Sociomaterial Fractals in a Quantum Storytelling Frame

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By Tonya L. Henderson, D.M.

Gly Solutions, LLC
www.glysolutions.com
719-440-7067

Abstract

This paper describes the theoretical contributions of Fractal Change Management (FCM) in relation to Quantum Storytelling theory and practice. Building on the application of complexity theory in the hard sciences as well as social contexts, this paper considers the areas of overlap and difference between FCM and its theoretical fellows, summarizing key areas of overlap, shared theoretical perspectives, and areas of overlap. Finally, an example of timespacemattering is shared as a means of illustrating a timely action that changed an emergent sociomaterial fractal in a way that honors the relational and sociomaterial aspects of QST.

Introduction

With increasing socio-economic turbulence, the need for new organization development tools is greater than ever. It is imperative that we introduce ways of spotting scalable, self-similar social and material patterns, consider their deeper meaning, and develop effective ways to capitalize on that knowledge. Complexity teaches us that these kinds of patterns, *fractals* are likely to continue to play out over time in a given system, making fractal patterns of behavior and perception vitally important for those who seek lasting organizational change. Understanding these patterns is equally important for those who would preserve pre-existing, generative patterns as well.

Sheldrake (1988) suggests that patterns of behavior become likely candidates for recurrence, simply by virtue of their having occurred in the past. This assertion seems to be especially true of fractals, which can be likened to the *signature dance moves of open systems* (Henderson, 2015). The metaphor is appropriate because, just in nature, human systems have natural tendencies and characteristics that repeat in big and small ways, often subconsciously. These sociomaterial fractals tell us something about the social system under study, what it tends to do as a matter of course.

While the timing and amplitude of recurrence can be difficult to predict, fractal patterning in open systems is sufficiently predictive that it is considered a useful mechanism for exploring the behavior of financial markets, (Mandelbrot & Hudson, 2004; Taleb, 2007). Taleb (2007) famously put this understanding to work in his consideration of large-scale market fluctuations, something he termed "black

swans." He reasons that just because you may never have seen one, that doesn't mean there is no such thing and that the occurrence of a rare event merits consideration because it may well occur again. For organization development, this realization has tremendous implications for risk management, trend-spotting, and values-based approaches to change.

Complex adaptive systems are open systems in which systems-level self-organizing behaviors occur, as the result of simple rules applied iteratively by or to individual agents. Fractals are scalable, self-similar patterns that occur repeatedly in such circumstances. These "signature dance moves" of open systems tend to play out self-similarly even when the context shifts (Henderson, 2015). A complexity-derived exploration of what Boje (D. Boje, 2011b, 2011c; D. Boje, 2014) refers to as the *living story web*,[1] often suggests scalable self-similar patterns within the aggregate storytelling of individuals from the same social network (Henderson & DePorres, 2014a; Wakefield, 2012). By bearing witness to the stories of social systems, we can begin to spot their signature dance moves and the motivations behind them.

Fractal Change Management

Organizations themselves can be conceived of as unfolding sociomaterial processes that are scalable and self-similar in nature (Henderson & Boje, 2015). Organizations, formally designated and informal ones, come into being when they serve a purpose, and then dissipate when no longer needed or supported by the societies in which they emerge. These kinds of ideas began soaking into management theory some six decades ago and have grown in importance as systems thinking evolved in an increasingly complex world

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[1] The living story web can be thought of as the sum of interactive story and emergent sense-making that characterizes antenarrative in dynamic human systems.

of global competition (D. Boje & Baskin, 2010b; Jantsch, 1973; Letiche & Boje, 2001; Meadows, 2008; von Bertalanffy, 1969). Fractal Change Management (FCM) offers a set of tools that support understanding and interacting responsibly with sociomaterial fractals. That is to say, fractals of behavior and perception whose manifestations are both social and material in nature. Grounded in complexity theory, it serves as a meaningful, practitioner-focused contribution to the emerging body of knowledge known as quantum storytelling. In this paper we very briefly examine some of the roots of FCM. Then we consider how FCM interacts with the larger theoretical field of quantum storytelling. Finally, we share a swatch extracted from the fabric of the author's living story web as evidence of FCM in action.

