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Integrated safety management based on organizational resilience

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ABSTRACT: The paper addresses how measures of resilience (engineering) can be added to the existing portfolio of principles and practices of safety management. Resilience (engineering) is not just advances in applied methodology, but another approach based on different assumptions and a radically different system model. Hence, the integration of resilience into the safety management portfolio will also have implications for existing principles and practices. In order to investigate this, the paper addresses issues related to complexity, sensemaking, and emergence.

1 INTRODUCTION AND SCOPE

This paper derives from work on safety in the off-shore oil and gas industry, which is extensively using ICT-based collaboration technology for the seamless integration of onshore vs offshore organizations, operators, (sub-) contractors, vendors and support centers. It is assumed that the safety challenges in that respect resembles many other industrial formations, both current and future, based on human collaboration throughout a dispersed structure.

The overarching theme is how the objectives of resilience can be incorporated into a safety management scheme that handles the double set of safety strategies, namely compliance and resilience.

The paper starts with a look at *social* complexity and emergence as the justification for *Organizational* Resilience (OR) (chapter 2). In chapter 3, a complementary relation between compliance and resilience as singular safety strategies is sketched out. In chapter 4, the premises for managing the situated practice of OR through actionable models are investigated. In chapter 5, the emphasis is once again directed at the joint endeavor of managing compliance and resilience in a joint manner, and thus a paradigm for (second order) OR ("2OR"), is proposed.

2 RESILIENCE IN RESPONSE TO SOCIAL COMPLEXITY AND EMERGENCE

Complex and emergent phenomena can be recognized as those that reside between simplicity and randomness, or "at the edge of chaos" (Sawyer, 2005:3). In this very generic sense, complexity signifies a tendency to produce unintended effects and emergent (novel) patterns as an inherent property of normal state of affairs. In everyday as well as scientific parlance, "complex" is however rather often used as an amplified or accentuated expression of "complicated" or "difficult", apparently without bearing any distinctive meaning other than being way beyond trivial to resolve and manage. Accordingly, the notion of "complex challenges" seems to be an everyday mantra for political as well as business leaders in order to signify an extraordinary capability of the messenger. On the other hand, over the past decades we have witnessed several waves of complexity theory orientations, constituting a plethora of more or less scientific literature that posits complexity as some esoteric and systemic secret that circumvents almost all prevalent and common sense based on apparently linear (uni-directional) causality. A brief look behind the everyday, the powertalk, the euphoric and even the dictionary meaning of complexity is thus needed in order to discuss the relation between complexity and resilience, as well as its implications for risk, safety and its management.

2.1 *Complexity and emergence*

The link between (the terms) complexity and resilience pervades recent literature on resilience in general, and Resilience Engineering in particular (e.g., Hollnagel et al. 2006, Hollnagel et al. 2008, Nemeth et al. 2009, Hollnagel et al. 2011). Although this literature reflects a variety of conceptions of intractable complexity and its

conceptual twin *emergence*, a common rhetorical trope is that they are immanent of these systems, and that their presence justifies resilience as a complement to or substitution for traditional safety approaches that are (explicitly or implicitly) based on a more linear foundation for prediction and modeling. Correspondingly, in a risk governance context, Renn (2008) recommends that for complex systems, resilience is the preferred risk management/mitigation strategy over risk control.

Conceived from a sufficiently narrow context or observation point in a system, the *implications* of complexity may however be reduced to *intractability*, in dictionary terms a formal word of (people) being "stubborn and difficult to influence or control" or (problems) seemingly "impossible to deal with". That is, intractability signifies the sheer impossibility of predicting exactly how a certain process or phenomenon will unfold. If the aim is to cope with a terminate situation/context, even attempting to avoid that it spreads and escalates into a "normal accident" (Perrow, 1984) or into "functional resonance" (Hollnagel 2004), sophisticated theories of complexity and emergence as such is maybe not needed. However, by seeing resilience as a more ambitious attempt of *systemic proaction* (Rosness et al. 2011), addressing nonlinear, extraneous effects and couplings that goes beyond the "normal", straightforward action and decision contexts within and across organizations, we have to consider complexity and emergence as something more.

