14

Naturalizing Sensemaking

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> The greatest loss of time is delay and expectation, which depend upon the future. We let go the present, which we have in our power, and look forward to that which depends upon chance, and so relinquish a certainty for an uncertainty.
>
> —**Seneca**

When things go wrong, its common to seek reasons for the failure with the intention of using the knowledge gained through that search to prevent similar failures in the future, and at times to allocate blame and responsibility. In management science considerable effort is placed on reducing uncertainty in the future through research, analysis, forecasting, scenario planning, and the like. We have a basic need to *make sense* of the world around us so that we can act in it. However, despite many investigations, multiple research projects, and an endless stream of popular (and unpopular) books that offer recipes for future mistakes, we still make mistakes; the future remains uncertain, and we are frequently surprised by what we thought were outlier events, so improbable that they could be ignored.

The material in this chapter has been derived from a broad range of projects over four continents in the past decade dealing with intractable problems. Much of the original funding came from the U.S. and Singapore governments in the context of counterterrorism and horizon scanning. Other source projects have included the mass engagement of staff in micro-scenario planning for the Government of British Columbia, the educational impact of museums on school children in Liverpool, issues of disintermediation for several pharmaceutical companies, as well as staff engagement and cultural mapping in the context of organizational change.

The argument will be made that we need to stop trying to anticipate the future, and instead move to a focus on anticipatory awareness, in which state we have a *resilient* capacity to recover from inevitable surprise. This is contrasted with approaches based on *robustness,* where the emphasis is on prediction and prevention of negative outcomes. To make the argument, we will first draw from complex adaptive systems theory to provide a theoretical base for the essential unknowability of future outcomes. This will lead to an examination of a new research tool based on self-signified micro-narratives to understanding the *evolutionary potential of the present,* which in turn enables a coevolutionary approach to decision making, in which theory, intent, and reality constantly interact through a series of safe-fail experiments (i.e.,

experiments in which failure is not fatal and from which we can recover quickly and learn), amplifying success and dampening failure, to allow the emergence of novel and beneficial solutions.

The term *sensemaking* is a neologism most commonly associated with the work of Weick (1995), for whom the term defines the various actions and their consequences that emerge from efforts to create order, and to make sense of what has occurred in the past. Weick's work originates in social psychology and emphasizes the importance of language and metaphor and meaning making through social interaction. While there is much in common between Weick's position and the material discussed in this chapter (e.g., work by Browning & Boudés, 2005), there are also some key differences. First, this chapter challenges the use of retrospective coherence to create models for future action, placing greater emphasis on understanding the present and reducing pattern entrainment that results from past failures. Second, we draw on the philosophical tradition of naturalizing epistemology, drawing on natural science, and avoiding the dangers of confusing correlation with causation, which are all too common in management science. Third, the term *sensemaking* is used to emphasize that we are talking about a diverse and constantly evolving collection of processes that synthesize human and machine capabilities.

Different Types of Systems

> Whereas strong dynamic links among components (characterized as nodes) result in a "strong cluster," weak links between strong clusters give rise to a community or a world. Since any node can simultaneously belong both to a strong cluster and to a larger networked community, society, or world, boundaries become diffuse, but also dynamic and creative. Complex dynamical systems thus begin to look more like bramble bushes in a thicket than like stones. And it is extremely difficult, as any outdoorsman will tell you, to determine precisely where a particular bramble bush ends and the rest of the thicket begins.
>
> **—Juarrero**

Complexity science has its origin in chemistry and biology, but has increasingly been applied in economics and social science (Byrne, 1998; Waldrop, 1992). It is best understood by looking at three different relationships that can exist between a system and agents operating within the system. I am using *system* to mean any network of interaction with coherence, which means it may have fuzzy boundaries. By *agent* I mean anything that acts within the system. That may be a person, a community, a dominant narrative, a process, or a rule.

Based on the constraint relationship between system and agent we can define three types of systems:

- **Ordered systems:** Here the nature of the system constrains the behavior of agents to make that behavior predictable. There are repeating relationships between cause and effect that can be discovered by empirical observation, analysis, and other investigatory techniques. Once those relationships are discovered, we can use our understanding of them to predict the future behavior of the system and to manipulate it toward a desired end state.

- **Chaotic systems:** These are sometimes called random systems, in which the agents are unconstrained and present in large numbers. For this reason, we can gain insight into the operation of such systems by the application of statistics, probability distributions, and the like. The number and the independence of the agents allow large-number mathematics to come into play.
- **Complex adaptive systems:** While these systems are constrained, the constraints are loose, or partial, and the nature of the constraints (and thereby the system) is constantly modified by the interaction of the agents with the system and each other; they coevolve.

The coevolutionary nature of complex adaptive systems means that they have inherent unpredictability, as the system will not return to an equilibrium state after it is disturbed; hence, the phrase *far from equilibrium* is sometimes used to describe them. In such systems the agents are adapting to proximate interactions with other agents and the environment. Any order or structure is emergent and only repeats, if at all, by accident, not by design. Of particular importance is the fact that due to these characteristics, complex systems are highly susceptible to minor changes or weak signals. This is sometimes illustrated by the cliché that the flapping of a butterfly's wings in the Amazonian rain forest causes a hurricane in Texas, but it is poor way of explaining the point, easily illustrated by asking the question: Why don't we just shoot the butterflies? There is no linear causality between the two events; the point is that multiple small perturbations create through their interaction an increasingly coherent storm system.

The phase change between types of system is also important and is more fully treated elsewhere (Kurtz & Snowden, 2003). It is important to realize the constraints in an ordered system can easily produce the conditions under which that system shifts and collapses into chaos. Attempting to exert excessive control through bureaucracy may result in a slow buildup of tension. Because excessive control makes it impossible to get anything done, people find workarounds, which enable the system to work despite itself, disguising failure until the system breaks catastrophically.