FCM is rooted in the understanding that social systems, including strict, hierarchical organizations are necessarily complex adaptive systems (CAS)[2]; even if they are intentionally designed in a way that does not openly allow for self-organization, we find that it occurs within the informal power structure and is manifested in the ever-changing living story web (D. Boje, 2014; Henderson & Boje, 2015). Within the ever-shifting fabric of poly-vocal storytelling, *the aggregate effect of many stories, perceptions, and material experiences of an organization or a social network*, fractals of perception and behavior can be said to exist, where scalable, self-similar stories emerge and dissipate over time, gaining strength— as fads and rumors gain speed and dissipate as interest wanes (Wakefield, 2012). Hazy (2006) says that for a human system to be a CAS, autonomous agents interacting in a

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[2] By contrast, Shoham and Hasgall (2005) suggest that not all organizations are CAS, differentiating between organizations that allow some level of self-determination at lower levels of the organization and those whose structures preclude it.

coordinated way, agents and socio-technical arrangements, etc. must change such that changes that work are kept alive in the system over time; I contend that these changes are kept alive in the form of fractals, whose scalable, self-similar recurrence amounts to the sociomaterial enactment of past changes that are to survive.[3]

In FCM, we pay attention to the scalable, self-similar patterns surrounding organizational life and use this information strategically. It serves as a tool for understanding organizational culture, considering risk, and conducting adaptation-focused strategic planning. FCM suggests that, even when an organization's formal power structure does not lend itself to autonomy and decision-making at lower levels of the hierarchy, the informal power structure will still behave as a CAS. We then find the emergence and dissipation of potentially unacknowledged power structures within that context. In fact, Hoverstadt (2008), in advocating for intentionally fractal organizational structures, points out that even in the most hierarchical organizations there exists some degree of autonomy, as different issues are dealt with at different levels of the organization, necessitating communication among levels (Hoverstadt, 2008). Thus organizational hierarchies live and breathe, morphing despite efforts to prevent such shifts by tightening down the formal lines of power and communication.

Why fractals?

To be sure, there are many different kinds of patterns in the spectrum of human interaction. Some constitute self-similar, scalable repetition while others do not (Eglash,

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[3] Of note: In the FCM view of the world, such changes may amount to destructive fractals as well as generative ones, necessitating analysis of the antenarrative potential of changes observed.

2005). Some business patterns are clearly cyclical, for instance holiday purchases and back to school demand for pencils and other supplies every fall in the USA. Others tend to repeat with less temporal predictability, but are clearly discernible on large and small scales over time, for example patterns of behavior that denote integrity at an individual and an organizational level. By paying special attention to those patterns that are fractal in nature, we can begin to recognize the emergence and dissipation that constitutes the day-to-day habituation of social networks. Storytelling offers us a unique perspective into the changing nature of social systems, as well as those aspects of their complex, adaptive nature that change slowly, if at all (Cilliers, 2006; McGreevy, 2008; van Eijnatten, 2004).

Mandelbrot's (1983) fractal geometry was developed as a means of simulating complex adaptive processes using computers. In fractal geometry, iteratively applying simple mathematical rules, termed "fractal generators" yields intricate graphics, wherein the same patterns are repeated on large and small scales, not unlike systemic patterns observed elsewhere in nature. These include everything from the behavior of avalanches to white noise, to patently human behaviors like automobile traffic flow. These patterns tend to grow exponentially and exhibit dimensionality somewhere between two and three, making them truly fascinating mathematical marvels.

Beyond the beauty of their mathematical expression, fractals can also be identified and used diagnostically in the human frame, in ways that range from medical professionals' judgment of healthy electrocardiograms (Liebovitch, 1998) to the organization development consultant's exploration of unfolding social

patterns (Eoyang, 2009; Henderson, 2014; Quade & Holladay, 2010). An excellent example of fractal-based consulting in a business context is seen in Quade and Holladay's (2010) dynamical leadership model. The ability of leaders to identify patterns and determine which ones are productive in order to support them, along with diminishing unproductive patterns, is encouraged in this model. An organization's adaptive capacity is tied to its "leader's ability to see and influence system patterns rather than discrete organizational issues, events, or actions" (Quade & Holladay, 2010, p. 15). These kinds of approaches are beginning to gain mainstream respect in the fields of management consulting and organization development, as evidenced by the presence of multiple complexity-related sessions on the agenda at the Academy of Management's 2015 conference in Vancouver, BC.

My own interest lies in the ways that scalable, self-similar patterns of aggregate human behavior, enacted through storytelling, often point us toward an understanding of the values behind the "hidden rules." These *sociomaterial fractal generators* appear to be applied both consciously and unconsciously at the individual level, in small groups and larger organizations, in communities, and even at a cultural level (Henderson, 2015). By studying the scalable self-similar perceptions and behavior patterns in social networks, we can sometimes identify norms and beliefs that run counter to espoused values, for example elitism among serious yoga practitioners— something that conflicts with their espoused value of *nonjudgment* (Henderson & Deporres, 2014b). The ability to observe and analyze perceived and materially evident fractals in a human context may offer us a powerful tool for assessing the likelihood that a social system's behavior will

continue a certain way despite changing conditions. It is also quite helpful as a way to uncover the "elephants in the room," by examining the themes that underpin multiple instances of perceived fractals among members of a particular organization or social network (Henderson & Boje, 2015; Wakefield, 2012).

