THE POSSIBILITY OF MORAL RESPONSIBILITY WITHIN CORPORATIONS AS COMPLEX SYSTEMS: A RESPONSE TO WILLIAM C. FREDERICK

Mollie Painter-Morland

A*bstract*: This paper addresses the inherent danger of relativism in any naturalistic theory about moral decision-making and action. The implications of Frederick's naturalistic view of corporations can easily lead one to believe that it has become impossible for the evolutionary firm (EF) to act with moral responsibility. However, if Frederick's naturalistic account is located within the context of his and other writers' insights about complexity science, it may become possible to maintain a sense of creative, pragmatic moral decision-making in the face of supposedly deterministic forces. Business's most creative response to moral dilemmas takes place "at the edge of chaos," where a temporary order comes into being via self-organization. This process of self-organization is influenced by a great number of variables. Some of these variables are the x-factor configurations of individuals and groups, which cannot necessarily determine, but can influence the moral-decision-making process. Moral responsibility becomes part of a complex process through which creative, value-driven solutions emerge.

1. Introduction

Suggestions with regard to the possible relationship between the natural sciences and ethics are usually controversial. One of the central objections that is leveled against establishing links between the natural sciences and business ethics is derived from the age-old philosophical contention that one should not deduct an "ought" from an "is." According to this dictum we should not be looking to the natural sciences' views of what "is" when we want to determine how we ought to behave in business. It is a proposition that relies on a number of very specific suppositions with regard to both the natural sciences and ethics. But these suppositions are themselves contentious. It is based on the dualistic paradigm we inherited from modernism's urge towards specialization (I will argue this point in more detail later). Alternative positions in this regard of

course have different implications. Personally, I have adopted a position that allows moral deliberation to be informed (though not determined) by a number of (sometimes divergent) forces, including the natural sciences. From this perspective, Frederick's articulation of the dynamics of the evolutionary form (EF) represents a valuable contribution to the debate around ethics in organizations. The natural sciences represent a wide and complex arena of enquiry with many competing models and theories. In his development of the notion of the evolutionary firm, Frederick seems to draw primarily on evolution theory. However, Frederick's enquiries into the field of the natural sciences are not limited to this model. Elsewhere in his oeuvre, he also explores the insights and implications of complexity theory.

Complexity theory represents an especially exciting new front in scientific enquiry. It has generated a number of new insights and concepts that may prove very meaningful within the context of business ethics. It is on these insights then that I will draw as I reflect on Frederick's conception of the evolutionary firm. In what follows I will first of all try to identify the main objections that are likely to be leveled against Frederick's position. I will attempt to formulate a response to these from the perspective of complexity theory. In addition, I will show how complexity theory sheds new light on some of the issues and concerns that Frederick raises. Finally I will outline in broad terms the possibilities and opportunities that complexity theory affords those who feel themselves firmly implicated in the logic of the evolutionary firm.

William Frederick's paper deals with a number of very basic issues. I believe that the position that he develops in this paper, is likely to incur resistance with regard to at least the following concerns:

1) The danger of determinism: Are all a firm's actions necessarily determined by its evolutionary struggle, it's economizing attempts to avoid entropy in the face of thermodynamic selection? Is there no room for principled ideals?

2) Closely related to the issue of determinism, is the age-old debate about nature versus nurture. To what extent are we able to intervene in and influence the actions of firms and how should this be done? If we agree that a firm naturally responds to an environment that poses competitive demands, are we also compelled to accept that a firm's leaders have limited power over their organization's actions, and by implication therefore, also limited responsibility?

3) Can a business organization be considered subject to the same evolutionary imprinted imperatives as natural organisms? Is Frederick right when he proposes that we see firms as a coalition of biological organisms, which therefore display the symptoms of the same evolutionary struggle?

4) Is the second law of thermodynamics, stating that *all* systems tend to-
   wards disorder, still the most dominant view in the natural sciences?
   Complexity theorists argue that the second law may not be an adequate
   description of all systems: some systems tend towards order, not disor-
   der. This discovery represents one of the major contributions of the
   science of complexity (Lewin 2001 p. 183). With this realization, other
   Darwinian elements that have long been taken for granted come under
   scrutiny. Is natural and thermodynamic selection still the prime ex-
   planatory concepts in terms of developments in the natural sciences?

As has been mentioned, I believe that insights from the science of complexity
sheds new light on all these issues and concerns. Frederick himself alludes to
certain aspects of complexity science in his paper and has in fact written exten-
sively on the subject elsewhere. I will start therefore, with a brief enumeration of
some of the basic tenets of complexity science and indicate why and how I be-
lieve it can be of practical use for dealing with ethics in a business environment.