Most human systems are complex and adaptable to local interactions. We are constrained to varying degrees by systems, but we are also capable of modifying those systems. Small things lead to unintended and unforeseeable consequences. Once disturbed, any human system is altered irretrievably and will not return to an equilibrium state. When we understand that a system is complex, then our expectations with respect to decisions and decision processes are different. We do not make decisions based on forecasting outcomes and best practice, as both are impossible. We cannot adopt an approach based on fail-safe design, but have to switch to safe-fail experiments and monitor for the emergence of patterns. Some patterns we amplify and some we dampen, depending on the evolutionary direction we wish the system to take. We thus manage the evolution of the system toward an unknowable future state; we do not waste energy in trying to achieve a predefined system outcome.

Managing a complex system is rather like the effective management of a children's party. We create some boundaries (and if we have any sense, they are flexible, not rigid), either physical (do not leave the garden) or moral (no teasing), and then use catalytic probes (a football, a computer game, or similar) to see if we can stimulate the

formation of stable self-organizing form of play. If what emerges is good, we amplify it; if it starts to go badly, we dampen it. The pattern of play is called an *attractor* in complexity theory. Attractors are phenomena that arise when small stimuli and probes resonate with people. As attractors gain momentum, they provide structure and coherence (Snowden & Boone, 2007). *We manage the emergence of beneficial coherence within attractors, within boundaries.* What is beneficial is determined in the light of loose goals rather than precise objectives. This is a highly effective low-energy solution compared with an approach based on learning objectives, project plans with milestone targets, incentives for target achievement, and party mission statements. The potential of complexity is to allow more to be achieved with less, and as importantly, to allow contextually appropriate solutions to emerge.

Managing for that emergent and beneficial coherence requires an effective mapping of the potentialities of the current state. Weak signals are important here, as outlier events represent both threat and opportunity. We are dealing in complex systems with human motivations and attitudes, and as will be argued, these are best revealed through an understanding of the day-to-day micro-narratives of existence.

Micro-Narratives

In order to understand the role of micro-narratives, we shall start with the endpoint of narrative research. Fitness landscapes, shown in Figure 14.1, were originally developed in biology (Wright, 1932) to represent the process of natural selection. With recent developments in computer modeling capability, it is possible to produce a representation of landscapes to demonstrate areas (the hollows) where there is an increased probability that the system will be stable. The deeper the hollow, then the greater the propensity of agents to visit, and the stronger the entrainment once there. The peaks, on the other hand, represent areas the system would normally avoid, but in consequence, these represent areas of unexpected or sudden change. The concept of fitness landscapes was adapted as a representation for large volumes of micro-narratives—in the above example, many thousand. How we produce these types of maps will be explained later in the chapter; however, the concept of fitness landscapes is

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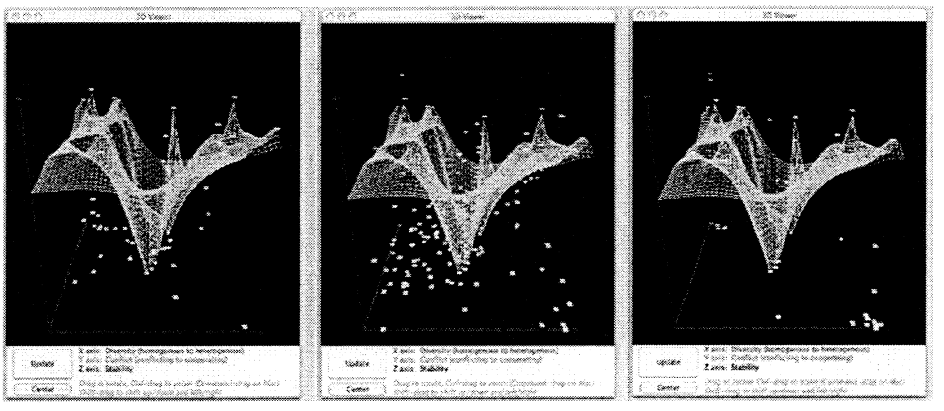

FIGURE 14.1 Fitness landscapes for micro-narratives.

introduced at this stage to demonstrate why new forms of research are needed to support the new dynamics of strategic decision making enabled by complexity science.

The self-signification of narratives (to be discussed later) produces the quantitative data that are captured in fitness landscapes. Hollows represent belief systems that are unlikely to change. If they are beneficial, then little energy is required to maintain them; on the other hand, if they are negative, they will be difficult or impossible to change. The smaller hollows (or "lumpy bits") represent proto-belief systems that could, with stimulus, become stronger attractors, potentially sucking support away from the existing ones.

This type of mapping allows decision makers to sense the evolutionary possibilities (and impossibilities) of the present along with risk assessment. It also allows monitoring of the impact of safe-fail experiments, permitting more rapid, effective, and lower-cost interventions. In Figure 14.1 each frame of the landscape represents a three-month period, and the yellow dots represent outlier events. The third frame shows a new cluster, an interesting emergent possibility for change, comprising less than 10 micro-narratives out of tens of thousands, a weak signal that would normally be ignored as an outlier or exception but now gains attention.

