

Survival toolkit for socio-technical project complexity

The enterprise landscape has multi-layered interconnectedness and dynamic complexities that are increasingly hostile to corporate planners and technologists. Welcome to the complexity era.

In today's hyper-connected enterprise infrastructures, unpredictable network effects cascade through densely intertwined social and technology fabrics. With non-linear complexity, small inputs and random "noise" can precipitate large unpredictable results that are described (but not predicted with certainty) by chaos theory and complexity science (Barabasi, 2003) (Gleick, 2008) (Lorenz, 1996) (Prigogine & Nicolis, 1989) (Hayles, 1991) (Laughlin, 2006) (Bohm, 1984) (Morin, 2008). Some key characteristics of complexity in the enterprise realm:

- Increasing relevance of the non-normal probability curves for planning, risk and quality (Taleb, et. al., 2009).
- Decreasing effectiveness of classic command-and-control hierarchies
- Rapid rates of change that make grand plans and large design specs obsolete before they are complete
- Increasing value of peer social networks for goal setting and problem solving
- Delicate interrelatedness of many social, technical, business, financial, operational dimensions

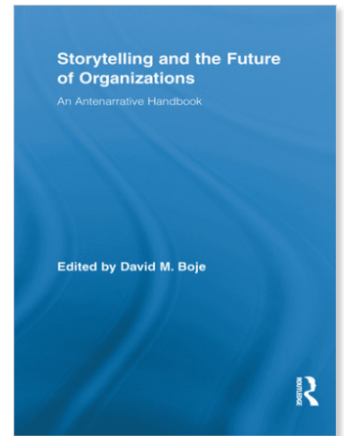
For those who design business processes, software and organizational structures, complexity is particularly daunting due to the persistent need to balance two oppositional forces: diversification and integration (Weick & Sutcliffe, 2007) (Geirland, 2007) (Regev & Wegmann, 2006).

1) Integration. The complexity era has a high rate of change that demands an integrated, unified response from the entire end-to-end enterprise.

2) Diversification. Complexity also creates an equally pressing need for the enterprise to preserve diversity, autonomy and local independence of internal processes, technologies, best practices and niche language/concept frameworks. Infrastructure diversity is increasingly non-optional in highly unpredictable commercial environments where we never know for sure which solution path will succeed or fail.

High levels of integration, standardization and consolidation create sameness that ultimately opens the door to cascading threats and reduced richness of innovation – diversity is the anecdote.

The simultaneous push towards orchestrated/unified systems vs. diversified/autonomous systems can be viewed as the interplay of powerful opposing centripetal/centrifugal (centering/decentering) forces that enterprises must resolve in their strategic planning and operational cultures. Some of the issues are technical –for instance, the benefits and pitfalls of data center consolidation that collapse previously autonomous IT resources into central facilities– but equally important are the social, organizational and linguistic aspects. To achieve a balanced mix of standardized and diversified resources, there must be ongoing creative choreography of people,



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processes, policies and technologies. Integration/diversity efforts hit enterprise staffs where they live so this is a cognitive and cultural playing field

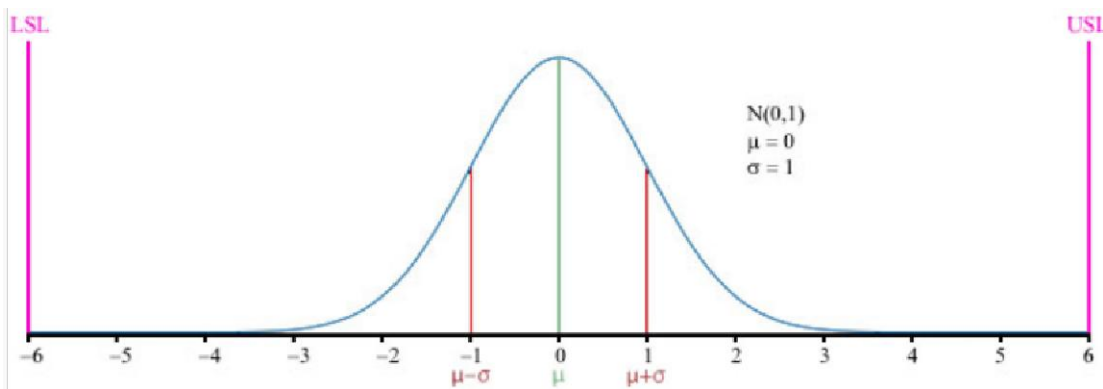
It's all noise... it's all signal

Business and project planners are often seriously handicapped when approaching the divergent aspects of complexity because they have management culture baggage that represents projects and plans as simple goal directed beginning-middle-end (BME) narratives and linear success stories that don't map well to spiraling non-linear complexity scenarios.