2. Insights From Complexity Science (CS)

2.1. What is Complexity Science?

Why bring complexity science to bear on this discussion? Science has only
recently come to grips with the kind of realities that we encounter in business,
i.e., complex nonlinear systems that don't necessarily respond predictably. Lewin
(2001 p. 11) indicates that for three centuries, science has successfully uncov-
ered the workings of the universe by means of the mathematics of Newton and
Leibniz. The linear world they described was characterized by repetition and
predictability, and it remains a very important part of our existence. Most of
nature, however, is nonlinear and unpredictable. The weather is an obvious
example: it encompasses many components interacting in complex ways, which
makes it extremely unpredictable. These nonlinear complex systems may seem
complex, even chaotic on the surface, but its complexity may in fact be gener-
ated by relatively simple sets of subprocesses. Interactions between related parts
within a complex system also leads to the emergence of a global order, a whole
set of fascinating properties that could not have been predicted from what we
know of the component parts.

Complexity science also provides new perspectives on evolution and the
processes of natural selection. Lewin indicates that, in Stuart Kaufmann's view,
pure Darwinism leaves one without an explanation of the generation of biological
forms. He (2001, p. 182) quotes Kaufman as saying: "In the pure Darwinian view,
organisms are just cobbled-together products of random mutation and natural se-
lection, mindlessly following adaptation first in one direction, then the other."
Complexity science reformulates Darwinian theory to include self-organiza-
tion, by which order emerges as a result of the complex interactions within the

organism itself. New theories in CS about the dynamics of complex adaptive systems seem to indicate that there are also internal, rather than merely external engines for change of the species as a community. Order arises out of the local interactions of complex dynamic systems and the system settles at the highest level of energy. CS theorists refer to this condition as the position "at the edge of chaos." An important characteristic of systems at the edge of chaos is that small changes to the system may have huge effects. Stability in this context is an emergent property. Complex adaptive systems fluctuate among three states—stasis, chaos, and the condition described as one "at the edge of chaos." The system is most creative when in the third of these states, therefore—"at the edge of chaos."

2.2. Can Theories About Complexity Provide Us With Useful Insights for Business Ethics?

In a 1992 Harvard Business Review article entitled, "Is Management Still a Science?" David Freedman argues that: "management may indeed be a science, but not the science most managers think." He argues that managers may still follow an outdated scientific mind set, namely the mechanistic, reductionist perspective. Lewin (2001, p. 199) traces this mechanistic reductionist perspective on management back to its origins in Taylorism. Taylor was strongly influenced by the prevailing thought of the 1910s, i.e., Newton's laws of motion and the new science of thermodynamics. Together these theories allowed scientists to calculate how a machine would operate with maximum efficiency. Taylor, a reductionist, analyzed the system down to its component parts and then sought the best method to ensure the efficiency of the system. Taylorism's machine-like model led to huge increases in productivity in the workplace, and is still influential today.

Yet, the recognition that much of the world, also the business world, is nonlinear and organic, characterized by uncertainty and unpredictability, has brought into relief the limitations of reductionism and the mechanistic management model. Lewin and Regine (2001, p. 198). argue that when business is viewed through the lens of complexity science it becomes clear that businesses do not merely resemble natural ecosystems. Instead businesses and natural ecosystems share fundamental properties. Both businesses and natural ecosystems are complex adaptive systems, displaying nonlinear processes. According to Lewin and Regine (2001, p. 197) we should recognize that businesses are complex adaptive systems that evolve to a critical point poised between chaotic and static states. Here, at the edge of chaos, a business' response is most creative and it is here therefore, that it is likely to be at its most profitable.

Lewin and Regine do however draw an important distinction between businesses and natural ecosystems: in economies, conscious decisions are made by people, whereas in biology there is no conscious intent of that kind. This introduces the question as to what exactly the difference is between natural systems and cultural or social systems.

3. Are Corporations Subject to the Same Evolutionary Imprinted Imperatives as Natural Organisms?

The crucial question here is whether Frederick can prove that a corporation is subject to the same laws and dynamics that dominate the natural world. Frederick argues that the firm is a coalition of biological agents and displays the same behavior and reactions as natural organisms. In his view, therefore, there is no meaningful difference between a corporation and a natural organism. What he is in fact saying is that the corporation *is* a natural organism. It is for this reason that he feels justified in utilizing evolutionary models to describe the dynamics of corporations.