A New Approach to Narrative Research*

> The model of the human mind has been assumed to be akin to that of a symbol processor, a computer like engine that allows us to manipulate successfully a range of symbols of which language is deemed the most significant.
>
> This view of the human mind is very limiting because it assumes that what we know, and are able to know, is expressible in symbolic form only.
>
> ...because intangibles cannot be captured in the grip of such symbolic representations as questionnaires or surveys. It might rightly be pointed out that there are qualitative means of assessing transformational leadership in terms of interpreting certain leader behaviors, or by applying leader self-reports. These are imbued with their own problems because of the inability of differentiating between competing interpretations, a core problem of interpretive social science and hermeneutics, and by the endemic unreliability of self-reports.
>
> **—Lakomski**

Czarniawska (1998) challenges the assumptions of those who advocate *homo economicus* in organizational studies by arguing for a narrative-based approach to organizational research. Stories are at the heart of our day-to-day discourse and our sensemaking abilities. They form a part of the commonsense world in which intention, interpretation, and interaction are all intermingled in any narrative. The narrator and listener must assume shared context when inferring meaning from narrative statements. Because stories carry with them ambiguity, their meaning can be interpreted in different ways in different contexts. So while few would disagree that narrative creates meaning, the question arises as to how it should be interpreted.

Much effort in recent years has seen the development of a range of formal methods derivative of the assumptions of interpretivism. Others see the interaction between researcher and research subject as an iterative process of inquiry that may be primarily

* Some of the material described this section is patent pending (Cognitive Edge Pte Ltd.).

driven by the research or the research subject. In the field of narrative this position is exemplified by Boje (2002). It is not the purpose of this chapter to provide a comprehensive summary or criticism of these methods other than to set the scene for what we are attempting with prehypothesis techniques, namely, to provide a quantitative technique that is supported by the rich context of self-interpreted narrative. In its turn, this provides a more objective basis for qualitative interpretative processes by the researcher, and indeed by the research subject, that can lead to sustainable action.

At the heart of this approach is a view of meta-narrative as an emergent property or strange attractor arising from social interaction, which is discoverable and actionable in the sense of quantum mechanics rather than the laws of motion. By taking narrative as a fragmented form of support for cognition, and using the ubiquity of the web and social computing together with the representational and information processing capacity of computers, we can considerably augment and enhance the natural pattern-based intelligence that underpins human decision making, and more so radically reduce interpretative conflict in the process. Further, research so conducted also creates a knowledge base that conforms with the naturalistic principles discussed throughout this volume.

Our goal is to utilize the rich context of narrative to inform sensemaking, and also to create objective data in which cognitive bias is minimized and we can place some reliance on the conclusions drawn. In particular, we want to be able to move rapidly from research to action in decision making, allowing the decision maker to move back and forth from an abstract representation of the field as a whole to the raw micro-narrative without mediating interpretative layers.

The micro-narrative approach described below derives from a coevolution of theory and practice. The historical context of this development was as follows:

- The original use of narrative was a source for mapping knowledge. It arose from the deeply practical need to create a rich context from which it was possible to extract decisions and judgments and to ask questions about knowledge in use (Snowden, 1999). Narrative was also shown to be a better recall mechanism for contextual knowledge than questions.
- Subsequent work extended to the field of antiterrorism both before and after 9/11, where the approach was based on the capacity of narrative to elicit disclosure of otherwise hard to understand factors, such as intent and purpose. Also, and more critically, narrative was proposed as a sensory mechanism of weak signal detection. This was based on anecdotal evidence, confirmed by subsequent experiments, that human brains are more sensitized to narrative forms of knowledge about a situation than they are to analytical processes (Lazaroff & Snowden, 2006).

In carrying out work using narrative as a research approach, which has spanned over a decade, the following conclusions were drawn. From the perspective of practice, they seem commonsensical and were subsequently validated by reading in the natural sciences, but at the time they were (and in some circles still are) controversial. In summary:

- Naturally occurring stories come in fragmented anecdotal form. Those with the most meaning are often the most poorly constructed. In one case, when looking at the stories of schoolchildren on leaving a secondary school in Singapore, we found that the most powerful stories were from the least articulate students; there was less disguise in their narratives. Stories with accompanying paintings or pictures often resulted in a ~~better~~ form of narrative expression than a pure story in textual form.
- A story is always told in a context, from a context. If you read it, then it will trigger a reaction, but the reaction is not necessarily sympathetic to that intended or experienced by the storyteller. Each reader has his or her own context and situation. When we also take into account that anecdotes need to be captured in their native language (try telling a story in something other than your mother tongue and you will see the problem), this adds complexity to the process of gathering narratives. There needs to be some common context for any translation to be effective. As will be described in the next section, we determined that the best way to achieve this was for the researcher to create a tagging system of sufficient simplicity to be understood without active interpretation, and for the storyteller to signify the meaning in his or her narrative. In this way the metadata represent a common context.
- If the researcher first looks for patterns in the metadata using statistical or visual tools, he or she is less likely to be biased by content and prematurely converge on an interpretation. Metadata enable larger volumes of material to be scanned, and anomalies and clusters to be more easily detected, including outlier events that are often ignored by conventional research. This allows the researcher to construct and test hypotheses after data capture, using the self-signifiers.
- The material so gathered forms, with simple visual and criteria-based selection, a valuable knowledge asset that allows direct access by the knowledge user to data ranging from an abstraction of the field to the raw self-interpreted narratives. The material reflects a natural knowledge repository. Faced with a difficult or intractable problem, we are unlikely to look up best practice as a structured document. Instead, we seek out people and other sources, such as the Internet, gathering fragmented material that we select and blend with our own experience and the current context to determine how to act.

Self-Signification

> Nor do people pour new wine into old wineskins. If they do, the skins will burst, the wine will spill out, and the skins will be ruined. Instead, they pour new wine into fresh wineskins, and both are preserved.
>
> **—Mark 9:17**

Self-signification, as discussed, refers to the process of "tagging" one's own stories. There are two approaches generally in use to create metadata. One is to adopt a classification system, frequently hierarchical, assigning the material to a category. Within knowledge management the generation of a hierarchical taxonomy has been a frequent starting point. Another option is to use the free form tagging of key words and categories, as in social computing, the aggregation of which creates what is now known as a folksonomy and may be semantically created as well as interpreted.

