MO also implies a strong commitment to resilience. Whereas the first three principles are concerned with sensing and sensemaking abilities of evolving events, the latter fosters resilience capabilities in case of “fire.”

Characteristics of Mindful Organizing

Developments in HRT have led to a revision of the underlying premises and assumptions of organizing and managing to establish reliability. Newer HRT (Weick & Sutcliffe, 2001), with its emphasis on MO, questions the predictability, stability, and rationality of social systems and seeks novel ways to deal with the challenges of unpredictability, impermanence, irrationality, and cognitive biases. Looking at the concept from the perspective of sociological system theory (Baecker, 2011; Luhmann, 1984, 2000), newer HRT provides interesting practical examples of how organizations can overcome the premises of rational decision taking and the misguided belief in the predictability of social systems. HRT fosters giving up the risky “illusion of control” (Langer, 1975). Newer HRT differs from classical management approaches concerned with risk, safety, or quality management (e.g., Crosby, 1979; Garvin, 1984). Classical approaches try to control all expected liabilities to gain reliability. Enhancing collective mindfulness forces managers to rethink fundamental wisdom about organizing as well as the role of leadership and management. Rather than focusing on short-term efficiency goals, leaders need to create a culture of trust and respect, transparency, mutual information, and honesty. Such a “culture of candor” (O’Toole & Bennis, 2009) provides organizations with the basic conditions to succeed in dynamic contexts. Adopting mindful practices allows managers to reflect on their own beliefs and practices and to learn how to deal with uncertainty and unexpected events. The main differences between MO and traditional management approaches follow.

Uncertainty as a Given

MO does not create reliability by control mechanisms, checklists, or procedures in an attempt to assure stability. On the contrary, as uncertainty is

considered the only certainty, preparedness for change and the ability to adapt quickly to new situations are the most important prerequisites for reliable performance. Organizations are considered not as complicated but as complex social systems (Luhmann, 2000). Whereas complicated systems are difficult but, in principle, potentially controllable, complex systems are unpredictable. Even highly detailed knowledge about every single component and the interrelations among these components does not enable a manager to predict the behavior of the whole system (Baecker, 2003). As complex systems, organizations are able to learn and therefore hard to predict. Managers have to assume that they are not able to get a complete picture of the organization (Nohria, 2006). They have to learn how to deal with complex, ambiguous, and unpredictable situations (Kane & Goldgehn, 2011). Managers have to take conscious steps to broaden their picture and face complexity (Pinha e Cunha, Vieira da Cunha, & Cabral-Cardoso, 2004). This is to say, complex systems cannot be controlled; they can only be navigated—and managers can use the principles of MO to create the necessary maps to do so. Whereas the naïve premise behind traditional organizational models is that a sophisticated system can secure reliability, MO takes a more realistic stance. There is no point in getting a holistic overview within a complex system. Managers have to deal with blind spots. To make sense of what is going on in complex systems they need to find ways to foster collective sensemaking by using the diverse and even contradicting knowledge, the different views, and the multiple observations of their whole workforce.

MO also means cultivating a sense of vulnerability within the organization. Mindful practices foster a preoccupation with failure (Weick & Sutcliffe, 2001) that promotes constant learning about what is going on in organizational systems. Managers value mistakes as sources of information about the system, rather than as unwanted disturbances (Weick & Sutcliffe, 2001). Managers constantly seek and evaluate smaller deviances, surprises, near misses, or failures to learn about the status quo of the system and its built-in sensemaking capabilities. They are ever attuned to how the unexpected evolves and to the latent incidents and failures they have not yet detected that need to be uncovered and interpreted (Reason, 1990). On aircraft carriers, for example, recruits complete so-called foreign object damage walk downs several times a day. The whole crew walks down the full length of the deck in search of anything out of the ordinary—a leak, tiny pieces of debris—whatever might suggest something is amiss (Weick & Sutcliffe, 2001). Frequent routine briefings encourage managers and employees to have candid discussions about surprising observations and

discrepancies: What surprised you on your shift about the functioning of the technical system, working with your gear, talking with clients, dealing with suppliers and service providers or about the technical or control data? Taking unpredictability as a given, managers are aware that they are never safe. They always have to be prepared. Nobody knows when a crisis will occur or what crisis to prepare for. Therefore, MO includes a strong commitment to resilience. Mindful organizations invest proactively in general problem solving that enhances the ability to interpret and improvise on the spot for whatever may come. Commitment to resilience requires constant effort and intensive training. Even when things run smoothly, staff members have to stay alert to various sorts of threatening scenarios and unexpected outcomes. Mindful organizations regularly test their capabilities to act resiliently and build redundancies into work processes to avoid dangerous chain reactions caused by strict coupling. Informal networks, knowledge banks, interest groups, and other alternative communication channels create an informed culture.

Disbelief in Rational Decision Taking

MO accepts that organizations face an unpredictable high-risk environment, and rejects the comforting, but misguided premise of rational decision taking. MO recognizes that decisions are based on uncertainty, as pointed out by cybernetics (von Foerster, 1985) and newer systems theory (Luhmann, 2000). Every decision is based on the paradox that it cannot be decided: If there were correct decisions, what was there to be decided on? MO takes into account that every decision creates a risk on the other side of the coin and that decisions are temporary solutions that very much depend on situation and context. Mindful practices seek to encourage doubt and contradiction, to constantly question, reframe, and refine decisions. Practices enhancing the sensitivity to operations create greater context awareness. They shift the attention to the ambiguous and complex world of the here and now, to the concrete actions of trying to get a broad picture of the present situation to detect discriminatory details and make sense of them. Observations are interpreted by using multiple framing options: In which context do these data make sense? Of what could they be an early sign? Past decisions and plans have to be reevaluated constantly for their current appropriateness: Which plans, procedures, and activities fit best to this specific situation? Every observation counts in helping to get a better picture. It is understood that the collective perception of the present is distracted by future plans that were decided on in the past.