Planners also have the tendency to polarize inputs, opinions and management information as either "relevant" or "irrelevant" ... i.e., they ignore informational noise, even though it's a key aspect of complexity. Chris Marshall, a widely published enterprise model designer writes about the status quo perspective on management information:

"Any data that does not directly support the decision [making process] is *noise*, which dilutes the impact of the relevant information and consumes management time in its interpretation." (Marshall, 2000)

This is a classic binary view of information that sees "signal" as the central solution path and "noise" as all the decentralized, unusual ideas and marginal opinions that must be excluded from corporate decision making. Noise-adverse decision making is analogous to quality management programs that attempt to relegate anomalies and errors to the outermost noisy fringes of the normal distribution curve, e.g., Six Sigma, TQM, Ishikawa, etc. This model may work on highly controlled plant floors but it's largely unworkable in complexity fabrics where "rare" and anomalous events are increasingly normal (Taleb, et. al., 2009).



In the complexity era, it's dangerous to ignore noise at the fringes of social or operational distribution curves because noise is a critical aspect of complex, emergent systems. Innovations and solutions often spring from areas that at first appear to be undifferentiated noise. Ignore or underestimate noise and all its anomalous analogs and there is little hope of adapting to complex uncertainty and non-linear change.

Simple linear success stories that ignore noise, complexity and uncertainty... these are the working tools of traditional planners who believe that goals should originate top-down from experts and senior executives in a hierarchy of company purpose that marginalizes diverse grassroots networks and peer-to-peer effects. Marshall sums up the widely held belief that goals and requirements are best crafted top-down:

"An enterprise is a purposeful system designed to create value, typically expressed in an abstract, high level vision statement, which is decomposed into increasingly concrete and detailed missions, goals and achievable objectives." (Marshall, 2000)

In contrast to this view, complex projects and business initiatives are more productive if traditional top-down, command-and-control methods are supplemented by bottom-up influences. The command hierarchy is not going away but it must be deployed in combination with peer structures and emergent networks. Complexity requires that managers “think with the network” not (just) their golf partners.

Corporate planners often miss the opportunity to use bottom-up network effects, but the U.S. military has a long history of original thinking about distributed command-and-control structures. From a National War College paper:

“The Marine Corps’ Sea Dragon initiative envisions a radically new, decentralized system of command and control. Hallmarks of this concept are command-by-influence through mission orders, reliance on the initiative of subordinates, based on local situational awareness, and more self-contained units capable of semi-autonomous action on a distributed battlefield. [Units] are less likely to be effective at learning and adapting to a chaotic environment when their behavior is governed by top-down rules.” (Gore, 1996)

Organizations generally benefit from some sort of shared goals but rigid top-down purpose hierarchies tend to suppress the noisy, bottom-up aspects of value creation that are hallmarks of the complexity era. According to Weick’s requisite diversity philosophy: “People are better able to get complex assignments done when given more discretion within a framework of common values.” (Geirland, 1996). Other examples:

- A provocative study in the consumer goods industry found that companies reap a higher return on investment and better success rate when product innovations (and hence company direction) come “bottom-up” from customers, and not from cloistered executives or R&D scientists (Shah, 2008).
- Cisco Systems became more competitive after radically decentralizing its management structure to allow strategic decision making in a large peer community of over 500 managers (McGirt, 2008).
- The Mozilla Firefox browser is a robust commercial product built by harnessing complex, emergent social network effects and peer network productivity (Bell, 2009).

In spite of all the interest in self-organizing emergence, complexity science and chaos theory, mainstream corporate decision makers and engineers still privilege deterministic, top-down hierarchical value systems and unitary root causes in a way that ignores the possibilities, threats and opportunities found in operational noise, grassroots voices and marginal influences that can rapidly go mainstream (Weick & Sutcliffe, 2007)(Taleb, et. al., 2009).

The spiraplex paradigm

Complex enterprise projects and initiatives are always somewhat unique but they have in common a pattern of **helical** (spirally intertwined) interactions among these aspects:

- top-down decision makers
- peer-to-peer social network influences
- heterogeneous technology platforms
- isolated functional teams and operational process silos
- orthogonal fields of domain expertise
- conflicting intra-company cultures

In many cases, project failures are caused by the cascading effects of technical blunders combined with poor communications between functional silos that have very different language and concept frameworks. To deal with spiraling, multi-layered interactions between socio-technical project aspects, project managers today need a new type of hybrid toolset that interweaves technology, business and linguistic best practices.