In practice, due to the inherent limitations of card classification systems (which passed into early computers), hierarchical taxonomies have required an item to be placed in a single unique category. Innovations such as facet analysis (Ranganathan, 1967) allowed for greater flexibility and, to a large degree, form an early evolutionary stage of the approach advocated in this chapter, although the practicalities of such approaches had to await the development of scalable and reliable computing together with the wider awareness of folksonomies generated through social computing. However, the ideas of deep structure in language are under challenge from cognitive science (Deacon, 1997; Freeman, 2000), and this limits the aggregation claims of the semantic web and other technologies.

In a very real sense we are now provided with two limited extremes: the rigidity of hierarchical classification and the anarchy of folksonomies. Neither presents an ideal solution for tagging. A classification system that attempts to remove ambiguity would be subject to the general criticism of such systems as static and nonadaptive (Weinberger, 2007). On the other hand, allowing people to assign whatever tag they wanted would introduce massive uncertainty about the way the material was tagged. In practice, people do not use the same words or concepts consistently even in small groups, let alone larger populations. A pure folksonomy lacks a grammar of meaning between researcher or decision maker and the subject. In more recent years attempts have been made to create controlled vocabularies in social computing environments. This has potential within a restricted population but is not practical for mass capture.

The approach we adopted and refined over several years of experiment was to create a semiconstrained tagging system, one that could be created by the researcher to accomplish specific objectives, or through an emergent process if inquiry is more general. The intention and practice of our system is to create a common interpretative grammar between subject and object.

This is best illustrated by taking a recent case involving the experimental cultural mapping of populations in Pakistan, South Africa, and the United Kingdom. This project is part of a wider program designed to allow lateral transfer of knowledge between communities in different parts of the world using micro-narrative. The principle of a signifier or semiconstrained index set is that it have enough structure to create meaning, but not so much as to confine that meeting to a hypothesis.

The method entails creation of a construct with labels (symbolic or language based) into which the tellers of the original micro-narratives position their story. Any shape can be used for this construct (this approach is patent pending), and the anchors are normally linked to the core concepts involved in the field of study. In this case that field was anthropology, so the process involved distilling some of the core concepts of anthropologym such as temporalization, law, motivation, reason, and so forth. A triangle was selected as the most natural shape to characterize these concepts. Balancing between three points places enough cognitive load to force the person signifying to think about placement; it also avoids the more traditional good-bad type scale. Two examples are given below, together with their explanations. The italicized phrase provides the guide or constraint for the tagging system.*

* The work of Dr. Beth Mirram, the anthropologist on the project, is acknowledged here.

Temporalization

The lesson in this story applies to . . .

Temporality is the process of cultural time construction, whereby actors create and plan their activities and their temporal reference points during their life projects, thereby engaging the past and the future in the present (Munn 1992, p. 104). Issues of time (which may be conceived and experienced as linear, cyclical, relative, part of a "dreamtime" or dreaming, social or "emplaced") have often been secondary to other anthropological frames and issues, such as political structures, dissent, ritual, work, narrative, history, and cosmology, and to general theories of anthropological discourse. This triad (Figure 14.2) recognizes the centrality of temporal orientation in cultural life (see also Gell, 1992).

Law

What type of justice is evidenced?

This triad looks at the variance of legal sensibilities (Figure 14.3), which are embedded in different moralities and understandings about the relative locus of justice, be

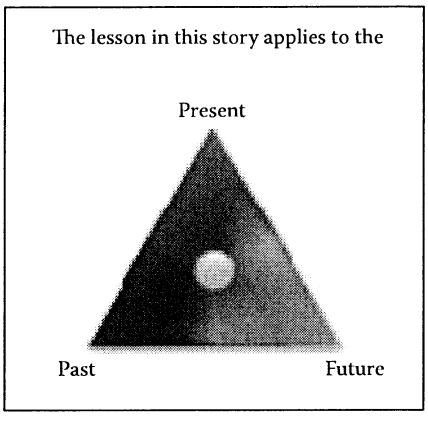

FIGURE 14.2 Self-signification—Temporalization triangle.

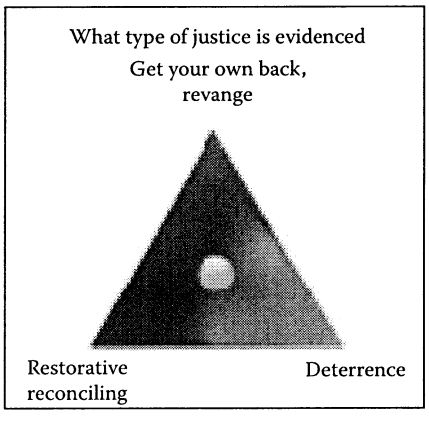

FIGURE 14.3 Self-signification—Law triangle.

that formal or informal. This field focuses on how societies—with or without courts and constitutions—manage disputes, and involves finding out how various systems of justice really work in practice.

The modern anthropology of law began with Malinowski's *Crime and the Savage Society* in 1926. Malinowski proposed an ethnographic approach to the study of legal issues, calling for extended fieldwork in order to "study by direct observation the rules of custom as they function in actual life" (1926, p. 126), which is one ethnographic component this triad extends and deepens.

This index does not merely detail a particular set of legal rules, but seeks also to explore the cultural context of law in a given situation, and to appreciate its rationality. As Malinowski put it, "We are met by law, order, definite privileges and a well-developed system of obligations" (1926, p. 21). The spoken feedback channel available in this methodology and signified by the speakers answers Comaroff and Simon's (1981) call for illumination of the processes by which disputes are resolved and norms are elaborated. It also contributes to Riles' (1994) corollary about the alternative regimes and structures of law that inhere in any society.