2.2 *Collaborative complexity and social emergence*

An understanding of sociotechnical, *collaborative complexity* (and emergence) must draw on the specificities of *social* systems. As stated by Sawyer (2005:1), "*societies have often been compared to other complex systems*", and "*the first wave of social systems theory is Parson's structural functionalism, the second wave is derived from the general systems theory of the 1960s through the 1980s, and the third wave is based on the complex dynamical systems theory developed in the 1990s*" (ibid:10). A common denominator has been the application of cybernetic models to (e.g.) biology, anthropology and sociology. Sawyer (ibid) however approaches the issue of social systems complexity and emergence by suggesting a reconciliation or rapprochement between microsociology and macrosociology, based on the clear premise that "*social systems have additional complex features that make them unlike any other systems found in nature*", and he "*attribute these features to the complexity of human symbolic communication*" (ibid:11–12).

Our point of departure is thus Sawyer's argument that *social* emergence and complexity is something substantially different than just a mirror of various chemical, biological or physical complexities and/or notions of emergence. Sawyer's argument is inherently supported by a considerable number of authors on related issues, e.g. Stacey (2001) who puts special emphasis on the *complex responsive* processes of human relating, and by Weick's (2009) notion of the *impermanent* organization. Employing Sawyers position in this way does however not imply the assertion of any undue primacy to the human/social—separated from or at any expense of technology. Rather, this position accommodates (e.g.) the claims of Hanseth and Ciborra (2007) that the use of ICT generates additional complexity in human collaboration. This view may be further substantiated by reference to the claim that ICT, perceived as a *re-presentation* technology, mediates symbolic interaction between humans in a way that requires reinforced attention to the hermeneutical premises of symbolic interaction (Grøtan and Asbjørnslett, 2007). Various ICT-related and other technical phenomena (e.g., failure, deviance, drift, performance variability, flawed interpretations of computer re-presentations) may also be perceived as key triggers that constitute the grounds as well as the imminence of the emergents of human collaboration.

2.3 *Complexity and emergence as source of hazard and danger*

The complexity-emergence dyad is a common denominator for research interests at very different levels, spanning from (e.g.) sociological investigations of social emergence, and our (obviously more limited) safety and risk issues related to identifying and/or coping with the unintended effects and emergents that actually signifies or carry a risk potential.

For investigations of social emergence, Sawyer (2005:220) recommends to go beyond the classical macro-micro distinction, and investigate *intermediary* levels such as *interactions* (e.g., discourse patterns, symbolic interaction, collaboration, negotiation), *ephemeral emergents* (e.g., topic, context, interactional frame, participation structure, relative role and status assignments) and *stable emergents* (e.g., group subcultures, group slang and catchphrases, conversational routines, shared social practices, collective memory), with emphasis on the bidirectional mechanisms of interaction between.

Figure 1 illustrates how Sawyers's sociological point of departure may also encircle the "complex accident". The left side of the figure illustrates the macro level and the micro level, as well

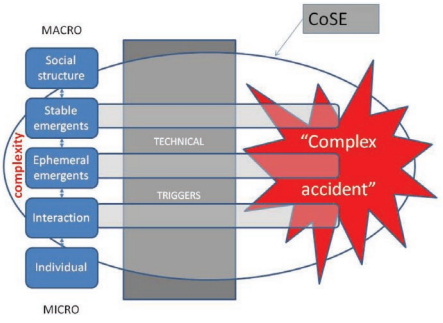

Figure 1. Sources of the complex accident.

as the intermediary levels that constitute a "circle of social emergence" (Sawyer, 2005:220). This circle, denoted CoSE, constitutes a demarcation line between what is really complex and emergent, and what is comparatively straightforward or just complicated.

It is primarily the initiation through emergents, including their combination with or without more trivial (non-complex) events and circumstances, and possibly triggered and made imminent by virtue of the technical, that represents novelty and thus "complex" potential for harm and damage. The potential "complex accident" is thus not necessarily novel or complex in terms of consequences, however it may comprise extraneous effects and couplings (which are themselves enabled by the initializing of other emergents) that may enforce systemic accidents which exceed what is normally expected, or can possibly be anticipated by any agent beforehand.

2.4 *Scope of resilience in the safety context*

Based on complexity theories incorporating emergence, it may be tempting to hypothesize that resilient capabilities as such will emerge out of encounters with complex problems, more or less like the classical examples of alchemy emerging into chemistry (Pariés, 2006), or protestant ethics emerging into the spirit of capitalism (Weber, 1930). Although the academic community of safety science may display such a tendency in terms of becoming more (pre-) occupied with resilience engineering at the expense of classical barrier approaches, such a transformation of an operational system cannot be expected without a metamorphoses of technical, human and organizational development processes.