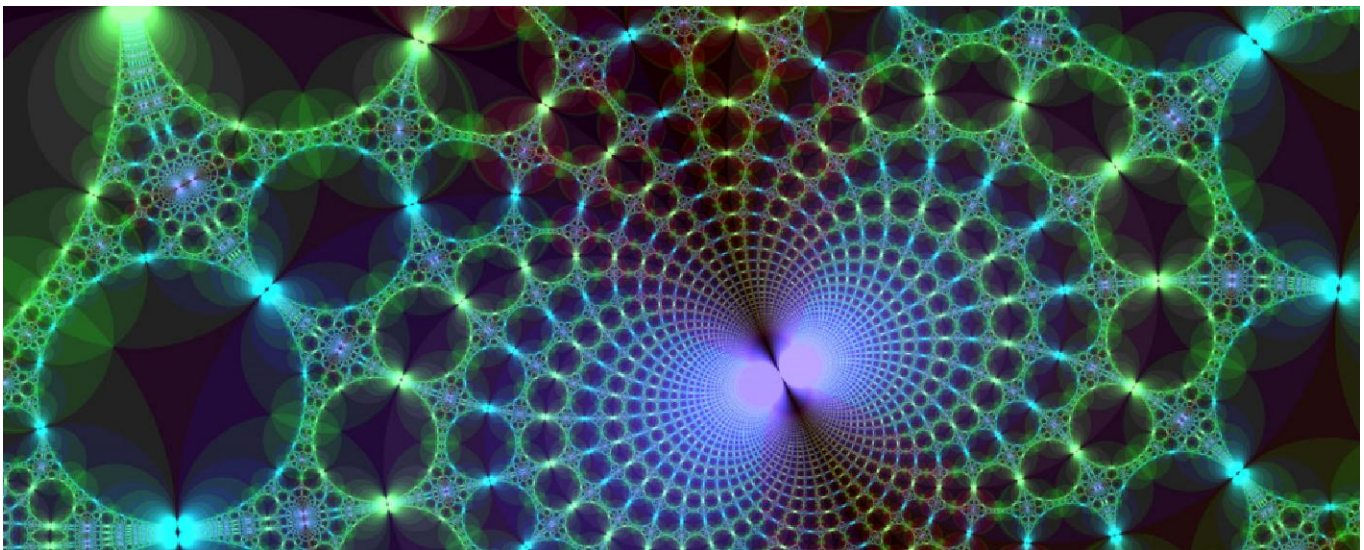
“Language not only transfers knowledge, it also imparts consciousness and coherence. It brings detailed knowledge into being and contextualized it...” “Language is also a crucial instrument of self-discovery and self organization.” (Leebaert, 1992)

In addition to the usual flow charts, functional decomposition and entity diagrams, project models should include a strong component of story fabric and linguistic content that is developed and organized in lockstep with the conventional static and dynamic modeling methods (ERD, class diagrams, data flow charts, UML, etc). Going forward, complexity will not be richly harvested and accommodated without a rich set of story models for every project and enterprise initiative.

To facilitate consulting work in complex enterprise environments, the author has coined the term “*spiraplex*” to describe projects that contain a bewildering mix of cross-discipline dimensions. The spiraplex concept draws on:

- spiral (non-linear, helical)
- plexus (network of interlaced parts)
- lexical (working unit of meaning)

To qualify as spiraplex, a project must contain a diversity of domain languages and conflicting best practices that congeal into a linguistic critical mass of confusion and project risk. In general, spiraplex projects are emergent non-linear phenomena that are very hard to understand, master and manage with a linear BME, top-down mindset.



Spiraplex infrastructure will not be easily tamed by any specific school of thought but there are some strategies that have emerged in the software engineering and organizational studies disciplines that can help us move away from outdated project and management thinking. The methods for dealing with dynamic enterprise complexity described in this writing draw on two bodies of seemingly unrelated knowledge:

1) Antenarrative story analysis, invented by David Boje for understanding and improving enterprise narratives, concept frameworks and cultural belief systems

2) Agile software development, a software programming philosophy described by Eric Ambler, Robert Martin, et. al.

Both of these approaches have a natural affinity for chaotic complexity and rapid change. The intersection of antenarrative theory, Agile development and complexity science is a space of immense richness and possibilities for solution cross pollination.

Enterprise storytelling

Increasingly, enterprise thinkers are finding that business process/practice improvement requires attention to organizational “stories” that guide how we view the world and how we work together. A search on Google for “corporate storytelling” yields dozens of web sites, consulting services and news articles on the subject of story strategies for business.

At its best, organizational story analysis seeks to understand and improve the narratives, myths, histories and underlying concept/belief systems that corporate culture is made of. David Boje’s “[antenarrative](#)” version of story analysis is well suited to spiraplex enterprise projects and business initiatives.

“My theory of storyability is that story turns event into experience, and shapes that into collective memory.” (Boje, 2008:194)

In the business and technology context, planning of project success paths requires the creation of viable project stories (conceptual paths) that everyone can understand and work from. In the antenarrative approach, story consultants acknowledge they can’t fully know or control what will happen so they allow language, concepts and communications to be more speculative, emergent and heuristic.

Traditional plans and projects proceed from one domain silo to the next in a rigid linear manner, e.g., from research to engineering to testing to marketing to sales to support, with each specialist group doing their thing in relative isolation using their own compartmentalized concepts and language. Story analysis adapts to complexity by seeking solution paths that “spiral” with non-linear diversity through corporate resource silos via open ended, forward looking (prospective) project language, designs and specifications. (Boje, 1996, 2001, 2008). Simple, linear beginning-middle-end story paths are not suppressed, but BME thinking is greatly supplemented and subsumed in this approach.

Antenarrative-based story analysis and story cultivation from the Boje school offers enterprise project planners and designers a rich array of conceptual tools. Here is a small sampling:

Antenarrative. Future-oriented (tentative, experimental) language/concept constructions leading to working stories that can mature into formal innovations and creative productivity. Antenarratives can be seen as fragmented, pre-narrative verbal wagers on a possible future stable discourse.