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These are two examples of the indexing constraints for self-signification; others covered issues of responsibility, worth, motivation, reason, and so on. No major issues or problems completing the process were found with any age group or literacy level. In other projects, symbols or animations have been used as an alternative to words, and various geometric shapes (not just triangles) can be used with the indexing occurring relative to fixed points used to generate scales for use in analysis.

For each triangle in the example above, we can derive three filters or scales, each representing the strength or weakness of one of the labels. These can then be used as axes on the fitness landscapes illustrated earlier, but they can also be used in a range of other interpretative systems, including correlation and *ad hoc* exploration. Here, visualization and statistical instruments allow patterns to be detected in the metadata, and once a pattern is detected, the ability to go to the supporting narrative, immediately and without interpretation, enables more effective decision making with respect to that pattern (e.g., encourage or dampen). Figure 14.1 shows the pattern of the metadata (one of several representations possible), and clicking on a part of that pattern reveals the underlying narrative. The nature of the method also means that capture is continuous and ongoing, and shows an evolving picture of the patterns of possibility. It contrasts with the more rigid planning cycle of annual targets and structured techniques, such as planning for specific scenarios. Ironically, the use of narrative data is both familiar and unfamiliar. In our day-to-day lives we live the unfolding narrative of our various social interactions, and we navigate them with ease. In the context of work, we move into more linear processes. Now that we understand some the natural science of uncertain systems, and we have new methods of research and representation, it is possible, as argued by Lincoln, to think anew, act anew.* To do so, however, requires new wineskins—the old cannot contain the new, although the old wine can complement the new vintage.

* Message to Congress, December 1, 1862.

Conclusions

> For now we see through a glass, darkly; but then face to face: now I know in part; but then shall I know even as also I am known.
>
> **—1 Corinthians 13:12**

This chapter started with a quote from Seneca about the attractiveness of the certainties of the present over the unknowable future. It now concludes with a more poetic quote from St. Paul and the nature of understanding. The use of complexity theory and associated narrative research is new, especially in the fields of social and management science. Its theoretical base and practical workings are still novel, showing potential, but not yet fully known. We see as through a glass darkly, but we can still see.

Most human social systems are complex adaptive ones. They are constrained, but the constraints mostly adapt to changing context. Sometimes that change is gradual; sometimes it results from the catastrophic buildup of tension in an overconstrained system. Heavily bureaucratic organizations (in the author's experience) tend to have dense informal networks that make things work despite the constraints, not because of them. The net result is that failure in the system is disguised and tension builds until the final collapse is sudden and unexpected.

For the decision maker there are multiple problems associated with managing a complex adaptive system. There is no definite future that can be determined, and the most that can be set by way of objectives is a general or aspirational goal. Additionally, in complex adaptive systems, what has happened in the past may not provide insight for the future. Hindsight is dangerous, as *hindsight does not lead to foresight.* The dangers of retrospective coherence, attributing cause in cases where complex historical events represent a unique pattern that will only repeat by accident, are all too obvious. So is the related danger of premature convergence, that is, coming too quickly to a solution for the future when even the present is not fully known. Where accurate anticipation is not possible, the decision maker has to move to a state of *anticipatory awareness* (see also Klein, this volume), operating on a safe-fail approach, assuming micro-failures, and focusing on resilience rather than robustness.

The narrative approach to research outlined above offers one new tool to assist decision makers in complex adaptive systems. By creating fitness landscapes we can direct the decision maker to the evolutionary potential of the present. Understanding what is stable, and what may rapidly or unexpectedly become unstable, allows better focus and the selection of contextually appropriate methods (Snowden & Boone, 2007). The collection of large numbers of self-signified micro-narratives enables not only research capability, but also a means to engage large numbers of staff or customers in the creation of micro-scenarios and to plot the landscapes of what those populations deem possible. Once a pattern is measured, deviations from that pattern can, with technology augmentation, be used to create weak signal alerts; the sooner an early pattern is spotted, the lower the energy cost of amplification or dampening of that pattern.

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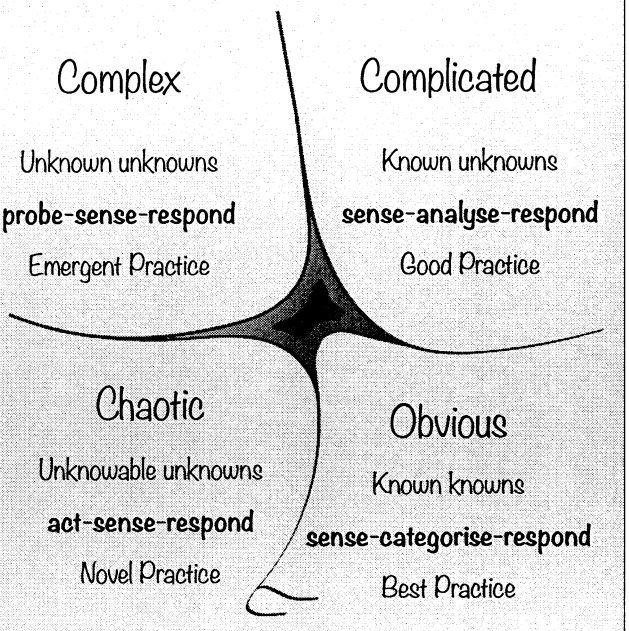
Understanding Cynefin

The basic framework

There are three basic types of system: ordered, complex and chaotic. In Cynefin order is divided into 'obvious' and 'complicated' based on people perception of the relationship between cause and effect.

Disorder (the fifth domain) is the state of not knowing which domain you are in and is divided into 'transitionary' and 'inauthentic'.

The boundary between Obvious and Chaotic is show as a cliff, or a catastrophic failure arising from complacency.