Speaking of resilience in our safety context however, the substantially more limited scope is strictly about identifying, recognizing, (hopefully) anticipating and/or (inevitably) coping with the (co-) variabilities, emergents and surprises that fall outside (1) the grasp of normative control as well as (2) the expectations that possibly can be derived from the past, *and* that carry a potential of harm and damage to key objectives and concerns.

Correspondingly, the macro and the micro levels represent stable (or temporarily stabilized) properties of the system that, within a certain time frame, will fall outside the CoSE, and from which hazards and risks *in principle* can be contained and managed by means of evidence- and compliance-based measures. A key resilience issue from a pure complexity viewpoint is therefore to *monitor and mediate* (interact and intervene with) the dynamic emergents (and triggers) of the intermediary levels, and to see these as apart from the hazards and risks that are more stable and knowable (derived from macro and micro).

However, a resilient *organization* cannot allow itself to be ignorant about the possibility that current, seemingly "stable" macro (and micro) patterns may have a complex origin, that they by themselves constitute fertile grounds for new complexities and emergents, and that major shifts in macro/micro conditions may also be manifestations of emergence. The CoSE is therefore not all solid but permeable, and it is thus also a possibly deceptive membrane between the complex and the non-complex.

2.5 *Main differentiatons of complexity*

The Cynefin sensemaking framework (Kurtz and Snowden, 2003) offers a basic tabulation of the predictability and manageability of systems, for the purpose of facilitating managerial sensemaking and decision making. Cynefin distinguishes between directed (resultant) order comprising the *knowable* and the *known* domains, while undirected (emergent) order comprises the *complex* and the *chaotic* domains. The four domains reflects different options for system understanding and comprehension; being "known" in terms of predefined categories, "knowable" in terms of analyzable cause-effects relationships; "complex" in terms of being (only) retrospectively coherent; "chaotic" in terms of no cause-effect relationships perceivable. The four domains also implies different styles for maintaining control; responding categorically; responding according to system analysis; responding according to probing (interfering with the system) and making sense of the system's reactions; and acting (intervening) in order to enact and enforce stability.

Moreover, the four main options invited by Cynefin correlate nicely with Weick's (2001) Interpretation System Model (ISM) of the organization, which is structured around the *analyzability* of the

system as such, and the organizational *intrusiveness* when acting upon a system. Cynefin and ISM can be used to derive a differentiation between different forms of complexity (Grøtan, 2011a):

- *Latent* complexity ("wildness-in-wait") that cannot be separated or clinically "cut out" from its embedding (known/knowable) order.
- *Manifest* complexity which implies that systems are persistently dynamic and only retrospectively coherent (manifest complexity is thus "observable" over time).
- The shifting combination of the above two, comprising *un-order* (Kurtz and Snowden, 2003).

In terms of the CoSE (Fig. 1), examples of *Latent* complexity are underlying patterns of interactions (stable emergents at a sub-design level) that mutely solidify into patterns that are unfit to respond to emerging situations and combinations. E.g., interactional frames and discourse patterns that do not capture or support the effects of technical triggers or other unknown circumstances and combinations. Without sufficient leverage of (salutogenic) emergents, a triggered situation will rapidly avalanche into a "wildness-in-wait". This may be recognized in retrospect as an extreme brittleness of otherwise ultrasafe systems. E.g., as in the Helios 2005 aircraft accident in which inhibition of sensemaking in dialogue, stemming from a standardized and thus rather impoverished "ICAO-english" (ICAO, the International Civil Aviation Organization), may be regarded as a fundamental cause (Dekker and Woods, 2010). Related to our focus on collaborative complexity, CoSE thus provides no less explanatory strength than other generic models of sudden and violent lapses into accidents, e.g., theories of "normal accident" or "functional resonance".

Manifest complexity, on the other side, can be spotted as a continual production of emergents reflecting a constant flux of adaptation and change. Designed optimization of a subsystem (inherently aiming at inhibiting or rendering emergents superfluous) will imply (complex) adaptations in the surrounding (sub-)systems. In CoSe terms, the production of emergents are thus just "exported" to the surroundings, in which they are allowed to unfold. The pathogenic potential is imminent, and the salutogenic potential may be seen as a kind of "raw" or "natural" resilience which comprises autopoiesis, learning, adaptations, preemptions, etc.