“Antenarrative , the pre-story is a bet that a coherent narrative or a multi-story dialogism will be forthcoming.” (Boje, 2008:198)

Dialectics. Story dialectics explore how enterprise actors internalize various managerial and social narrative structures, which can expose submerged cognitive oppositions and social/self identities that control how we

express ourselves and think. Dialectics looks at how we define ourselves and our voices in self-reflexive ways. Our self-defined (often self-limiting) internal audience is engrained in each utterance we make. Unexamined internal identities contribute to narrow minded polarized viewpoints and lockstep group think – which works against complex project efforts in many ways.

Dialogics. The interaction of many opinions, beliefs and points of view in a productive tapestry of multi-voiced (polyphonic) enterprise dialog. Top-down management styles and BME thinking repress all but the central managerial voice, a dangerous practice in the complexity era. Dialogic story analysis teases out the productive creativity found at the intersection of many different team voices, including opinions and knowledge that come from peer networks, grassroots user bases and marginal or emerging areas of the extended enterprise.

“In business language, a dialogism is when people with different logics meet in the same time and place, and engage in something transcendental, on their differences, allowing for the possibility of something generative to happen, out of the explorations.” (Boje, 2008:22)

Chronotopes. A linguistic/conceptual fusion of time and space which forms a familiar inner venue where awareness and communication can take place. All fictional, journalistic, mythic, business and technical stories rely on chronotopes to convey a tangible sense of time/place to readers. There are many chronotopic archetypes embedded in our cultural fabric. These underlying situational themes manifest as travel stories, fortress stories, epic hero stories, prison stories, etc. – all of which are conceptual building blocks for enterprise project discourse, it turns out.

Antenarrative story analysis encourages the creation and propagation of textual “story fragments” –unfinished or premature linguistic constructions that are often the precursor to innovation and solutions. In combination with cross-discipline sense-making dialogics, an antenarrative bet can be conceived in one enterprise silo... gestated in another... and matured to formal narrative in a third before cycling around again. In traditional enterprise planning and projects, story fragments and experimental concept frameworks are generally frowned upon and seen as noise. In story analysis they are grist for the complex solution mill.

Spiral story sense-making allows antenarrative analysts to capture complex, dynamic enterprise content that goes beyond linear BME fairy tales. According to Boje:

“Antenarrative double spirals embed story fragments with context. The antenarrative double spiral also jettisons fragments as the intertextual antenarratives form a spiral that traverses time-space. Old story fragments get restoried or exchanged for different ones.” (Boje, 2004b)

“The antenarrative double helix is continuous, it is unfinished and unfinalized at either end. The present keeps unfolding; the past keeps being restoried (or rehistoricized). An antenarrative is a storyteller's bet that a pre-story (an improper story) can change the system. Antenarratives are spun on a bet that they can change the meaning of past, present, or future to their audiences.” (Boje, 2004b)

Enter Agile!

Although they come from seemingly different universes, antenarrative methods are remarkably similar to strategies for socio-technical complexity that emerged independently in the [Agile development](#) community (Ambler, 2004)(Martin and Augustine, 2005).

Agile is in response to a long history of large software development failures that wasted millions of dollars and years of effort (Standish, 1995) (Leishman and Cook, 2002). After decades of horrendous software project losses, landmark studies in the 1990's forced the software industry to sober up and rethink its methods.

A 1995 DoD study on software spending found that 75% of military software projects were cancelled midstream or never deployed (Leishman & Cook, 2002). In the commercial realm, a Standish Group study of over 8,000 commercial software projects found that only 16% percent of large projects were considered successful. This so-called Standish “Chaos Report” summed up the situation this way:

“Software development projects are in chaos, and we can no longer imitate the three monkeys – hear no failures, see no failures, speak no failures.” (Standish Group, 1995)

After witnessing a seemingly endless string of spectacular multi-million dollar project failures, senior software developers got serious about alternative and creative practices that moved away from traditional linear, monolithic point-A-to-point-B project “waterfall” paths. In 2001 this thinking became sufficiently coherent to enable an “Agile Manifesto” that laid out key ideas, which have since been refined and extended. The Agile continual test-and-adjust strategy draws on and refines earlier Spiral and Rapid Prototype development methods (Boehm, 2000).

- The best architectures, requirements, and designs emerge from self-organizing teams.
- Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
- Business people and developers must work together daily throughout the project.

– www.Agilemanifesto.org

To deal with ever threatening issues of uncertainty and failure, Agile developers strive to fail faster, fail more often, but *fail forward*, i.e., build failure into the plan and then get past it. Agile doesn't attempt to execute work in a single linear BME pass of design-build-test-run phases. Agile instead uses an iterative circling approach that executes many rapid passes of the development cycle, making continual adjustments to the design along the way. Agile iterates through design, planning, coding and testing phases during the course of a project and does not necessarily do these steps in a linear BME order.

The Agile Manifesto presents a curiously social and organizational set of precepts coming as it does from a technical enclave. Agile developers combat failure by diving deep into multiple business and technical expertise silos looking for convergence and divergence of stakeholder views. Agile has a number of strategies for breaking down communication barriers in complex cross-functional projects. Plans can be based on dynamic collections of elicited *user stories* that software features must support (Martin, 2002).