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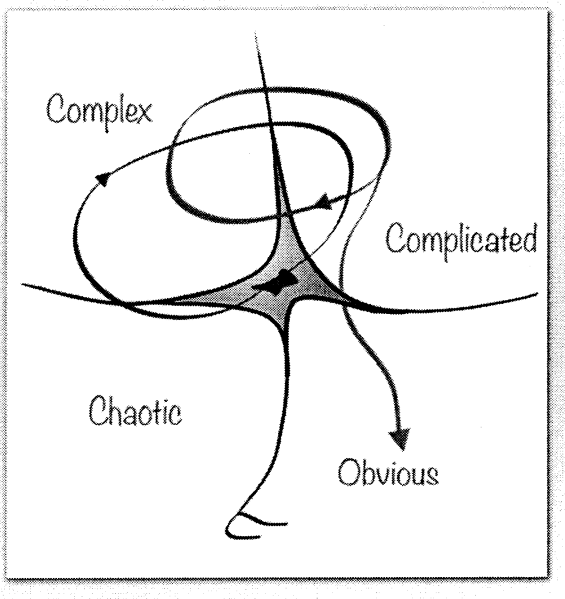
Cynefin dynamics

- Increase constraints & if sustainable, stabilise to allow for exploitation in the complicated domain.
- Periodically relax constraints to enable new patterns to emerge in the complex.
- The shallow dive into chaos unblocks long term entrainment.
- Material which is unlikely to need change is highly constrained to allow best practice in the obvious domain
- People often missed the dynamics and also assumed that each domain was a single bucket - hence the need for domain models



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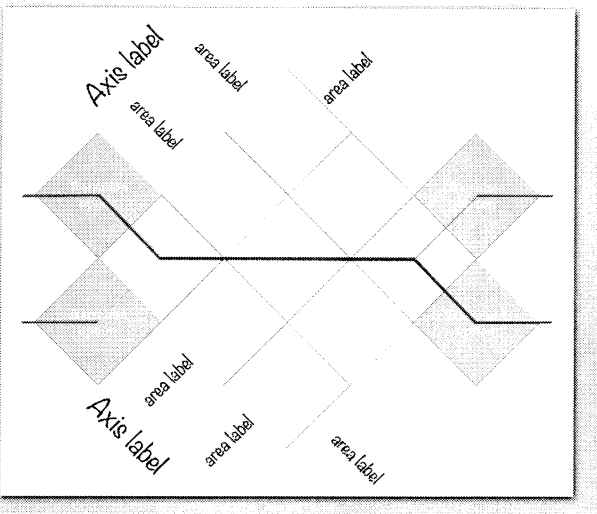
Understanding Cynefin

The nature of a domain model



The generic form is a three by three matrix that in full use is orientated through 45° to allow linkage; axes labels are not fixed.

The line of coherence (red here, grey normally) represents the ideal transition through the domain and links the various models & is horizontal.

The upper and lower boxes represent undesirable states (red or green) or transitions (blue).

The domain of disorder is to the top and bottom of each diamond

Transition options link up or down depending on the energy required to move to the adjacent domain

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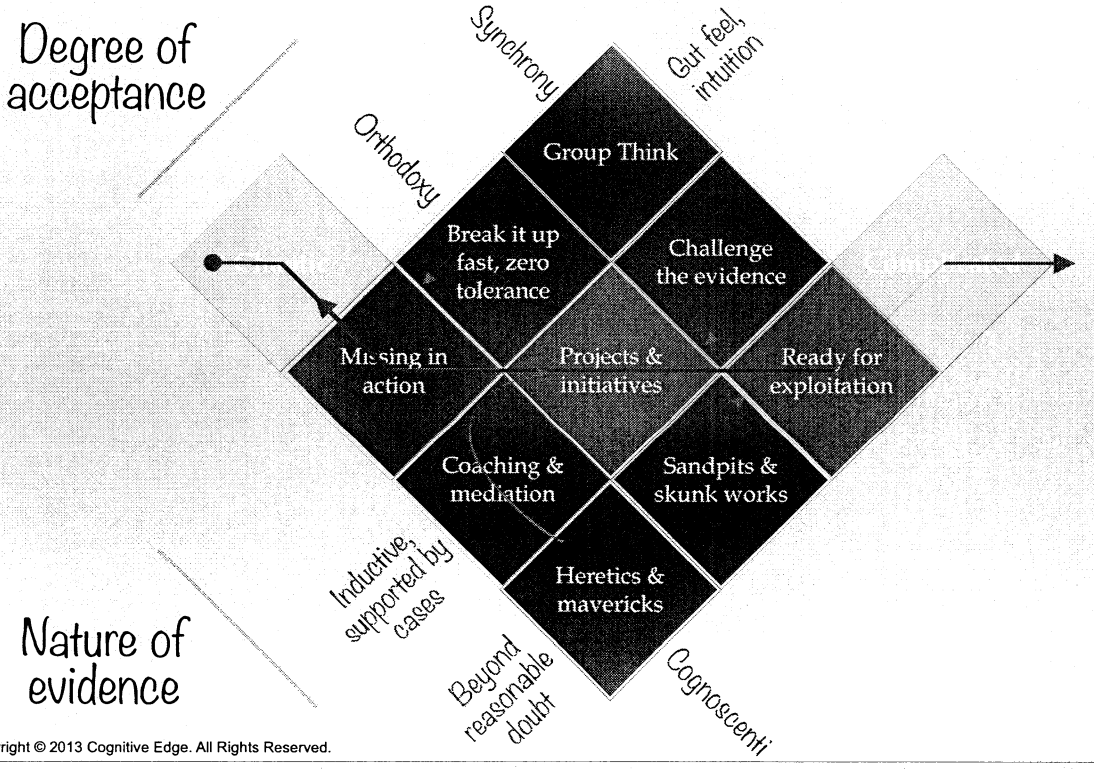
The complex domain