Note that the scope and grasp of these three forms of complexity constitute a clear demarcation line towards the more prevalent human error and human factors approaches that do not capture the development of the potentially dangerous emergents. The resulting sociotechnical, contextual complexity cannot be reduced or boiled down to a matter of lower performance limits of (groupwise) human reliability (Grøtan et al., 2011).

3 STRIKING A BALANCE BETWEEN COMPLIANCE AND RESILIENCE

It is however hard to imagine industrial, collaborative systems put into operation that are so complex that they can only be safely managed on premises of complexity and resilience. It is thus fair to assume that resilience as a safety strategy will never replace compliance entirely, but will be a "small" but crucial supplement.

A prime issue is therefore how objectives and measures of resilience (engineering) can be added to the existing portfolio of principles and practices of safety management. Inevitably, this will also have implications for existing principles and practices. An integrated safety management objective can hardly be based on two disparate missions based on two singular, non-coherent points of reference.

In Figure 2, the objectives of Integrated Safety Management (ISaM) are comprehended in terms of a complementary relation between (1) self-evident, "common-sense" safety *resulting* from traditional, repetitive compliance measures justified by assumptions of commensurability and stability at the macro and micro levels, and (2) the *elusive* safety *emerging* from resilience(s) justified by different forms of complexity. The elusiveness of safety is not something we have invented for the occasion of this paper. Weick & Sutcliffe (2001, p30) assert that "*Safety is elusive because it is a dynamic non-event—what produces the stable outcome is constant change rather than continuous repetition*".

The (social) emergents that actually "drive" the complexity are encircled by the CoSE in Figure 2.

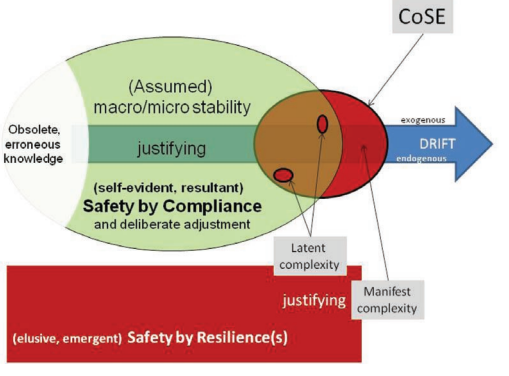

Figure 2. Compliance vs resilience.

They partly overlap the stable (stabilized) zone that justifies compliance as a strategy, thus illustrating the crucial distinction between *manifest* and *latent* complexity (and hence also their un-ordered combination). An inherent "drift" moves the demarcations between the obsoletes, the stable/stabilized, and the complex. This drift is both *exogenous* (sensitive to external changes), but also *endogenous*, e.g. in terms of the permeable CoSE (new stable/stabilized, macro/micro patterns (or "punctuated equilibria") that may emerge out of complex interactions and deliberate learning efforts), or other sources of dynamism in the complex system (Grøtan 2011a).

The above premises allows us to incorporate the premise of the "impermanent" organization (Weick 2009), and thus challenge the prevailing practice that if an accident or incident investigation reveals a flawed or "imperfect" organization (that is, not compliant with formal rules), the accident/incident is (too) easily attributed to this failure. We challenge this by asking: is the organization actually "working" (in order) when failure do not happen, or *is it something else* that "keeps it together"? We argue that the (social) *emergents* depicted by CoSE may source the continual "re-make" of the impermanent organization. This view is supportive of Weick and Sutcliffe (2001, p31) who assert that "*.... when a system is operating safely and reliably there are constant outcomes and nothing to pay attention to. That does not mean that nothing is happening, even it is tempting to draw that conclusion. Quite the opposite. There is continuous mutual adjustment*".

4 ACTIONABLE MODELS OF RESILIENCE(S) FOR SAFETY MANAGEMENT PURPOSES

4.1 *The dialectics of (safety) management*

In general, any safety management scheme will embed an inevitable dialectic between the prescriptive, managerial "work as imagined", and the "work as done" (which social scientists are more eager to describe on practitioner's terms). It is thus more than tempting to claim that these dialectics between prescription and practice is grossly underplayed in most traditional Safety Management Systems (SMS).