The generalizing specialist

The Agile development paradigm was forged in the bellows of spiraplex-grade software projects. In this realm, Agile developers often play a pivotal, pan-discipline role, referred to as “generalizing specialist” (Carroll & Daughtrey, 2007)(Augustine, 2005)(Ambler, 2004), which requires a hybrid skillset that is deep in some specialized fields but also broad enough to span many diverse expertise domains coherently. As with antenarrative story analysts: Agile generalizing specialists are capable of explicit and tacit content transformations that cross multiple line-of-business, technical, functional and cultural silos.

An Agile developer speaks each domain's business or technical language and serves as a touchpoint that facilitates productive dialogues among often antagonistic organizational stakeholders. This is critical for spiraplex contexts because diversity of goals, diversity of methods and diversity of success paths are highly necessary if complexity is to be survived. Without the generalizing specialist role in the mix, there is no master specification, architecture or project plan that can ensure success (Cockburn, 2001).

“It is the role of the architect to develop this vision together with the team and then keep up the flame. This is mainly a social task. The architect has to mediate between the different experts to help them find the best solution. The architecture has to be stable enough to provide a working backbone, yet flexible enough to adjust to changing requirements and to correct when it is found to be faulty. An architecture that doesn’t change is a dead architecture and usually results in a dead project.” (Coldewey, 2002)

When the Agile generalizing specialist is augmented with antenarrative knowledge, the result is a *spiraplex consultant* who has a super-charged skillset that is well suited to the challenges of hyper-complex projects. The spiraplex consultant extracts business cases, requirements, use case scenarios and designs from diverse functional and cultural enterprise silos without imposing a top-down BME viewpoint. Consequently, the value of isolated domain experts and specialists is unlocked with an efficiency that is not possible with less hybrid approaches.

Although the spiraplex consultant role is just emerging, it’s pretty clear that this skillset could uniquely prepare project managers and planners for the conflicting integrate/diversify influences and related centripetal/centrifugal forces at play in today’s enterprise infrastructures.

The various cultural and functional silos in a complex enterprise project can be visualized by spiraplex consultants with the help of David Boje’s Tamara “distributed theater stage” analogy. Tamara is a stage play that is performed simultaneously by actors in different rooms of a building so the audience can wander freely from room to room, experiencing the narrative in a highly fragmented, faceted and chaotic manner (Boje, 2001).

Using the Tamara model, the spiraplex consultant can operate as a uniquely heterogeneous sensemaker who has the ability to span complexity boundaries with simultaneously divergent story analysis across “different rooms” of the project. Tamara “story tracing” is a valuable dialogic tool for spiraplex consultant because enterprise projects have many Tamara qualities.

Cognitive blocks and flips

Spiraplex projects benefit from numerous antenarrative-based insights and practices, particularly the content transformations (Boje, 2008) that take place when project language is allowed to morph from enterprise silo to silo via a mix of interspersed micro-cultural sensemaking modalities.

When working as a generalizing specialist consultant on complex, cross-departmental projects, the author has often witnessed a dialectical pattern of *cognitive blocks and flips* that limit the team’s ability to span various helical aspects of the work.

Author’s bio

Steve King has architected over 300 business systems and online IT applications in government agencies, universities and corporations. He provides strategic consulting to Microsoft, IBM, HP, Cisco, HP, Dell, Mercury, Quest and Motorola and numerous high tech ventures. His technology insights have been published for international audiences by McGraw-Hill, IDC, Ziff-Davis and CMP journals.

The applied antenarrative principles embodied by the spiraplex consulting approach are the outcome of in-depth ethnography and requirements gathering that the author conducted in the course of complex cross-discipline projects. Extensive elicitations were collected from corporate executives, front line managers and knowledge workers in HR, legal, IT, finance, risk, manufacturing, sales, marketing and other operational areas.

A cognitive block is a project blind spot that occurs when team members don't have the linguistic bandwidth necessary for sampling viewpoints from outside their specialist silo. A cognitive flip takes place when a project worker flips from one domain perspective to another without conscious awareness of the flip. Examples from recent project ethnography:

- Team members who flip from top-down command-and-control responses to consensual peer group decision making (social network) without self awareness
- Flipping from impact assessment (risk planning) to opportunity assessment (sales and marketing)
- Flipping from horizontal matrix management to a vertical reporting org. chart structure

Flipping between silo perspectives can be triggered like a reflex by external or top-down narrative controls, in which case there will be a limited, stereotyped set of responses from each project worker.

Unexamined flipping and habitual blocking of concepts from outside the native domain are two common project behaviors that greatly reduce the likelihood that valuable contrasting/conflicting viewpoints can be socialized and harvested in complex projects. In spiraplex terms, cognitive flips and blocks greatly reduce a worker's ability to transform content/decisions/goals/values from one dimension of the project to another (e.g., from engineering spec to financial goals to human resource issues to supply chain metrics to environmental concerns and sustainability, etc.).

Cognitive limitations are often associated with embedded, polarized self/group identities that infer correctness and completeness of a silo's cultural concept framework in a largely static and impervious manner (Boje, 2008:19).

A skilled spiraplex consultant can use dialectic/dialogic spanning methods to interrogate oppositional language and identity patterns in each project silo, looking for marginalized signs of "other stories" and other concept frameworks, e.g., a marketing metric that is appropriated and buried in the financial language of an accounting report, or, the rigid top-down conceptual model of a boss embedded unconsciously in the granular design work of an employee, etc.