Therefore, mindful practices counteract communication blockades imposed by a hierarchical structure. As opposed to more traditional organizational structures, MO reduces gaps between abstract strategic management and concrete operations, promotes communication channels between levels and disciplines, institutes the questioning of leaders, and removes biases and hindrances to early detection of problems. Very often, managers can be found physically near production sites to learn from employees' observation of deviations. They do not control employees, but value their inputs and provide quick feedback.

Focus on Sensemaking Capabilities and the Social Construction of Reality

MO requires close attention to the patterns of how people collectively make sense of what is going on. Sensemaking in organizations describes the collective process of creating shared meaning, understanding, and awareness out of different individual experiences, interests, and perceptions (Weick, 1995). MO deals with uncertainty through observation, interpretation, and decision capabilities. Managers try to make sense of complex and unpredictable situations by achieving "profound simplicity." This paradoxical expression refers to the need to combine thinking that is sufficiently complex that it requires them to consider possibilities—but not so complex that confusion overwhelms them. This creates the ability to take simple actions (Colville, Brown, & Pye, 2012). However, collective patterns of constructing reality typically evolve toward dangerous oversimplification of thought. Especially in highly complex, uncertain situations, people tend to reduce equivocality by applying biases that preserve the illusion of control (Langer, 1975). They stick to old beliefs, identities, and reasoning in order to reduce uncertainty (Dörner, 1987; Weick, 1993). Individuals and teams hesitate to challenge assumptions or previously made "rational" decisions. They rely on expectations created in the past and seek confirmation, labeling new situations as known or as easy to cope with to heighten the perception of certainty (Oswald & Grosjean, 2004). They normalize deviances in order to stick to plans (Vaughan, 1996) and engage in groupthink to avoid and sanction doubt and contradiction (Janis, 1982). Using tunnel vision, hesitating to speak up, and favoring command and order behavior reduce the volume of data to be considered in stressful situations (Dörner, 1987). Complex decisions tasks are simplified by excessive optimism (Audretsch, 1995).

MO takes these biases into account and seeks collective practices that help people get a more profound view of the situation. Managers and employees have to be aware of their biases (Langer, 1989; Tversky &

Kahneman, 1974) as well as blind spots (von Foerster, 1993). It is precisely these structurally determined perceptions that MO tries to oppose by altering perspectives and by seeking revision. Managers have to ask: Which filters do we need to observe our operations and environments? How do we interpret the data collectively? How flexible are we toward our established ways of sensemaking?

Leaders in high reliability seeking organizations have to counteract the tendencies of cognitive and collective biases. They have to focus on developing sensemaking capabilities that facilitate their ability to detect surprising (negative or positive) deviances and interpret variations: How can we avoid evolving new threats when they are still at an early stage? How can we identify and seize new opportunities? Mindful practices involve trying to avoid simplifications by proactively complicating the picture. This “resistance to simplify” (Weick & Sutcliffe, 2001) means deliberately creating ambiguity by leveraging multiple perspectives. Team members consider for and against arguments and deal with doubts and contradictions. Studies on decision making show, for example, that a group’s decision-making performance is enhanced if the group engages in vigilant interaction prior to arriving at a decision (Hirokawa & Rost, 1992). When manufacturing the 737, Boeing set up practices enabling every mechanic facing a problem or disturbance to quickly put together a team of people with different expertise right at the assembly line to find an effective solution to the problem. Different perspectives and experiences are considered during the search for a solution (Gebauer, 2010).

Disbelief in a Continuous Time Flow

Many biases and expectation-based behaviors are based on the assumption that there is a continuous time flow, that the future is more or less determined by the past and that present trends can be used to approximate future developments. This unchallenged belief in a continuous time flow often leads to mindless behavior (Langer, 1989). In MO, it is considered extremely risky to rely on a continuous flow of past, present, and future. Instead, the way we construct the past and the future also limits the spectrum of what we recognize in the present. In order to see more in the present, mindful practices seek to construct alternative versions of the past and future, mainly by reframing (e.g., storytelling; Denning, 2005), simulating different futures or playing with multiple future scenarios (Schoemaker, 1992; Schoemaker & Gunter, 2002), or using role-plays in decision processes (Armstrong, 2001). These practices develop organizational members’ collective ability at counterfactual reasoning (Byrne, 2005; Kahneman &

Miller, 1986; Tversky & Kahneman, 1974), which also plays an important role in crisis management. Cirka and Corrigan (2009) argue that managers have to overcome the very common probabilistic view and instead develop a possibilistic view. Mindfulness depends on raising awareness that the future is not determined by the past but is only loosely coupled with it. For example, after the 1993 terrorist attacks on the World Trade Center in which a bomb in the garage was detonated, well-established probabilistic thinking led to more security in basements to avoid similar threats. Past events constrained attention and assumptions. Nobody thought more inclusively about other ways of being attacked (e.g., by air). Reframing the present by exploring different scenarios that alter projections improves sensemaking.

Working on the System Level and Using People's Perceptions as a Resource

In addition, MO focuses on the system and interpersonal levels rather than blaming individuals for their decisions and behavior. But despite the system focus there is a strong emphasis on and appreciation of individual abilities: People are treated not as a disturbing factor or a source for human failure, but as an important resource for perceiving what is actually happening within the system. Their observations broaden the sensorium of the organization. Through the ability to perceive and feel, reflect, describe and learn, as well as by their capacity to say "no," people are an organization's best resource for finding ways to deal with unexpected situations (Baecker, 2003). MO involves looking for ways to use the valuable potential of individuals. Managers seek to create routines that encourage people to share their observations, opinions, and intuitive gut feelings (Gigerenzer, 2007), even if these differ from rules and conventions. Viewing intuition as a way to enrich rather than to contradict rational decision taking is an important aspect of management education and development (Sadler-Smith & Burke, 2009). Because there is a thin line between appropriate reliance on intuition and overconfidence, managers together with their employees have to learn how to make sense of their intuitive perceptions and evaluate their significance for a specific situation (Kahneman & Klein, 2009). MO means that managers are consciously creating work settings where they can evaluate intuition collectively.