Complexity theory offers a further justification for utilizing insights from the natural sciences in understanding corporations. It argues that a corporation *is* a complex system just like any other natural organism. The qualifying characteristic that allows one to extrapolate from complexity science to corporations does not necessarily reside in the fact that it is composed by biological agents. Theorizing about complex systems encompasses a wide variety of phenomena, including social or cultural systems, e.g., Lewin's (2001, p. 6) analysis of Anasazi civilizations in the Chaco canyon, Mark Taylor's (1997, p. 326) virtual webs, the brain, and ecosystems. In my own research, I have tended to treat the notion of complex systems as a metaphor. In other words, I assumed that corporations function *like* complex systems. However, reading Mark Taylor's work on the dynamics of complex systems in biology, cultures and virtual reality (non-totalizing structures as he calls it), I have realized that a much stronger statement can be made. From Mark Taylor's perspective, the rejection of a correspondence theory of truth, i.e., that words and theoretical models provide a picture-depiction of objects and events in the real world, opens a new perspective on what scientific theory actually does and can claim to do. Our descriptions of reality, *is* in fact our reality. The virtual world becomes the real world and the real world becomes our descriptions of it. What we are dealing with in science, is an array of endless layers of meaning behind which nothing is hiding. We do not reveal the truth about something, we construct it. If one treats perspectives from the natural sciences in this way, science becomes less of an instrument of control and prediction, and more a process of tracing the complex relationships between events, entities and the meaning(s) we attach to them.

Complexity theory as a scientific view is extremely effective in helping us understand the complex layers of meaning. It demonstrates how the physical survival struggle of biological organisms are intricately linked to the cultural and social life in a system, as well as the external pressures and opportunities of the environment in which organisms operate and of which they are also an intricate part. Subject-object dualisms dissolve in an intricate web, and it becomes difficult to identify and sustain a distinction between nature and culture. I concur therefore with Frederick's insistence that the dichotomy between culture and nature has become meaningless. In a very real sense, culture is nature and nature is culture.

4. IS *the Danger of Determinism Looming in Frederick's Thesis?*

What are the implications of a position that sees values as cultural and social responses to nature, influenced by biological and physical realities? To what extent is our behaviour determined by natural forces? It is an important question for ethics, since ethical directives become impossible in a situation where all actions are explained and even justified from a determinist perspective.

Objections to what is seen as naturalistic determinism often represent nothing more than yet another mutation of the inherent dualistic tendencies of most philosophical ethics. It is characterized by an insistence that nature should not determine values, but that behavior should instead be directed by values. However, if the dualism between values and nature is dissolved, values and ethical reasoning become just another aspect of our natural existence. It becomes possible, as Petersen (1999) described it, to "judge from our guts," or to "think with our hands." This view is much more consistent with recent studies on the origin of emotions, or consciousness. Our brain is the prime example of a complex system where order emerges from complex interactions between emotions, abstract reasoning, language, and sensory experience.

We might no longer be the transcendental subject who with abstract reasoning rules over nature and directs our own behavior, but neither are we now passive objects determined by nature. Frederick has described the complex nature of economizing in another study: "*Today, economizing among humans is clearly a blend of genetic processes and sociocultural symboling, the latter much elaborated beyond a genetic level but still resting on and continuous with that underlying genetic process and capability*" (Frederick 1995, p. 42). As a commentator on Frederick's book, Timothy Fort (1996, p. 148). noted: "*To reduce nature to ruthless competition misses the complexity of the ecologizing and power-aggrandizing elements of life just as business without concern for ethical responsibilities misses what any human enterprise is about. Frederick's description of technologizing also emphasizes human ability to solve problems, utilize symbolic processes, reason abstractly, and display creative behavioral features.*"

It is important to keep in mind, however, that though our behavior may not be completely determined by ruthless selection, we are not in the "driving-seat," exercising complete control, either. We are in fact part of complex systems that self-organize towards order. These systems respond to our creative energies, it interacts with us and impacts on us, it evolves in, with, through and even despite us.

5. Is Human Responsibility an Outdated Notion?

Dissolving the subject-object distinctions between ourselves and the natural world raises questions as to whether we can in fact still argue for human responsibility in a business context. Can we still significantly influence the system that we are part of? What is the measure of our influence and how does this change the nature of our ethical pursuits in business?

In Frederick's Ruffin paper, which is under discussion in this volume, he chooses to elaborate on businesses' economizing function. Seen in isolation from the rest of Frederick's work, this focus may be misconstrued to mean that no matter what we argue in business ethics, corporations are always going to be ruthless profit-maximizers. Clearly this is NOT what Frederick has in mind.

In his book, *Values, Nature, Culture and the American Corporation (VNC)*, Frederick (1995, p. 39) distinguishes between various developments in thermodynamic theory. In *Entropy I: The Austere view*, he describes the two laws of thermodynamics and the struggle against entropy much like he did in this paper. The second section, *Entropy II: Order from disorder,* describes another view of thermodynamic effects. It argues that thermodynamic processes provide way stations—life oasis—on a road that otherwise inevitably leads to ultimate doom. This is an acknowledgement of the fact that complex dynamic systems do not necessarily always tend towards disorder, some systems display the counter-tendency that embodies order, organization, patterns and regularity. Here Frederick (1995, p. 39) elaborates on his view of human responsibility: "*In the human arena, invention, creativity, self-awareness, social awareness, intellectual exploration, symbolic forms, and technological complexity appear.*" Ultimately, it is this self-organizing activity that makes sustained existence possible.