In relation to the "elusive, emerging safety by resilience(s)" side of things (Figure 2), the dialectical issue is no less than urgent and precarious. Without it, the whole notion of "resilience" actually becomes void of meaning. Nathanael and Marmaras (2008) depict a basic anatomy of the dialectic inherent in the idea of organizational resilience, commensurable with our own notion of organizational resilience that encompasses interactions across organizational strata. In a similar vein, LeBot (2010) emphasizes the difference between the control objective of management vs the autonomy objective of the practitioners. Hence, a scheme of organizational resilience dependent on detailed, prescriptive managerial instructions for behavior is for us a contradiction by terms (or, reduced to a fantasy of a "joystick organization" (Groth, 1997:392), designed by and in the hands of a "technical maestro" (Westrum, 2008)).

Hence, our premise for exerting a managerial control objective, whether for achieving compliance or achieving resilience, will be that the "command" have a prescriptive character, the "response" is constituted by a community of practice (not a purely "obeying" individual), and the managerial side have to make sense of the effects of its dispositions, choices and priorities in terms of the unfolding practice as well as its more "objective" consequences.

4.2 *An actionable model for resilience management*

Sometimes, management is about getting out of the way to let good things to happen. This taken literally, the implications of resilience thinking is that management should step aside and provide substantial space for "letting go", that is, provide resources and support, and let resilience unfold among practitioners. This is of course no more than a caricature of managerial practice, an impossible stance for any manager accountable for outcome and results, and contradictory to the scope of an *Organizational* Resilience (OR) based on mutual sensitivity and responsiveness across organizational contexts (Grøtan, 2011b), for the purpose of systemic proaction (Rosness et al., 2011). We thus need some concept or control/action points from which resilience (safety) management may exert some objectives, influences and directions, but also receive feedback in order to make sense of the actual effects of their own dispositions, choices and priorities. Somewhat reluctantly referring to Westrum's (2008) notion of the "technical maestro", we may add that such a "maestro" needs to be utterly reflexive in relation to the inherent constraints of exerting his/her "design" of the sociotechnical organization that shall "make resilience happen", this not at least due to the dialectical aspects.

4.3 *Layered articulation of control points*

Figure 3 depicts a possible layering that articulates a set of actionable "contact points" between management and the situated practice of being

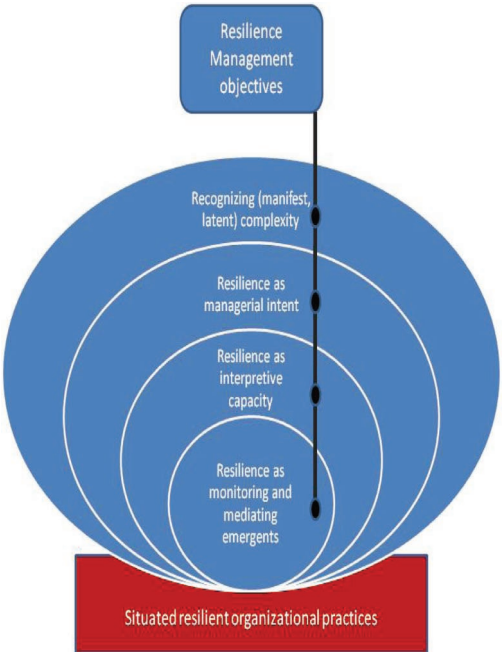

Figure 3. Layered action/control points.

resilient in a stratified organization comprising a multitude of operational and decision contexts, possibly reflecting a structure of operators, contractors, sub-contractors. The layering of this model comprises various "controls" over resilience in terms of:

- A *managerial intent* and baseline to indicate the (at the time) presumed presence of complexity (forms) and the preferred modes of dealing with this complexity, based on the Cynefin framework (Kurtz and Snowden, 2003)
- An *interpretive capacity* of agents dealing with (possibly emergent) events and incidents, based on the Interpretive System Model (Weick, 2001) dimensions of analyzability and intrusiveness (as described in Grøtan, 2011a, Grøtan et al., 2011)
- A designated activity of *monitoring and mediating* the (dynamics of) emergents according to CoSE (Figure 1), herein anticipate their accident potentials in conjunction with technical triggers.