Post-Heroic Leadership

Managers in mindful organizations are not expected to act as heroic leaders who have superior knowledge and viewpoints. A post-heroic style of

management (Baecker, 1994) uses the perceptions of all people on board to create the needed collective sensorium for what is going on. No one can predict when and where something unexpected will happen. Management does not always have the best overview to make intelligent decisions when sudden disruptive events occur. In normal situations, top-down decision making may be efficient. Yet in unknown, uncertain situations, decision-making processes need to be flexible. Flexible structures allow to defer decision taking to the person or location with the greatest expertise. A good example of this mechanism is the “andon cord” principle followed at Toyota’s production plants (Liker, 2004). Whenever a problem is spotted on any vehicle, any employee—as the expert for the situation—is authorized to halt production by pulling a rope strung along the assembly line. Only when the problem is resolved is production resumed.

Mindful Organizing as a Lens to Develop Managers: Using Staff Rides to Experience Patterns of Collective Mindfulness

The principles of MO can serve managers as a lens to reflect on and gain insight into their existing systems and practices—not only for classical reliability tasks such as quality and safety but also for other management challenges related to strategy development or change. Teece (2009), for example, stresses the important role of sensing, seizing, and reconfiguring capabilities for organizational innovativeness.

How can principles of MO be used in management development programs in ways that equip participants to apply and to translate these principles to their areas of responsibility? The first thing that is to say – MO must be taught experientially. Managers need to experience mindful practices. In the following, I describe staff rides as an action-learning–oriented MO method that can sensitize managers to existing patterns of sensemaking and their effects on reliability. When integrated into an organizational learning and change process designed according to the principles of MO, staff rides can be a valuable tool for individual learning and organizational change.

The Purpose of Staff Rides

Staff rides study failures or near misses by reconstructing how a single unexpected, behavior patterns event was able to evolve and what the specific conditions, behavior patterns and circumstances were that made it

happen. A group of selected participants returns to the location where the event took place. The participants then interview different people who were directly involved in the event, at the same location where they were when it took place. The term *staff ride* originally comes from the military (Robertson, 1987), where combat situations are studied retrospectively to learn something about the underlying relationships between environmental conditions, behavior, and communication. Staff rides are also used in wild-land firefighting and in the chemical industry. Staff rides are relevant to development processes on the individual, interpersonal, and organizational levels. For this reason, they are also suitable for executive development programs that closely combine individual learning and organizational development.

A staff ride is not undertaken to assign blame or find clear cause–effect chains. Nor is it about finding out what was done wrong and what might have been done better. Unlike crisis simulations (Boin, Kofman-Bos, & Overdijk, 2004), staff rides do not simulate a situation to identify and exercise the best coping strategy. Rather, staff rides examine the rules of the game in an organization: What in our everyday organizing enabled the gradual emergence of errors and unexpected events? Staff rides go beyond the analysis of the single incident to explore organizational conditions, interpersonal interactions, and individual thinking.

Stages and Process of a Staff Ride

Staff rides consist of three main phases: intensive preparation, implementation at the site of the original event, and subsequent action planning. In the preparatory phase, the near-accident, failure or accident is outlined together with the responsible party/manager and chronologically reconstructed with the help of some of those involved in the event. The results are recorded on a timeline: What led up to the event? Who was directly and indirectly involved in the case? What correspondence, consultation, and information circulated? All major materials, instruments, project elements, and documents are collected for the implementation phase. In addition, the necessary parties are identified. These include members of the different levels and departments who experienced the event “in situ” (e.g., engineers, managers and experts, and also external customers and suppliers). These people serve as “experts of the situation,” who will be interviewed during the staff ride. Other less involved parties, such as line managers, employees, and organizational development, safety or quality control managers, can serve as observers, offering unbiased perspectives during the staff rides.

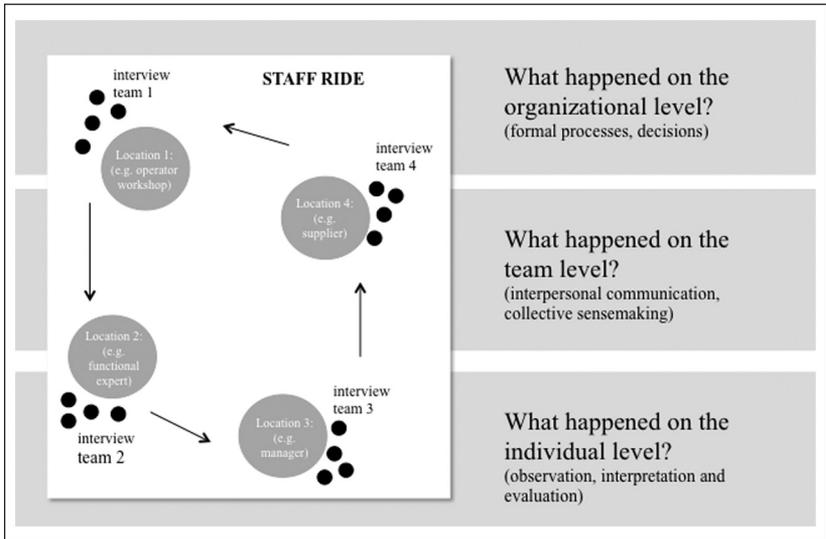


Figure 1. Interview carousel of a staff ride.