Storytelling

Storytelling is "the preferred sense making currency of organizational participants who live, work, and consume in a world of action," and is central to third order cybernetics (p.13, Boje, 2011b). This decidedly Bojean approach demonstrates that various actors often experience the same events quite differently (Baskin & Boje, 2005; Krizanc & Boje, 2006; Luhman & Boje, 2001). For example, Letiche (2000) Tamara-izes[i] the organization through phenomenal complexity theory. Luhman and Boje (2001) tie narrative storytelling to complexity through laboratory manager and worker perspectives. Baskin and Boje (2005) consider storytelling as an emergent phenomenon that "drives the human equivalent of attractors" (p. vi.). These attractors are apparent in Shirky's (2008) descriptions of virtual organizations. Boje and Haley(2010) liken diffraction patterns from multiple beams of light forming holograms to the interactions among micro-stories and dominant narratives in the living story web, consistent with Haraway's (1992) treatment of sociomaterial interaction. For Boje and Baskin (2010a), storytelling is the substance in which self-organizing criticality emerges. The Bojean approach to storytelling seems intent on sense making that is a poly-vocal, shifting and emergent act of timespacemattering in its own right.

Nowhere is the emergence and dissipation of fractals in the human frame so poignantly displayed as here, in storytelling (D. Boje, 2008). Rumors, antenarratives,

fads, and social media memes all seem to emerge and dissipate in ways that are eerily familiar and yet not quite identical to past occurrences. Perceived sociomaterial fractals in organizational life offer insights into the nature of a social networks, helping make the unfolding of present and future patterns clearer and somewhat more predictable (Henderson, 2013, Forthcoming- in peer review, 2014; Henderson & Boje, 2015; Henderson & Deporres, 2014b; Wakefield, 2012; Wakefield, Boje, & Lane, 2013). To know an organization's fractal patterns is to glimpse the collective soul of its members, to learn the rules they live by and how they think in aggregate. Access to these patterns and their emergence in the living story web is granted to the listener whenever a story is told in the absence of approval seeking or fear of retribution.

Laymen can easily identify social fractals when the concept is explained in simple terms. The stories told when purposively selected persons from the same network are asked to identify social fractals can reveal shared values tied to hidden rules of behavior. Their revelation requires a thematic coding process conducted at multiple levels of analysis, with a view toward identifying fractals. The method, termed *ontological systems mapping*, has been used in the nonprofit sector and Colorado Springs, Colorado's yoga community and is being examined in additional contexts as well[4] (Henderson & Deporres, 2014b; Wakefield, 2012). In interview settings and in workshops, there seems to be no shortage of examples of scalable, self-similarity in the storytelling of successful members of various industries.

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[4] A workshop for software developers conducted as part of the city of Colorado Springs' 2015 *Start Up Week* activities revealed a similar response from software developers, something I am exploring further with Dr. MJ Cohen.

Quantum Storytelling

Quantum storytelling theory (QST) offers a way of thinking about organizations that is steeped in process ontology and that also considers organizations as unfolding sociomaterial processes. As such, they are best explored through storytelling and analyzed using the lenses of timespacemattering, with a healthy respect for metaphysical considerations. This includes a strong Baradian influence, along with Heideggerian approaches to the authentic self (Barad, 2007; Heidegger, 1962). FCM falls partially into this category, as do Cousar's (2013, 2014) Sande Leadership model and DePorres' (2000) works on transformational change. Ancient, sometimes other-worldly influences including shamanism, yogic philosophy, and Native American wisdom are also influential within this sphere, where multi-planar, nonlinear conceptualizations of organizational realities are considered the norm (See for example: D. Boje & T. Henderson, 2014; D. M. Boje et al., 2015; Gladstone, 2014; Hockenberry, 2014; McCulloh, 2014).