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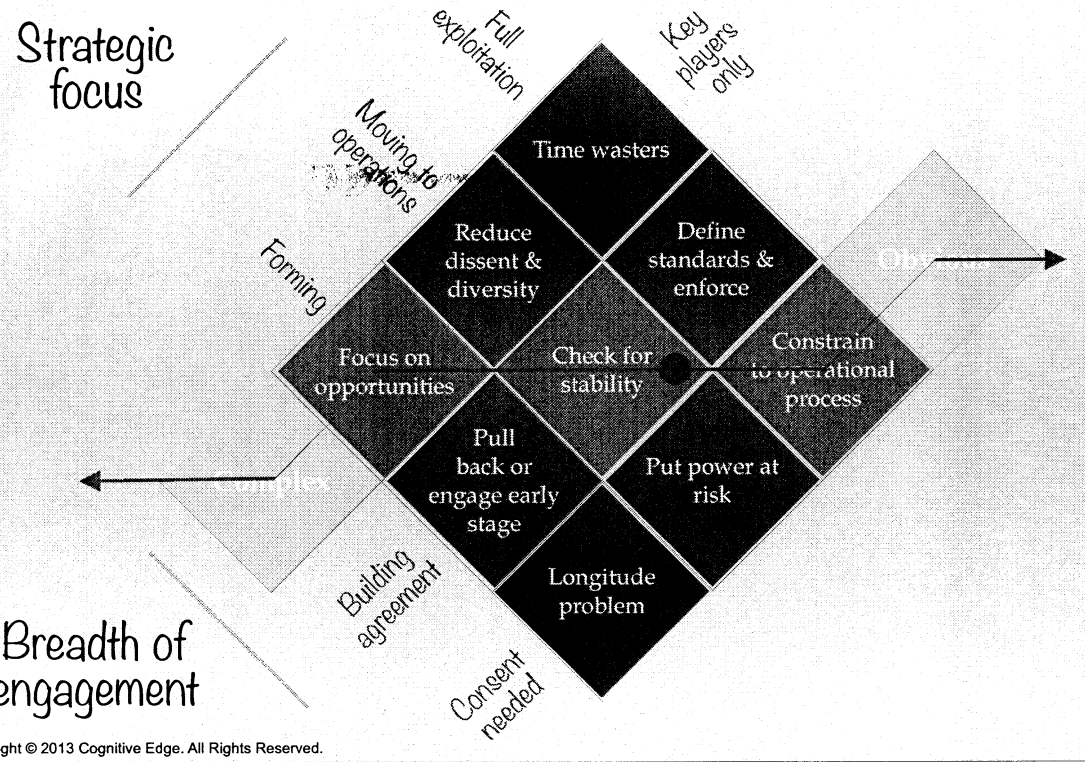
The complicated domain



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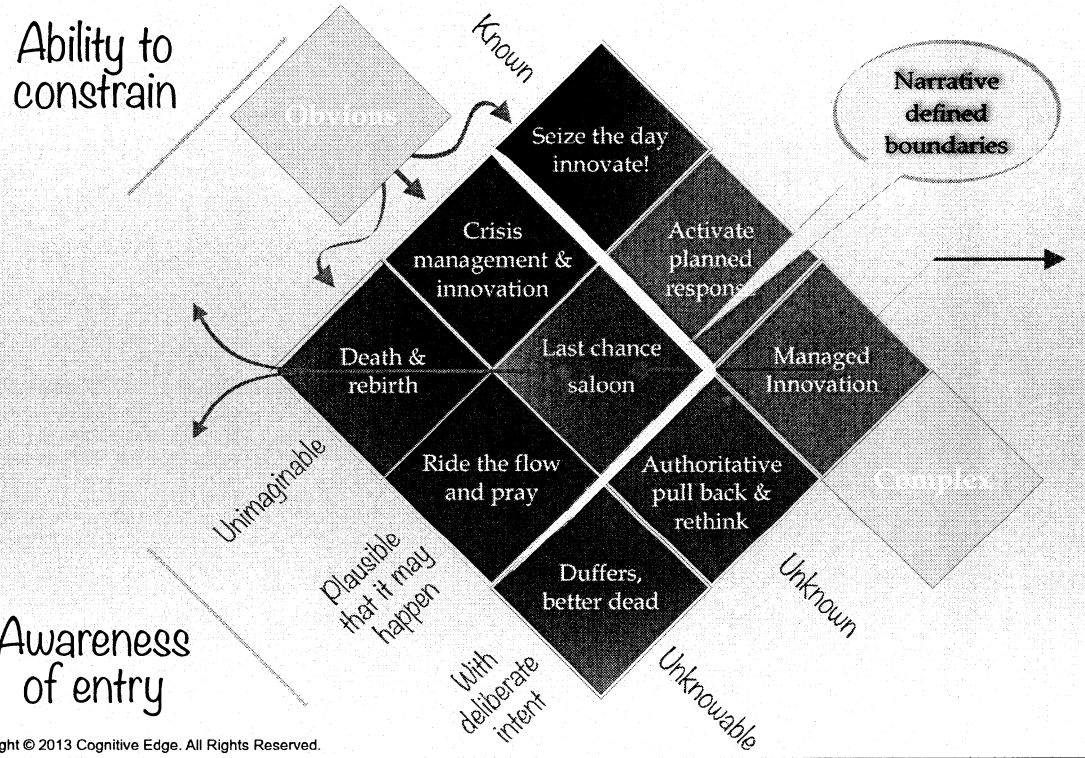
The chaotic domain