The staff ride itself is conducted in the form of an interview carousel (Figure 1). An inquiry team of five or six persons is assigned to each site under investigation. After about 30 to 60 minutes of questioning at one site, the teams rotate to the next site, so that at the end, each survey team has visited every site and can develop its own perspective on the course of events. The inquiry teams interview the experts of the situation onsite: What exactly did you do, step by step? What did you see, hear, feel, and think? How did you interpret what you perceived, and on what assumptions? What did you do then? They also explore the interaction patterns: To whom did you speak? Who else could have seen something different? Is there someone who could have noticed something earlier? Whom could you have asked? What were the alternatives? They investigate the organizational practices and processes to determine which practices were involved and how they were used in this specific situation. The primary aim of the survey is to understand *why* the parties behaved in the actual situation as they did, and not differently, rather than to determine what they could have done better.

After the interview carousel, the evaluation phase begins. First, each interview team gathers its findings and creates a timeline: How did the event evolve, step by step? What did people do and experience before the event, during the event, and after the event? Interview teams are asked

to reconstruct their findings on three levels: individual, interpersonal, and organizational. What did individuals experience? How did people interact? How were organizational structures and routines involved?

The results and hypotheses of each inquiry team are collated and integrated into a joint timeline. Different and contradictory findings are not homogenized but interpreted in the group to yield a richer picture of the situation. The construction of the timeline leads to an open discussion about underlying patterns and possible improvement actions to take. Improvement actions are gathered in a roadmap with (a) individual actions related to create the conditions for MO (e.g., trust, respectful interaction, or leadership issues); (b) interpersonal interventions, such as communication issues, team meeting routines, or the design of interfaces; and (c) the implementation of specific mindful practices such as specific organizational structures and routines.

Principles of Mindful Organizing and the Methodology of Staff Rides

Staff rides address the principles of MO. They foster anticipation by promoting preoccupation with failure, sensitivity to operations, and resistance to simplification. Managers who have been through a staff ride experience uncertainty and complexity and the associated biases. They also witness the construction of social reality and learn about the importance of collective sensemaking.

Experiencing complexity by preoccupation with failure. Staff rides are based on the idea that mistakes and surprises often reveal more than successes do about the state of a system. This is largely due to established habits of attribution. There is a tendency to rationalize successes retrospectively and to evaluate the result of an intended plan after the fact (Weick, 1984). Therefore, the investigation of successes confirms our present knowledge of the functionality of a system, rather than allowing us to learn something new about that system. Indeed, managers often do not know exactly how a success came about—often it was just luck (Collins, 2001). However, we readily interpret errors as unplanned, random, and hard to predict. Errors seem to be the result of individual failure, or to occur due to an abrupt environmental change or other external event over which we have little influence. We dismiss them as “bad luck.” Yet these interpretations are often not accurate. Studies of disasters show that errors usually build up slowly, deviation by deviation, but go unnoticed because of expectation-driven perception (Reason, 1990) and a lack of collective awareness. The staff ride investigation of the formation of errors extends managers’ knowledge of the inner workings of a system and challenges simplistic assumptions about that system. They learn about

complexity and ambiguity and how the collective construction of social reality affects reliable performance under conditions of uncertainty. Managers come to appreciate the impact of their own strategic decisions and leadership behaviors on organizational performance. They get a sense of the need to manage uncertainty by creating conditions and practices that foster collective mindfulness.

Experience sensemaking by being sensitive to operations. The interviews in a staff ride focus on the individual experience of each of the involved persons as well as the collective sensemaking patterns (Gebauer, 2010): What exactly did they hear, see, smell, and feel? How did they explain what they observed? What were their underlying assumptions for these interpretations? What were their gut feelings in that particular situation? How did they communicate these observations with others? Which formal and informal channels did they use? What did they communicate and what did they omit and why? Interviewers pay attention to the smallest details in order to glean insights into people's collective sensemaking of the situation and the conditions under which the unexpected event was able to evolve. Frequently, participants note, for example, that management plans and standard processes have minimal effect on the real work "on the shop floor" and that those responsible are unaware of many critical points. Differences between simple and therefore persuasive and attractive "ideas" and the more complex and ambiguous world of daily "action" (Brunnson, 1993) become obvious. People learn about unclear interfaces that impede the communication of perceived problems. Individual staff members have often observed something unusual but have not communicated this information for various reasons. They either did not have access to the proper communication channels, normalized deviances, lacked the knowledge to determine the relevance of what they have observed, misinterpreted what they sensed, or simply did not dare to be the messenger of troubling news.

Experience biases by resisting simplification. By using the method of the interview carousel, staff rides proactively complicate the picture. Each survey team constructs its own view of the event and forms its own hypotheses as to how the dangerous near-accident could have emerged. This process reveals to the individual teams completely different points of weakness and aspects of collective negligence, such as a vague assignment of duties, a lack of knowledge and skills, or action on the basis of unquestioned assumptions.

In one staff ride, people examined the event of an oil spill under high pressure as a potentially deadly incident. The technical reason had already been analyzed: Certain parts had been assembled incorrectly because of a missing instruction that should have been provided by the supplier. During

the staff ride, participants got a much broader picture of the case. They found out that different teams worked in parallel on similar tasks, but that nobody had a clue that this was happening. They also learned that due to a lack of supply specifications and a more informal request-for-proposal process, the supplier had delivered the wrong plant parts to the assembler. The supplier delivered the same parts “as usual,” not seeing the specific requirements of this case. The assembler, who was surprised by the non-compatibility of the parts, did not enquire further due to an insufficient understanding of the overall process. He relied on the correct allocation processing of his superiors. He assumed that there had been a measurement error and fitted the parts by hand. Everyone acted to the best of his knowledge and in good conscience, based on his assumptions. There was a lack of collective routines to question these assumptions and normalizations (Gebauer, 2010).