Cognitive aspects of project management can be addressed with the awareness that there are always other stories and other identities that make necessary contributions to the successful project solution and success path diversity.

*"Those generalized others survey our telling of a story, its contents, implications and the way we tell it."
(Boje, 2008:192)*

Antenarrative spanning methods create a new set of dynamic, non-polarized "living project stories" that go beyond stale BME linear narratives, allowing project thinking to evolve in a complex emergent manner. One potential outcome of this approach is the formation of "faceted communities of practice" that can rapidly interface with many different value chain components and concept frameworks, solving business and technical problems and defining accurate product requirements in a pluralistic manner that is free from out-dated narrative controls and cognitive blind spots. (Lave & Wenger, 1991) (Boje, 2001)

Just-in-time design: Act, *then* think

Traditional technology projects start with a detailed design specification before the development work is executed. The “spec” is then used as a highly deterministic beginning-middle-end (BME) roadmap that drives work throughout the linear steps of the project. This so called “waterfall” approach to project management is still widely used today in spite of its essential contribution to hugely expensive failures (Hibbs, Jewett and Sullivan, 2009) (Pfleeger and Atlee, 2006). When the non-linear, bottom-up emergent, dialogic aspects of a project are ignored by BME waterfalls, negative effects include:

- Reduction of heuristic, experimental project team creativity
- Repression of free-form linguistic interplay among stakeholders and domain roles
- A very narrow solution space that lacks requisite complexity, serendipity and external influences
- Lack of much needed non-linear paths through project and solution

Waterfall fits our familiar, comfortable linear narratives about how work unfolds in a tidy, orderly manner, but it has a fundamental inability to adapt to real world complexity and the non-linear, recursive nature of spiraplex infrastructure.

“So the question is: why is the [software project] failure rate so high? A large part of the blame can be traced to the widespread adoption of the Waterfall method.” (Hibbs, et. al., 2009)

Waterfall design specs typically enact a linear *plan-before-acting* paradigm that dominates a project’s conceptual framework. Waterfall’s rigid unidirectional design disallows *strategy during implementation* efforts. BME waterfalls kill project worker creativities and path diversity by drastically limiting think/act iteration and recursive possibilities (Cockburn, 2001) (Ehin, 2008).

In Agile, the goal is lean design and “just-in-time” planning, i.e., do just enough front-end thinking to get some project action going... then, after results of the action are reviewed... do a bit more thinking... but not too much! In a nutshell: Thinking without acting is as bad as acting without thinking. A seminal Agile text by Highsmith uses the phrase “barely sufficient” to convey this:

“I use the term ‘Agile Software Development Ecosystem’ to describe a holistic environment that includes three interwoven components - a ‘chaordic’ perspective, collaborative values and principles, and a *barely sufficient* methodology...” (Highsmith, 2002) [emphasis mine]

Traditional waterfall projects often generate hundreds or thousands of pages of BME specs that are supposed to guide a project safely from start to finish. But in reality, there are many holes, gaps and fissures in this narrative. The BME spec exists not because it is a viable plan but because of the strong top-down cognitive influences it exerts on the project team, managers and planners.

BME project specs can be seen more accurately as a sort of “architectural spectacle” (Boje, Rosile, Duran and Luhman, 2004), apparently solid but made only of narrative fragments united by linguistic flourishes in an artificial cohesion that operates on project audiences in a theatrical sense. Spec as spectacle, indeed!

In projects run by Agile, antenarrative-aware spiraplex consultants, a more loosely defined “living” spec is drawn from many different expert/function silos and evolved as action proceeds. The living spec can use textual methods that provide the project community with a *chronotopic*, dimensional, situated experience wherein all

project milestones are considered and refined simultaneously in a relational network of diversely ordered sets. In this context, social sensemaking and decision making are centrifugal and centripetal --uniquely able to balance centralizing and decentering influences.

Test, then build

With the Agile “test-first” best practice, heuristic acting-mixed-with-thinking occurs as developers build software test routines *before* there is any software code to test – this is quite the opposite of how software and other engineering tests are usually deployed *after* development in the old BME model. Test-first design is not a process of rigid front-end BME goal setting, rather, it is experienced-based “refactoring” (refining) of a heuristic model. Hence, planning can paradoxically follow testing and building. Other related Agile methods:

- Design patterns. Even in complex spiraplex environments, there are recurring patterns that can be mapped and modeled. Software design patterns are very different from rigid functional specs because they give developers a sort of flexible roadmap that allows many different paths through the project landscape and many different interpretations of the “best route” to success. Indeed some popular design patterns are so flexible they have been used to create radically different applications.
- Refactoring. Refactoring is a key strategy for mixing up of thinking/acting with the aim of just-in-time design. According to noted Agile maven Martin Fowler, refactoring is the process of changing a software system so as to improve internal structure while not altering external functionality (Fowler and Beck, 1999) Refactoring is done incrementally and iteratively as the programmers experience the codebase and interact with real world users in situ.