In our first volume of QST readings, we explored nonlinear approaches to time and space, and examined the role of objects *mattering* in a posthumanist, actively co-creative frame (D. M. Boje & T. L. Henderson, 2014). Boje (D. Boje, 2011c, 2011d, 2012) has written extensively in this area and continues to expand the body of knowledge, building not only on QST but FCM as well. In related works organizational and individual views of reality comingle to create nontraditional ways of examining the world, focusing on the entangled, co-creative nature of reality as an emergent product of myriad agential cuts amid fluid, multi-dimensional timespacemattering (D. Boje, 2011c; D. Boje & T. Henderson, 2014). Combined, the work of the quantum storytellers

suggests a worldview that is at once self-aware, poly-vocal, and co-creative, with a sociomaterial perspective that honors Latour's (1999) collectives, also termed "assemblages" (2011a, 2011b, 2011c).

FCM and QST

For Fractal Change Management, quantum storytelling serves two roles, one contextual, and the other as a theoretical lens that assists in the process of identifying organizational fractals. The FCM view of organizational reality is that it is a co-creative, intra-active field in which sociomaterial fractals (organizations and related processes) constitute emergent and dissipative situations. Thus, the principle contribution of QST to FCM lies in its descriptions of organizational reality, the substrate within which sociomaterial fractals emerge and dissipate. The second role of QST in shaping FCM is its service as a theoretical lens. It offers a specific vocabulary and a means to understand not only systemicity but also co-creative elements in the framing of FCM theory and practice. In turn, the developing works surrounding FCM have duly influenced QST, with an increase in the discussion of fractals in QST conferences and papers. The intersection of FCM and QST is one of give and take, of mutual influence. Two primary areas of agreement between the two are their shared emphasis of both co-creative relationality and materiality.

Relationality:

Relationality in the QST frame is inspired by Barad's (2007), Latour's (1999, 2005), and Haraway's (1992, 2008) treatment of co-creation. This feminist-inspired view seems to fly in the face of Western, romanticized individualism. FCM expands relationality beyond limited considerations of human interaction, drawing on Latour's

(1999) notion of collectives and Boje's (2010, 2011a, 2011b, 2011c) later discussions of assemblages, groups of people, sometimes animals, and objects (the mixture of sentient and nonsentient) whose combined impact is much greater than the sum of their parts. This perspective is consistent with discussions of timespacemattering as a co-creative process of Being and Doing in a posthumanist frame (Barad, 2007; Strand, 2012). It is also consistent with Clough's (2008) take on biomediation and the symbiosis of man and machine, something I have also explored (Wakefield, 2013c).

In FCM this notion of co-creative interaction is manifested as *relational introspection*, "the threefold dynamic exercise of self-awareness, regard for others, and ecosystem knowledge" (Wakefield, 2012, p. 114). This concept combines self-awareness and regard for our co-creative partners of all kinds with a constant attunement to the shifting ecosystem in which all stakeholders must coexist. It drives us toward a more relational, network-aware view of the systems we study. To practice relational introspection is to become attuned to one's authentic self— its deeper motivations and sometimes fickle emotional state, as well as others we encounter, and the context of our shared interaction. This concept is scalable, existing at the individual and aggregate levels of analysis (D. M. Boje, 2014; Henderson, 2013, 2014; Wakefield, 2013b). The practice necessitates starting from a chosen point and then sort of "zooming out" instead of trying to draw an artificial boundary around the entire system, not unlike some other approaches to analyzing networked organizations. Such an approach is useful in the search for scalable, self-similar repetition in social systems where boundaries are fluid if they exist at all.

Materiality

Building on the work of Bennett (2010) and others, quantum storytellers and agents of FCM alike acknowledge what Bennett (2010) calls "thing power." Latour's (1999, 2005) considerations of material agency include a discussion of speed bumps, which he terms "sleeping policemen," with posthumanist assemblages as powerful co-creative forces in the context of emergent interactions between people and things, as man colludes with material elements to set the stage for emergent phenomena. Under the heading of "Vital Materialism," Bennett (2010) forces readers to take a careful and honest look at how material objects, particularly in assemblage, affect human thoughts and reactions in ways that are co-creative, wherein the human being is not 100% in charge. This approach is consistent with considerations of biomediation, wherein man and object are somehow fused, whether through the social reframing of handicapped persons as one with their prostheses (Haraway, 2008), dialysis (Wakefield, 2013a), genetic modifications (Silver, 2012) or biomediation in other forms (Clough, 2008). This approach suggests the material and social are actually inseparable, intertwined emergent processes— not unchanging objects per se.

Nature is a commonplace and a powerful discursive construction affected in the interactions among material-semiotic actors, human and not (Haraway, 1992, p. 299).