In another staff ride, people examined the nearly deadly accident of an electrical high-voltage shock at a control panel. The staff ride revealed that the initial accident analysis, based on existing routines for reporting accidents, had been hasty and narrow-minded. Management had expected to get facts about the root cause very fast. The fast analysis led to a misidentification of the technical root cause that was not questioned anymore. Because the real technical problem had not been discovered, the risk of a new accident remained for the 6 months preceding the staff ride. By participating in the staff ride, people found out how accustomed they were to focusing on technical causes rather than on social dynamics. They investigated how assumption-based behavior and normalization of deviance contributed to accidents, and learned how the tendency to find a quick and technical explanation of a problem and unclear responsibilities within the organization had impeded their learning from failure.

Designing the Learning and Change Management Process

Staff rides allow managers to observe, in a blame-free atmosphere, their organizational practices through a different lens and reflect on the effects of dysfunctional practices. The observation of the collective pattern of negligence brings about a common concern among all parties that can subsequently be harnessed as energy for change. Staff rides can thus serve as a starting point for rethinking models of managing toward MO. In order for staff rides to facilitate change, they need to be part of an action-oriented learning process that integrates individual reflection and experience with learning at the organizational level (Gebauer, 2007; Revans, 1980). The

design of the learning process needs to reflect principles of MO, such that during the staff ride people work as if they already were practicing MO.

Working in mixed teams representing different levels and areas of expertise fosters the creation of a broader picture and limits single-minded simplifications. Using multidisciplinary, division-spanning teams allows for a multiplicity of viewpoints, explanations, and solutions. Members learn to deal with the complexity that results from having diverse perspectives and alternative opinions. In addition, each team has a member who is not knowledgeable about its particular business area. This “alien” team member is a valuable resource, whose external perspective allows him or her to pose naïve questions about topics that others no longer question, and thus broaden the discussion and uncover blind spots.

Research and observation tasks reconnect top managers to the shop floor. High-level managers experience firsthand the benefits that looking more closely at the “here and now” has on understanding the functioning of the system as well as the emergence of problems. They consider how their decisions affect reliability in the organization. They also appreciate how they can proactively look for surprises and deviance. The learning during the staff ride depends on creating conditions for mindfulness, that is, a blamefree atmosphere that encourages trust and information sharing. Participants also reflect on their capacity to speak openly with external participants about their internal weaknesses.

Experiences at a German Manufacturer

An actual example illustrates the application of the staff ride methodology in an organization. Top managers at a large German manufacturer worked on reliability issues using MO as a lens and staff rides as a method to explore existing practices (Gebauer & Kiel-Dixon, 2009). The company’s senior executives internal corporate academy developed a customized program that involved senior executives and strategists, as well as quality and safety experts. The organization had been facing many challenges related to its strategy dedicated to technological innovation and organic growth. Two new plants, each in a different foreign country, had been built and the level of uncertainty about these investments was high. There was little knowledge about the foreign environments, culture, or working conditions. Additionally, the organization was facing quality and safety issues that created cost-intensive responses.

The action-learning program was developed following the observation that the expert-based approach to reliability and quality challenges had reached its limit. Although numerous quality processes and safety systems

had been implemented, quality and safety problems persisted and needed to be addressed differently. Managers were asked to examine structural alternatives to the work processes currently in place. It was decided that top managers would work through their burning business problems using the perspective of MO. The learning process consisted of three main steps: an introduction to MO and formation of teams, an observation phase using staff rides to examine existing practices, and an implementation phase.

Fieldwork carried out in five groups formed the core of the learning infrastructure. Top management worked in mixed teams on a challenge that was pressing to at least one of the team members. The teams consisted of three to four people from the same business area but with different expertise. In addition, one or two team members were assigned as "aliens." Participants learned about MO principles and reflected on what they could learn from this new perspective concerning their own organization and management practices. Teams clearly defined the parameters of the problem they wanted to address and determined how to proceed. In order to observe and examine their own practices from the perspective of MO, participants were introduced to the method of staff rides. Coaching support constantly reminded participants to stick to the principles of MO.

The observation phase purposely slowed down the normal problem-solving process. Instead of prematurely discussing possible solutions derived from conventional wisdom, the teams were encouraged to examine their own practices by analyzing concrete exemplary incidents using MO criteria. Their detailed examinations of the gradual development of unexpected events quickly led to more general insights about interaction patterns and attitudes in the respective area. The teams gained a better picture of the existing patterns of mindfulness and considered practices that could help raise their organization's collective mindfulness.

All the observations collected by the teams during the fieldwork were recorded and reflected upon. The teams thus benefited from critical feedback by their peers. Building on these reports, the teams planned sensible measures and interventions for implementation. Some teams introduced processes that would improve communication during shift changes. As employees finished their shift, they were asked about any surprising events or problems before the next shift took over. No individual would be criticized for disturbing the workflow. Instead, that person would be considered the one with the most expertise in the situation, and observations surrounding the error would be evaluated collaboratively. Other teams put different reporting procedures to the test. cursory accident statistics were replaced with reports containing qualitative mistake analyses. In addition, the teams

created processes to ensure that this content-rich information would reach management. Managers started to visit factory sites and locations more frequently, speaking directly with employees and asking explicitly about divergences from the plan in order to gain a more nuanced picture of the situation. With employees they evaluated this information and used multifunctional teams to find sustainable solutions to problems.