When a spiraplex consultant engages all diverse project stakeholders in a communal backwards/forwards process of *act-then-think*, it creates a productively “dissipative” effect that frees the project from the neurolinguistic constraints of waterfall BME narratives. This opens the door to the positive influences of chance occurrences, controlled serendipity and novel solutions that come from noisy bottom-up sources of ground breaking innovation.

Spiraplex integration

For the past couple decades, system/application/data integration has been a major unfulfilled goal of corporate executives and technologists who are responsible for the end-to-end performance of extended supply/demand chains (Hohpe, 2004)(Putnik,2005). To achieve end-to-end enterprise process cohesion, integration must forge centrally agreed on standards and policies that cut across functional silos, IT systems, specialist vocabularies, tacitly embedded work practices and knowledge, etc.

Integration is the driving force of this decade of IT (information technology) spending. As enterprises buy more and more packaged applications, it is estimated that the task of combining these application “silos” results in over 40 percent of the IT spending, even though the amount of code written for integration is significantly smaller than 40 percent. This is because integration projects tend to be one-of-a-kind, and complex to write. (Jhingran, et. al., 2002)

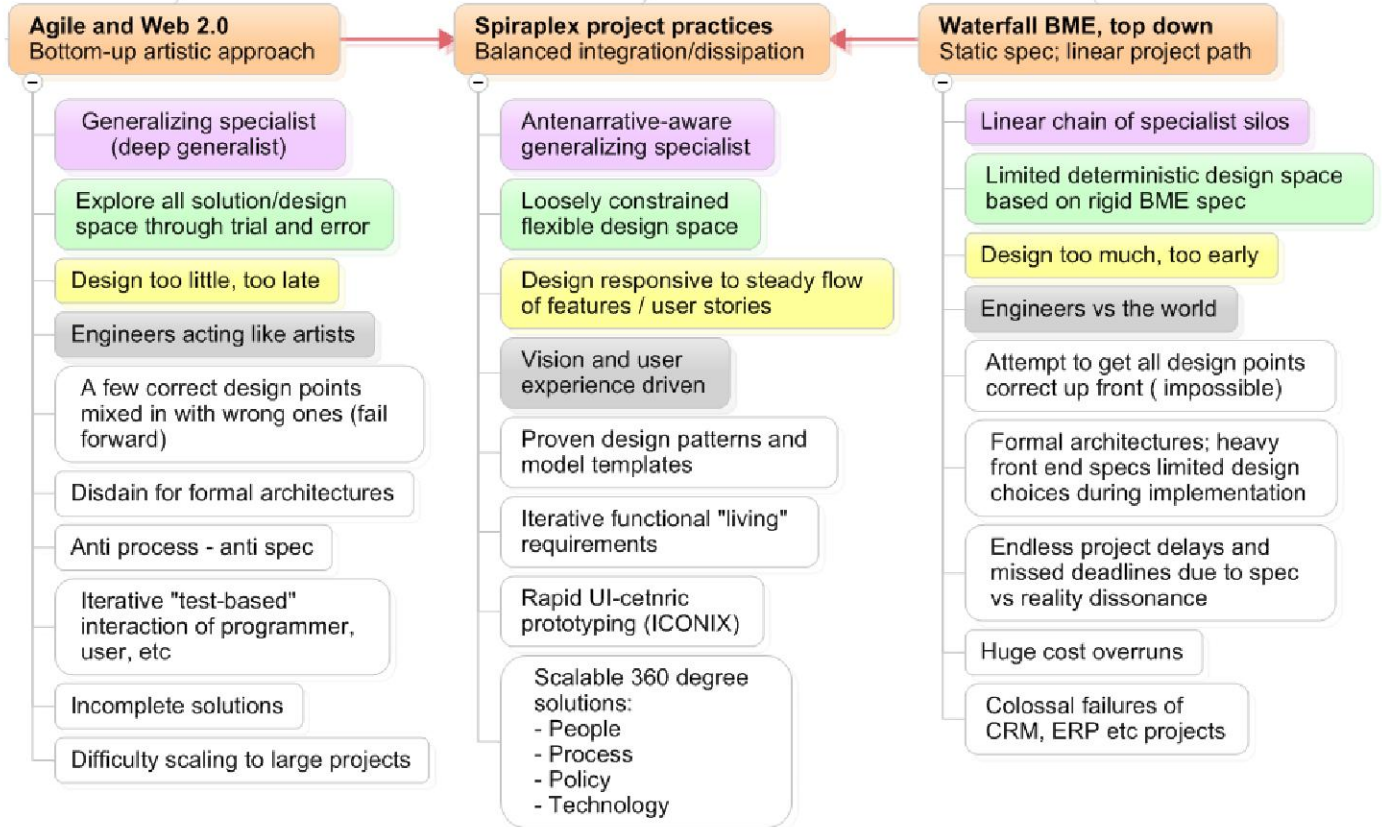
In spite of massive investments in integration and interoperability of systems and software, and in spite of the huge effort expended on Service Oriented Architectures, meaningful integration eludes enterprises to a large degree even after 20 years of work. Meanwhile, the forces of complexity have introduced the

centrifugal/decentering need for diversity and empowerment of local solutions that in many ways works against centrally mandated integration initiatives.