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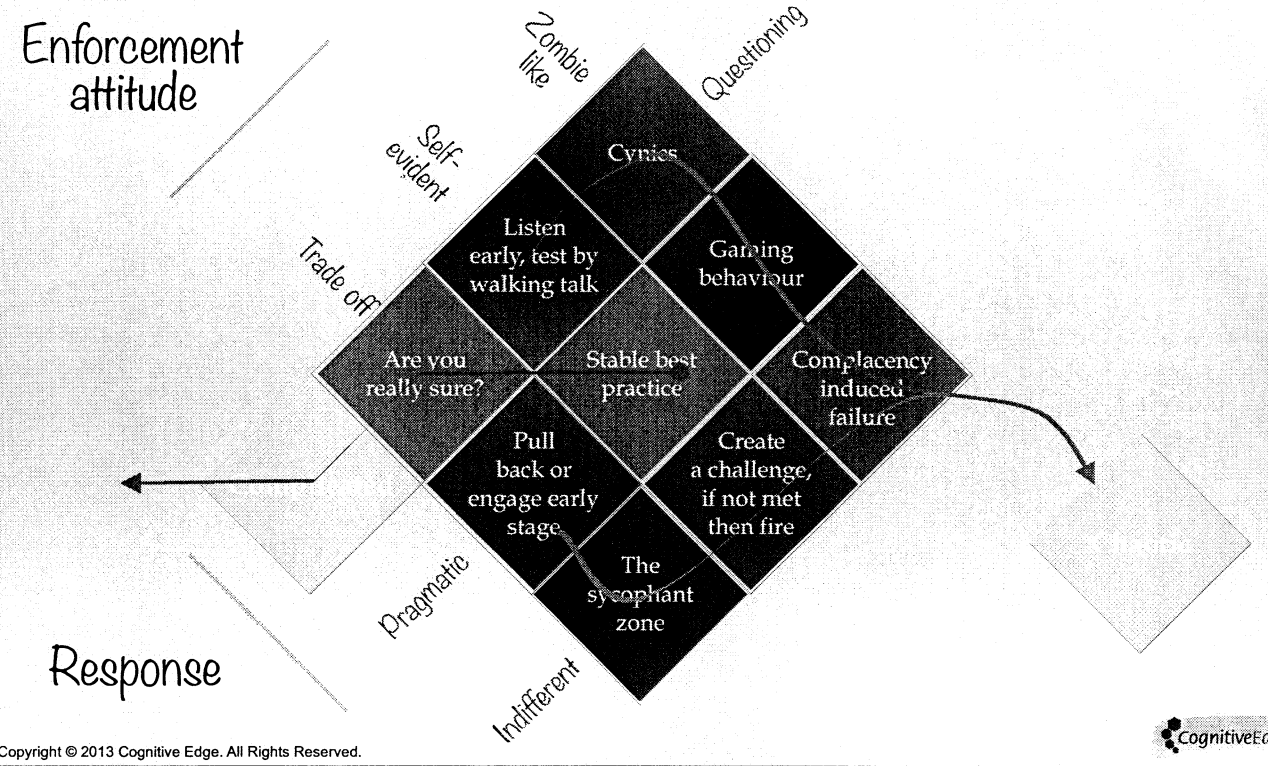
The Simple domain



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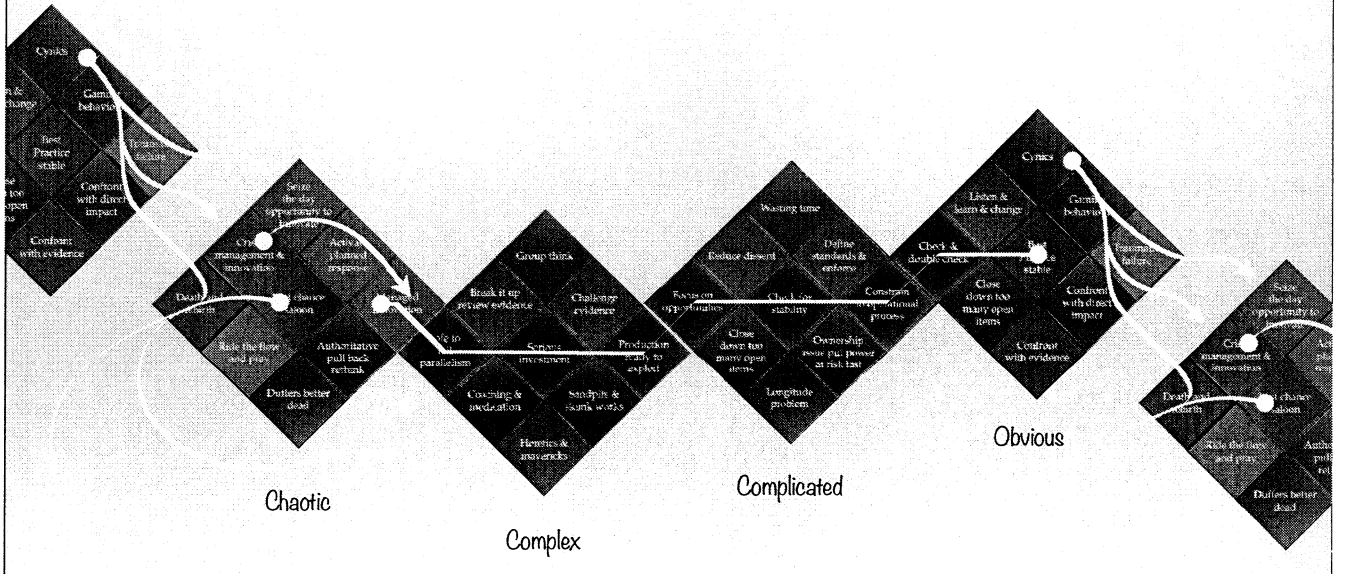
... and for the bigger picture



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