Team discussions highlighted the importance of improving communication as an important condition for promoting mindfulness and sustaining new practices. The desired practices include developing a more modest and respectful management style, creating a work atmosphere free of stigma and blame, and encouraging (unavoidably annoying) doubts. Critical reflection on the practices also makes clear the difficulties and challenges involved. Whereas traditional models of organizing depend on simple interpretations of situations that lead to comfortingly, but misleadingly, well-defined solutions, principles of MO raise the awareness of uncertainty and complexity. They entail proactively facing contradictions, accepting multifaceted observations and interpretations, and putting into question past decisions and indeed the entire decision-making structure. Based on their very concrete staff ride experiences, managers discussed how to better balance efficiency and robustness (Lietaer, 2009), centralization and decentralization (Bartlett & Goshal, 1989), and exploration and exploitation (March, 1991).

After 4 months of the program, facilitators interviewed 12 of the 36 participants about their achievements. The 12 participants were chosen randomly. The goal of the interviewing was to get an early sense of the effects of the program. Participants were asked about changes in (a) their personal behavior and attitudes, (b) established interaction patterns, and (c) structural changes. Following the constructivist approach, the purpose of the evaluation interviews was not to conduct an objective before-and-after study, but rather to continue the process of self-observation, to reflect achievements, and to guide managers to continue on their pathway to reliability-seeking performance. Most of the noticeable achievements took place on the individual level and involved improving the conditions for mindfulness. Some achievements were related to the interactional level, whereas changes on the organizational level after 4 months still were rare. Many managers had started to create blamefree environments, asking subordinates for feedback and criticism and treating them as situational experts. Some managers made a greater effort to be near the operations. Achievements on the interactional level included instituting awareness meetings and multidisciplinary problem-solving teams. Participants also related changes to financial impact. For example, one participant stated that he took much

more seriously his own and his team's perceptions of first signs indicating a possible failure of a contractor. Based on this early signal the team worked out a contingency plan that allowed an estimated savings of several million U.S. dollars. Another participant stated that he was able to find a solution for a very challenging project worth more than 10 million U.S. dollars by setting up an interdisciplinary team instead of following the well-established linear way of engineering.

Facilitating “Unhappy Learning”

Introducing the principles of MO often engenders uncertainty and opposition (McDonald & Mansour-Cole, 2000; Reilly, 1992; Rollag & Parise, 2005). Well-established premises (such as, for example, the premise of rational decision taking) are challenged (Luhmann, 2000), which evokes “unhappy learning” (Mayer, 2003). MO asks managers to compromise other organizational objectives, such as efficiency or cost reduction (Lietaer, 2009). Ideas about organizational excellence and best practices are put into question. Reliable performance is no longer seen as a task that can be achieved, but as an ongoing effort. MO asks managers to give up the comforting illusion of control and raises their awareness of the challenge of finding the right degree of (de)centralization (Bartlett & Goshal, 1989).

Trainers and internal program directors have to be prepared to react to participants' defensive reactions to MO. Managers tend to revert to their old way of thinking and to start normalizing the principles of MO using traditional management paradigms. Preoccupation with failure, for example, was translated into a zero-failure tolerance and the call for more checklists and procedures for anticipating expected events. These reactions are part of the learning process. For example, the reconnection of managers to the shop floor might be considered as a waste of time: Why should managers bog themselves down with annoying operative details? Why cannot subordinates do the analysis and then report their findings? Or managers are confronted with their assumptions about hierarchical structures and mutual expectations of blaming individuals: Can we candidly discuss mistakes with our employees? How do we create an atmosphere free of anxiety and fear when we jointly discuss incidences, lack of quality, manufacturing disruptions, or accidents? Resistance and hesitation can serve as a valuable resource in the learning process to reflect critically on the managers' mind-sets and beliefs. The learning design has to provide room to reflect on and address these issues. Trainers have to be sensitive to group dynamics and know how to deal with

them. The learning process must support the conditions for MO, including trust, respect, and a blamefree atmosphere.

Conclusion

Encouraging self-observation processes is a central lever for developing managers and organizations. Using MO as a lens for management development introduces a new paradigm for managing in times of uncertainty. Principles of MO show managers that organizing and performing reliably in dynamic contexts is a matter of constantly checking, revalidating, decontextualizing and adapting—a perpetual process of seeking high reliability, rather than an end state that will be reached. Staff rides provide an action-oriented learning design that expose managers experientially to the complexity and unpredictability of their organizations. Managers begin to understand that the reality in their organizations is socially constructed and that it is important to cultivate collective sensemaking capabilities. The staff ride guides managers to question their own mind-sets while working on existing organizational challenges. It thus creates awareness, a sense of urgency, and the energy to make changes toward high-reliability seeking. With MO, crisis management becomes much more than just the management of rare events. Seeking, identifying, and interpreting exceptions become important issues on managers' everyday agenda.

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Note

1. With its specific focus on individual perception and experience and collective sensemaking, the staff ride is similar to the group-level failure analysis used in morbidity and mortality conferences in the health sector (Deis et al., 2008).

References

- Armstrong, J. S. (2001). (Ed.). *Principles of forecasting: A handbook for researchers and practitioners*. Norwell, MA: Kluwer Academic.
- Audretsch, D. B. (1995). *Innovation and industry evolution*. Cambridge: MIT Press.