Control exerted through *managerial intent* will require the articulation of a proper balance (between resilience and compliance) that the organization can endure, and an awareness of the "embryos" embedded in current practice that will change the future picture. e.g., A system may appear ordered (*known/knowable* in Cynefin terms), but the organization may still have to cautiously disclose, identify and preempt dangerous, complex "edges" of normal operations. Or, the system may exhibit traits of the *complex* domains over time, and must be mustered to deal with and endure "*chaotic*" episodes, in the worst case by imposing predefined "emergency" modes of operation in order to retain control. It is also important to note that managerial sensemaking about the system will most likely distinguish between parts and subsystems, and that the urge for "order" (motivating compliance) will be a constant backdrop for "complex" managerial intents.

Control exerted through *interpretive capacity* will have to set the conditions for how intrusive, how analytical the organization/system can be (allowed to be) at the time. e.g., Organizational units may be encouraged to prepare to deal with anticipated, exceptional situations by enacting some perceived scenarios (inventing the environment), learning by the reaction and returning in a controlled manner to a formal, analytical elaboration of the implications. Or, units and teams may be trained to be able to be in a permanent mode of enactment and invented environment due to an endured conception of the (real) environment as unanalyzable. However, as for the above, "order" (motivating compliance) in terms of presumed analyzability of subsystems, will be part of the managerial sensemaking also here.

Control exerted through *monitoring and mediation of emergents* will (e.g). scout for solidified (stable) emergent patterns, and enforce "stress-tests" of them in terms of their robustness and potential effects on other emergents, with a special attention towards potential leverage of unwanted consequences. Or, analyses will address how formations of key resilient properties (e.g. based on "Contributing Success Factors" (CSF) according to Størseth et al. 2010) are embedded in the observable emergents. Or, efforts can be made to identify the emergents that are most volatile and dynamic, and reinforce their constitution. And finally, the managerial side will have to pay special attention to possible "macro shifts", and decide whether to let them evolve naturally or enforce them with proper impetus or modulation, subsequently elaborating the implications for (a new mode of) compliance.

5 DISCUSSION: TOWARDS INTEGRATED SAFETY MANAGEMENT

5.1 *Implications and capabilities of OR*

So far, we have founded our conception of Organizational Resilience (OR) at a "meso"-line level. However, this is not a "meso" level that is

just an intermediate position between macro and micro, but a highly dynamic realm of complex interactivity, unforeseen effects and emergents, according to Sawyer's (2005) notion of the "circle of emergence", re-articulated for our purpose in Figure 1.

We have also indicated a direction for the management of resilience through addressing complexity and emergence. We have demonstrated that *resultant safety through compliance* and *emerging safety through resilience* are complementary issues (Figure 2), and that it is possible to conceive a layered set of action/control points for the purpose of resilience management (Figure 3) that work with, not against, and take advantage of the inherent dialectic between prescription and practice. We have also demonstrated that notions clearly related to compliance as a strategy, are boundary conditions for the exertion of resilience management.

5.2 *A need for OR of the 2nd order (2OR)*

Acknowledging that *resultant safety through compliance* and *emerging safety through resilience* are complementary issues, what still remains unresolved is a feasible comprehension of their joint management. As we see it, this challenge resembles many of the challenges that we have addressed already in the discussion of OR, and we therefore coin these issues with the common notion of "OR of the 2nd order", or just 2OR.

As this theme can not be elaborated within this paper, we will just indicate possible paths for the quest of conceptualizations of 2OR. A common denominator that incorporates the "first order" OR we have discussed so far into such a scheme of 2OR is that organizations will have to cope *reflexively* with the changing circumstances of hazard and risk(s) due to their own (endogenous) impact on them.

Hence, we direct attention to what Hutter and Power (2005) denotes the Organizational Encounter With Risk (OEWR). The OEWR concept implies a continuous focus on *operational* risk. They see organizations as the critical agents for this, because organizations are the contexts in which hazards and their attendant risks are conceptualized, measured and managed. Hence, they address the *risks of risk management*, by questioning how organizations experience the nature and limits of their own capacity to organize as they are about external shocks and disturbances in the environment.

Hutter and Power assert that imposition of rational decision theory can be counter productive, if not risky itself, and that ontological separation of environment vs (cybernetic) risk management implies neglecting the importance of context, sequence, attention capacity etc. Hence, the *organizing process* itself is a source of risk, and must therefore also be open for critical inquiry and change. This conceptualization of organizational encounter with (*signs* of) hazard and risk comprises three independent pillars: (1) The organization of attention (the "intelligence" apparatus), (2) (individual and institutional) sensemaking processes, and (3) the capacity of re-organizing.