Based on the preliminary experiences of the author: by extending the Agile skillset with Dr. Boje's advanced linguistic, cognitive and organizational story methods, the spiraplex mindset could allow planners and designers to play more effectively on the enterprise integration playing field. Spiraplex consultants potentially have the unique ability to marshal the rich set of cross-discipline community interactions that are necessary if infrastructure projects are to span decentering and centering socio-technical forces.

Design and Integration Methodology



Spiraplex risk management

Spiraplex methods can also potentially lead to better risk management by creating many alternative paths to project success, making enterprises less susceptible to “black swan” failures that easily wipe out a single critical path (Perrow, 1984) (McKelvey, 1999). Black swan events are qualitatively and quantitatively extreme, but they are inevitable in complex infrastructure, as is described in a Harvard Business Review article on business risk:

“[In] a world of tame randomness, around two-thirds of changes should fall within certain limits (the -1 and $+1$ standard deviations) and that variations in excess of seven standard deviations are practically impossible. However, this is inapplicable in real life, where movements can exceed 10, 20, or sometimes even 30 standard deviations. Risk managers should avoid using methods and measures connected to standard deviation, such as regression models, R-squares, and betas.” (Taleb et. al., 2009).

Project managers need a new way of thinking about risk and uncertainty, a new way to generate probable and possible scenarios and planning stories, a new way to socialize and prepare for threats and opportunities. Clearly, today’s threats and unforeseen events have major human aspects:

“While hazards and their aftermath can be identified, risk depends on a complex interplay of a number of social variables, which are ultimately combined by human judgment.” (Tsohou, et. al., 2006)

Navare (2003) concisely describes the social nature of risk and crisis management:

“Culture, structure, experience and legal compliance requirements converge at the point of crisis.”

The spiraplex agile+antenarrative mentality is a potential advantage for risk management in several dimensions:

Social and organizational. Corporate risk management practices have traditionally been deployed with an eye to systems and processes, with little regard for subtle socio-organizational dimensions (Sutton, 2006) (Perrow, 2007). Spiraplex thinking is equally versed in business, operational, technical, social and cognitive concerns.

Process path diversity. Spiraplex consultants are always looking for serendipity and spiral path diversity in the emergent project noise fringe and grassroots voices of the value chain – today marginal, tomorrow mainstream. Emergent antenarrative story and restory exercises that can provide alternative path diversity through an uncertain probability landscape (Boje 2001, 2007, 2008). Rich and diverse antenarrative-based scenario generation allows alternative processes, edge cases and exception handling to be introduced into the process infrastructure.

Spiraplex consultants can think through possible threat/opportunity scenarios in vivid and highly situated chronotopic storyscapes (Boje, 2008). Chronotopic analysis can potentially help risk managers gain insights into black swan and non-stochastic, emergent events that plague our supposedly deterministic systems and financial markets on an ongoing basis.

Fail fast, fail forward. Spiraplex thinking expects that failure and anomalies will not stay outside the statistical process control bounds. Black swans are around every corner and the spiraplex outlook expects them (Taleb, 2007). Because they are alive and by nature unpredictable, antenarrative-based risk management can help spiraplex project consultants achieve a mental posture that is poised and ready for the uncertainty and unexpected failures that spring naturally from complex, non-linear and non-deterministic enterprise environments.

High-energy pair-programming

Another aspect of Agile development is the “pair programming” practice that creates an intimate software coding experience between two co-developers working in close proximity, often sharing a single computer and trading off tactical and strategic roles (think vs. act!). One of the partners does the hands-on keyboard “code-cutting” while the other looks on and thinks ahead. Then they switch off.

Pairs can change partners periodically so that the entire group of programmers cycles through each area of the project. Agile pair programming is a strongly interactive, “membrane-to-membrane” work experience that facilitates high-bandwidth body language and collaborative problem solving using all the rational and intuitive skills of the development team. (This is similar to air traffic controllers working in pairs with four eyes and two brains on the radar screen in tandem.)

The intuitive real-time communications found in Agile pair programming has been described by David Boje as “energy sensemaking” (Boje, 2008). It is likely that energy management insights will greatly enhance pair programming productivity and work satisfaction.

On-site ethnography sessions are another project discipline that benefits from engagement of all communication channels: body language, facial micro-expressions and elicitation of terse linguistic constructions loaded with subtext and contextually activated signification. Spiraplex ethnography is greatly facilitated via high energy “group membrane” sensemaking and non-verbal horse-sense intuition on the part of consultants. When trained in antenarrative principles, spiraplex consultants can soak up a maximum amount of explicit and tacit

knowledge as they cross back and forth between specialized enclaves interacting in real time and real space with all sorts of diverse and orthogonal collaborators.

In conclusion, complexity is not a hopeless situation if managers, designers and planners use linguistic methods to intuitively weave success paths, project stories and antenarrative fabrics from a mix of helical socio-technical enterprise dimensions. It's the author's view that these methods will be viable in virtually any business or technology initiative that needs an alternative to heavy BME master plans and top-down design specs. Software projects are just one of a large range of commercial areas where the antenarrative-aware generalizing specialists can survive and thrive.

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