- Baecker, D. (1994). *Postheroisches management. Ein Vademecum* [Post-heroic management. A manual]. Berlin, Germany: Merve.
- Baecker, D. (2003). *Organisation als system* [Organization as system]. Frankfurt, Germany: Suhrkamp.
- Baecker, D. (2011). *Organisation und Störung* [Organization and disorder]. Frankfurt, Germany: Suhrkamp.
- Bartlett, C. A., & Ghosal, S. (1989). *Managing across borders. The transnational solution*. Boston, MA: Harvard Business Press.
- Beck, U. (1992). *Risk society: Towards a new modernity*. London, England: Sage.
- Boin, R. A., 't Hart, P., Stern, E., & Sundelius, B. (2005). *The politics of crisis management: Public leadership under pressure*. Cambridge, England: Cambridge University Press.
- Boin, R. A., Kofman-Bos, C., & Overdijk, W. (2004). Crisis simulations: Exploring tomorrow's vulnerabilities and threats. *Simulation & Gaming, 35*, 378-392.
- Bourrier, M. (1996). Organizing maintenance work at two nuclear power plants. *Journal of Contingencies and Crisis Management, 4*, 104-112.
- Brunsson, N. (1993). Ideas and actions: Justification and hypocrisy as alternatives to control. *Accounting, Organizations and Society, 18*, 489-506.
- Byrne, R. M. J. (2005). *The rational imagination: How people create alternatives to reality*. Cambridge, MA: MIT press.
- Cirka, C. C., & Corrigan, E. A. (2009). Expanding possibilities through metaphor: Breaking biases to improve crisis management. *Journal of Management Education, 34*, 303-323.
- Collins, J. (2001). *From good to great. Why some companies make the leap and others don't*. New York, NY: Harper Business.
- Colville, I., Brown, A. D., & Pye, A. (2012). Simplicity: Sensemaking, organizing and storytelling for our time. *Human Relations, 65*, 5-15.
- Crosby, P. B. (1979). *Quality is free: The art of making quality certain*. New York, NY: McGraw-Hill.
- Deis, J. N., Smith, K. M., Warren, M. D., Throop, P. G., Hickson, G. B., Joers, B. J., & Deshpande, J. K. (2008). Transforming the Morbidity and Mortality Conference into an instrument for systemwide improvement. *Advances in Patient Safety, 2*(8). Retrieved from http://www.ahrq.gov/downloads/pub/advances2/vol12/advances-deis_82.pdf
- Denning, S. (2005). *The leader's guide to storytelling*. San Francisco, CA: Jossey-Bass.
- Dörner, D. (1987). *Die Logik des Misslingens. Strategisches Denken in komplexen Situationen* [The logic of failure. Strategic thinking in complex situations]. Frankfurt, Germany: Rowohlt.
- Garvin, D. A. (1984). What does "product quality" really mean? *Sloan Management Review, Fall*, 25-45.

- Gebauer, A. (2007). *Einführung von Corporate Universities* [Introduction of corporate universities]. Heidelberg, Germany: Carl-Auer.
- Gebauer, A. (2010). Aus Katastrophen lernen. Staff Rides zur Analyse kollektiver Muster der Unachtsamkeit [Learning from disasters. Staff rides for the analysis of collective pattern of negligence]. *Wirtschaft und Weiterbildung*, 10, 21-27.
- Gebauer, A., & Kiel-Dixon, U. (2009). Das Nein zur eigenen Wahrnehmung organisieren. High Reliability in Extremsituationen [Organizing the "No". High reliability in extreme situations]. *Organisationsentwicklung*, 3, 40-49.
- Gigerenzer, G. (2007). *Gut feelings: The intelligence of the unconscious*. London, England: Penguin.
- Hirokawa, R. Y., & Rost, K. M. (1992). Effective group decision making in organizations: Field test of the vigilant interaction theory. *Management Communication Quarterly*, 5, 267-288.
- Janis, I. L. (1982). Decision-making under stress. In L. Goldberger & S. Breznitz (Eds.), *Handbook of stress: Theoretical and clinical aspects* (pp. 69-80). New York, NY: Free Press.
- Kahneman, D., & Klein, G. (2009). Conditions for intuitive expertise: A failure to disagree. *American Psychologist*, 64, 515-526.
- Kahneman, D., & Miller, D. (1986). Norm theory: Comparing reality to its alternatives. *Psychological Review*, 93, 136-153.
- Kane, K. R., & Goldgehn, L. A. (2011). Beyond "the total organization": A graduate-level simulation. *Journal of Management Education*, 35, 836-858.
- Lagadec, P. (2000). *Rupture créatives* [Creative ruptures] Paris, France: Organisation-Les Echos
- Langer, E. J. (1975). The illusion of control. *Journal of Personality and Social Psychology*, 32, 311-328.
- Langer, E. J. (1989). *Mindfulness*. Cambridge, MA: Da Capo Press.
- LaPorte, T. R. (1988). The United States air traffic system: Increasing reliability in the midst of rapid growth. In R. Mayntz & T. Hughes (Eds.), *The development of large scale technical systems* (pp. 215-244). Boulder, CO: Westview Press.
- LaPorte, T. R., & Consolini, P. (1991). Working in practice but not in theory: Theoretical challenges of high reliability organizations. *Journal of Public Administration Research and Theory*, 1, 19-47.
- Lietaer, B. (2009). Erhöhte Unfallgefahr [Increased risk of accidents]. *brand eins*, 1, 154-161.
- Liker, J. K. (2004). *The Toyota way. 14 Management principles form the world's greatest manufacturer*, Madison, WI: McGraw-Hill.
- Luhmann, N. (1984). *Soziale Systeme* [Social systems]. Frankfurt am Main, Germany: Suhrkamp.