As illustrated in Figure 4, by virtue of the three pillars, OEWR invites reflexivity and is thus able to acknowledge inherent dialectics of OR. OEWR is also able to accommodate the exertion of layered objectives, influences and directions as depicted in Figure 3 by a conscious organization of attention (which includes a deliberation of what is not attended to), and also invites making sense of feedback (and individual sensemaking) in order to make institutional sense of the effects of managerial dispositions, choices and priorities. Accordingly, OEWR thus also provides a sensemaking basis for taking into account that notions clearly related to compliance as a strategy, are boundary conditions for the exertion of resilience management.

It is thus our view that the OEWR approach have a potential of capturing a full fledged 2OR, establishing a capability of mustering the balance between "compliance" and "resilience", and relate to the actual effect(s) in a reflexive manner, based on the complementarity depicted in Figures 1 and 2.

It is however an open question whether top management will be tempted to embark on the challenges of 2OR, e.g. in terms of OEWR. It is a "fact of life" that safety even in its most straightforward form (that is, compliance), often lacks top management attention and resources.

The motivation for "2OR" kind of endeavors may perhaps be sought on other arenas than safety alone. In that respect, it is interesting to observe that our above proposed use of OEWR for implementation

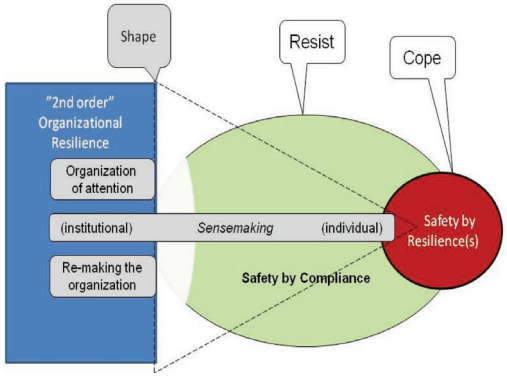

Figure 4. OEWR for 2OR.

of 2OR have a clear resemblance with the claims of Lengnick-Hall & Beck, (2009:39), that "*organizational resilience capacity can be viewed as an antecedent to strategic agility*", under the premise that "*resilience capacity help firms navigate among different forms of strategic agility and respond effectively to changing conditions*" (ibid).

5.3 *Implications for use of proactive safety indicators*

The use of proactive safety indicators gains increasing attention as a managerial strategy, and can be coupled to the OEWR notion of "organization of attention". The above discussion clearly hints that while it is rational for compliance-based safety approaches to address such indicators individually and "weigh" their respective importance on these terms, the OR perspective of "elusive, emergent safety" demands a rather different attention, not only to Critical Success Factors (CSF) (Størseth et al., 2010) as such, but also to clusters and formations of such factors in a stratified organization. Both OR and 2OR concepts thus reinforce the message of Størseth et al. (2010) that CSFs should be designed in a way that opens for looking at paths and connections between and across levels and layers. CSF themes can vary in terms of taking on the form of premise, function, or ability. Opening for these latter variations (premise, function, ability) offers an additional observation point to look at how the CSF themes can be associated in various formations (ibid).

6 CONCLUSIONS

As noted by Weick and Sutcliffe (2001), the temptation during safe operation may indeed be to infer that 'nothing happens'. Their point however, is that continuous mutual adjustment is actually the case. With this point a challenge is no doubt issued in terms of striking a balance for compliance and resilience in the safety management portfolio.

A fundamental question brought to the fore by this relates to the extent to which continuous adjustment is manageable. The current paper has attempted to address this by elaborating the organizational resilience scope (i.e. 2OR); and also to suggest an approach towards specifying OR control points for safety management. As for the complement side of things (compliance), Weick and Sutcliffe's note brings urgent emphasis to the issues of how, or if safety management is willing to look behind the organizational facades (e.g., questioning unified actors, homogeneous environments and long lines of uninterrupted action), relax its traditional stronghold on a "realist" position stemming from a distinct focus on accidents, incidents and errors, and employ a sense of "constructivist" view on resilience as well as on safety as a whole. A crucial point will be to search for *actionable* knowledge and models that can enable a dialectical interactivity between safety management and operating "agents" throughout different organizational contexts.

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