Differences

Despite these key areas of agreement, FCM is not entirely a subset of QST. The ways in which it differs from other QST offerings are its primary emphasis and its

methods. In FCM, complexity theory is the principle driver of our understanding, with indeterminacy and other quantum physics inspired concepts taken as contextual factors—influencers of the REAL action, which is the emergence and dissipation of sociomaterial fractals. In FCM, the very nature of organizational life is reduced to the emergence and dissipation of these patterns over time, across contexts, in different instantiations of timespacemattering, to use Barad's (2007) term. To be fair, this emphasis of process and movement is not entirely divorced from other methods, such as Rosile and Boje's equine approaches and material storytelling (D. M. Boje et al., 2015; Strand, 2012). Yet the FCM focus on scalability and repetition, coupled with its emphasis on shifting and reinforcing generative patterns constitute a significant difference in terms of the area of focus.

Methodological differences are more easily explained. FCM involves collecting stories of perceived sociomaterial fractals from purposively selected subjects within a social system of interest. These stories are then analyzed to identify generative patterns and underlying principles, information that can be leveraged for organizational development and change aims. This differs from the methods employed by other scholars in that it offers the complexity lens and then encourages a content-agnostic exploration of each participant's perceived patterns.

Other QST-related approaches support change using a host of methods that may or may not specifically employ the complexity lens. For example, Deporres' (2000) postmodern approach to transformational change is rooted in the co-creative interaction of people, wherein their quanta of perception and experience combine and interact in constructive ways, facilitated by using questions and statements of appreciation. Tisby-

Cousar's (2013) approach uses qualitative data collection techniques and interpretive analysis tied to the leadership attributes of the African Sande tradition, encouraging participants to reflect upon lived experience to extract sustainability-focused lessons. Boje's[5] postmodern take on storytelling emphasizes multiple perspectives as situations are "Tamara-ized," a brand of sense-making wherein sociomateriality is processed using inputs from a variety of perspectives rather than a top-down imposition of narrative. Rosile's (2002) many years of work with horses and organizations emphasizes deeper ways of knowing, including what she terms "horse sense." Strand's (2012) material storytelling emphasizes the selection and placement of toys in a sand tray, which leads to storytelling about what is going on in the current situation. In each case, the QST-inspired view of organizing is approached using a unique approach to interacting with subjects and garnering their perspectives.

Conclusion

I am finishing my paper aboard an airplane, bound for the conference, and way behind schedule in myriad ways. My paper is late. My flight is late. I am cranky, tired, and out of sorts. I had planned dinner with my friends, but the flight is so late leaving that by the time the stewardess comes around with food I utter a ravenous request, complete with a snide comment about the length of the flight (now delayed over three hours). This is something that is quite out of character for me (I hope). As soon as the negativity sneaks out, I take it back apologetically. The last thing she needs when coping with a planeload of cranky customers on a three-hour delay is an obnoxious comment from yours truly. She quickly assesses the situation, sees my emergent pattern of

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[5] His work has provided the inspiration for a wide variety of approaches within the realm of QST and he is credited as the father of this mode of inquiry.

crankiness, and chooses to connect with me— socially and materially, to counter my spreading crankiness pattern with one of kindness and understanding before it can spread to the other passengers and ripple out into the world, gaining strength like a snowball rolling downhill. She jokes with me and offers me the glass of red wine I was going to ask for anyway, refusing to charge me for it, before I even mention that I want it! She brings me a bottle of water too, desired but not asked for— thoughts before words…

She spots the fractal of sociomaterial grumbling and fidgeting in the airline seats, manifestations of the downward spiral of a planeload of passengers whose muttered, under-their breath, storytelling attempts to make sense of delays and ruined plans. The passengers' unfolding actions and resentments reflect a higher level of frustration than usual, owing to the length of the delay amid their holiday rush and the living story web heaves with their growing displeasure. She acts quickly, summoning McCulloh's (2014) beloved *Kairos*, and alters the emergent pattern of customer angst, one that she has undoubtedly seen thousands of times.

Her kindness pattern jumps from my heart onto my keyboard, transcending linear notions of space, time and matter to connect with you, dear reader, inspiring more of the same as her generative fractal emerges in sociomaterial ways that taste as good as a nice glass of wine on a really hard day and feel as good as a laugh from a kind stranger. Her pattern of positivity counters and alters my own fractal of travel frustration and aggravation as her positivity spreads to me and my fellow travelers. Now THAT's spacetimemattering… and FCM at its finest.

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[i] The Tamara play is performed as a set of concurrent exchanges among actors in different rooms ion, with audience members selecting characters to follow and comparing perspectives. [See Krizanc, J., & Boje, D. (2006). Tamara Journal Interview with John Krizanc (Vol. 5, pp. 70-77): TAMARA: Journal of Critical Postmodern Organization Science, ibid.]