- Luhmann, N. (2000). *Organisation und Entscheidung* [Organization and decision]. Frankfurt, Germany: Suhrkamp.
- March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science*, 2, 71-87.
- Marcus, A. (1995). Managing with danger. *Industrial & Environmental Crisis Quarterly*, 9, 139-151.
- Mayer, B. (2003). *Systemisches Managementtraining* [Systemic management training]. Heidelberg, Germany: Carl-Auer.
- McDonald, K. S., & Mansour-Cole, D. (2000). Change requires intensive care: An experiential exercise for learners in university and corporate settings. *Journal of Management Education*, 24, 127-148.
- Nohria, N. (2006). Risk, uncertainty, and doubt. *Harvard Business Review*, 84(2), 39-40.
- Oswald, M. E., & Grosjean, S. (2004). Confirmation bias. In R. F. Pohl (Eds.), *Cognitive illusions: A handbook on fallacies and biases in thinking, judgement and memory* (pp. 79-96). Hove, England: Psychology Press.
- O'Toole, J., & Bennis, W. (2009). What's needed next: A culture of candor. *Harvard Business Review*, 87(6), 54-61.
- Pearson, C. M., & Clair, J. A. (1998). Reframing crisis management. *Academy of Management Review*, 23, 59-76.
- Perrow, C. (1984). *Normal accidents: Living with high-risk technologies*. New York, NY: Basic Books.
- Pinha e Cunha, M., Vieira da Cunha, J., & Cabral-Cardoso, C. (2004). Looking for complication: Four approaches to management education. *Journal of Management Education*, 28, 88-103.
- Reason, J. (1972). *Human error*. Cambridge, England: Cambridge University Press.
- Reason, J. (1990). *Human error*. New York, NY: Cambridge University Press.
- Reilly, A. H. (1992). Understanding resistance to change: The Jefferson Company exercise. *Journal of Management Education*, 16, 314-326.
- Revans, R. (1980). *Action learning: New techniques for management*. London, England: Blond & Briggs.
- Roberts, K. H. (1990). Some characteristics of high-reliability organizations. *Organization Science*, 1, 160-177.
- Roberts, K. H. (1993). *New challenges to understanding organisations*. New York, NY: Macmillan.
- Robertson, W. G. (1987). *The staff ride*. Washington, DC: United States Army Center of Military History.
- Rochlin, G., LaPorte, T., & Roberts, K. (1987). The self-designing high reliability organization: Aircraft carrier flight operation at sea. *Naval War College Review*, 40, 76-90.

- Rollag, K., & Parise, S. (2005). The bikestuff simulation: Experiencing the challenge of organizational change. *Journal of Management Education*, 29, 769-787.
- Rosenthal, U. (2003). September 11: Public administration and the study of crisis and crisis management. *Administration & Society*, 35, 129-143.
- Roux-Dufort, C. (2007). Is crisis management (only) a management of exceptions? *Journal of Contingencies and Crisis Management*, 15, 105-114.
- Sadler-Smith, E., & Burke, L. A. (2009). Fostering intuition in management education: Activities and resources. *Journal of Management Education*, 33, 239-262.
- Schoemaker, P. J. H. (1995). Scenario planning: A tool for strategic thinking. *Sloan Management Review*, 36(2), 25-40.
- Schoemaker, P. J. H., & Gunther, R. E. (2002). *Profiting from uncertainty: Strategies for succeeding no matter what the future brings*. London, England: Free Press.
- Schulman, P. R. (1993). The analysis of high reliability organizations: A comparative framework. In K. H. Roberts (Ed.), *New challenges to understanding organizations* (pp. 33-54). New York, NY: Macmillan.
- Schulman, P. R., & Roe, E. (2008). *High reliability management operating on the edge*. Stanford, CA: Stanford University Press.
- Taleb, N. (2008). *The black swan: The impact of the highly improbable*. London, England: Penguin.
- Teece, D. J. (2009). *Dynamic capabilities and strategic management: Organizing for innovation and growth*. Oxford, England: Oxford University Press.
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185, 1124-1131.
- Vaughan, D. (1996). *The challenger launch decision. Risky technology, culture, and deviance at NASA*. Chicago, IL: University of Chicago Press.
- Vogus, T. J., Sutcliffe, K. M., & Weick, K. E. (2010). Doing no harm: Enabling, enacting, and elaborating a culture of safety in health care. *Academy of Management Perspectives*, 24(4), 60-78.
- Vogus, T. J., & Welbourne, T. M. (2003). Structuring for high reliability: HR practices and mindful processes in reliability-seeking organizations. *Journal of Organizational Behavior*, 24, 877-903.
- von Foerster, H. (1985). *Sicht und Einsicht. Versuche zu einer operativen Erkenntnistheorie; Wissenschaftstheorie, Wissenschaft und Philosophie* [Sight and Insight. Attempting an operative epistemology; scientific theory, science and philosophy]. Wiesbaden, Germany: Vieweg.
- von Foerster, H. (1993). *Wissen und Gewissen. Versuch einer Brücke* [Knowledge and consciousness. Bridging the gap]. Frankfurt, Germany: Suhrkamp.
- Weick, K. E. (1984). *The social psychology of organizing*. New York, NY: McGraw-Hill.

- Weick, K. E. (1990). The vulnerable system: An analysis of the Tenerife Air Disaster. *Journal of Management*, 16, 571-593.
- Weick, K. E. (1993). The collapse of sensemaking in organizations: The Mann Gulch disaster. *Administrative Science Quarterly*, 38, 628-652.
- Weick, K. E. (1995). *Sensemaking in organizations*. Thousand Oaks, CA: Sage.
- Weick, K. E. (2011). Organizing for transient reliability: The production of dynamic non-events. *Journal of Contingencies and Crisis Management*, 19, 21-27.
- Weick, K. E., & Roberts, K. H. (1993). Collective mind in organizations: Heedful interrelating on flight decks. *Administrative Science Quarterly*, 38, 357-381.
- Weick, K. E., & Sutcliffe, K. M. (2001). *Managing the unexpected. Assuring high performance in an age of complexity* (1st ed.). San Francisco, CA: Jossey-Bass.
- Weick, K. E., & Sutcliffe, K. M. (2003). Hospitals as cultures of entrapment: A re-analyses of the Bristol Royal Infirmary. *California Management Review*, 45(2), 73-84.
- Weick, K. E., Sutcliffe, K. M., & Obstfeld, D. (1999). Organizing for high reliability: Processes of collective mindfulness. In R. I. Sutton & B. M. Staw (Eds.), *Research in organizational behavior* (Vol. 21, pp. 81-123). Greenwich, CT: JAI Press.