I would like to add a few thoughts on what level of responsibility becomes possible, and should be expected of us within the business context. I would also like to venture a suggestion with regard to Frederick's analysis of the economizing, ecologizing, and power-aggrandizing value clusters in his book [VNC] (Frederick 1995, p. 20). More also needs to be said about the moralizer-evaluator function of the evolutionary firm. Economizing and power-aggrandizing values should in my view be balanced by a value strategy that can deal with the paradoxical struggles between different value clusters.

Frederick proposes in his paper that: "*the moral traits, features and habits of the EF are the product of contradictions embedded in diverse neural algorithms.*" That these paradoxes exist, cannot be denied, and if they are not identified and effectively dealt with, Frederick may well be right in concluding

that: *"EF is not only it's own worst enemy but cannot avoid moral condemnation by others both inside and outside the firm."* However, this need not necessarily be the case. If we acknowledge the fact that we are all part of ever-evolving, self-organizing complex systems, our symbolic capabilities allow us to make pragmatic sense of the paradoxical notions we encounter in the business world. I want therefore, to take up Frederick's challenge to bring pragmatism to bear on businesses as complex adaptive systems.

In describing the firm's moralizer-valuator function, Frederick balances the economizing tendencies of the firm with the important mutualizing tendencies that are part of human life. Cooperative, symbiotic behaviors emerge as a result of the fact that cooperation makes survival (economizing) sense. Economizing motives sometimes override mutualistic tendencies and Frederick describes this irony as "*the algorithmic crossroads where one finds the most intractable moral dilemmas of EF.*" Clearly we need a way out of the paradox in which economizing causes mutualistic tendencies whilst at the same time in some cases undermining it. Frederick presents us with another challenge when he describes the way in which opposite and conflicting emotions and emotive reactions coexist in the same individual and firm. What are we to do with what Frederick calls "*a veritable tangle of overlapping, inconsistent and ultimately contradictory neural algorithms lying at the heart of today's business practitioners?*"

Frederick's analysis of how the evolutionary firm (EF) makes choices under these conditions embraces both natural selection and thermodynamic selection, but still comes to the conclusion that LEE (logic of evolutionary effect) will consistently select *economizing* algorithms and that this remains the dominant motivating force behind the evolutionary firm's actions. He qualifies this position by recognizing that the moralizer/ valuator function of the firm comes into play. He also acknowledges the fact that each of individual represents a unique and diverse moral configuration that can be a rich source of independence, creativity and moral imagination. In addition, some creativity and imaginative intelligence is allowed for as part of the firm's innovator/ generator and enabler/ stabilizer functions. He further acknowledges that mutualisms abound in all systems, and that a firm's values can act as strange attractors that orientate the EF in an ever-shifting fitness landscape. Having said this, we are still led to the somewhat fatalistic conclusion that economizing considerations ultimately trump all others. Our only alternative is to somehow augment Frederick's value clusters with something that can mediate the paradoxes inherent in them.

I think Frederick's (1995, p. 187) chapter on techno-logics in VNC provides us with some useful points of departure. It makes provision for a pragmatic logic that links organizational logic, cooperative-coordinative logic, unifying logic, and civilizational/ humanizing logic, with the notions of combinatory logic, cumulative logic, and progressive logic. I want to argue that we need to creatively find mediating concepts to act as strange attractors that mediate between paradoxical notions and apparently contradicting moral demands. These

mediating concepts could be developed by combining pragmatist techno-logics with what Frederick (1995, p. 119) refers to as x-factors. These x-factors are value-configurations that arise within the individual and group as a result of the complex interactions of diverse tendencies, beliefs, motivations, capabilities etc. The x-factors cause unexpected contributions to come into play, which is then mediated by pragmatist techno-logics. In this way, creative, value-driven solutions emerge. These new solutions allow us to manage the inherently paradoxical tendencies in corporations meaningfully and effectively. What I would therefore like to do is to adjust Frederick's value-cluster diagram to reflect the emergence of mediating value concepts. (See diagram 1 below.) This corresponds with Dewey's instrumental pragmatism (Frederick 1995, p. 274), which argues that values emerge from human experience in socio-cultural-economic communities. In the new diagram, therefore, values are seen as those properties that emerge within complex systems if the pragmatist techno-logic of human participants in organizations, and their unique x-factor configurations, are brought into play in situations where the three value clusters make conflicting demands. These emerging mediating values (such as trust and respect in the diagram) should however always be seen as contingent, contextual responses to specific moral dilemmas.
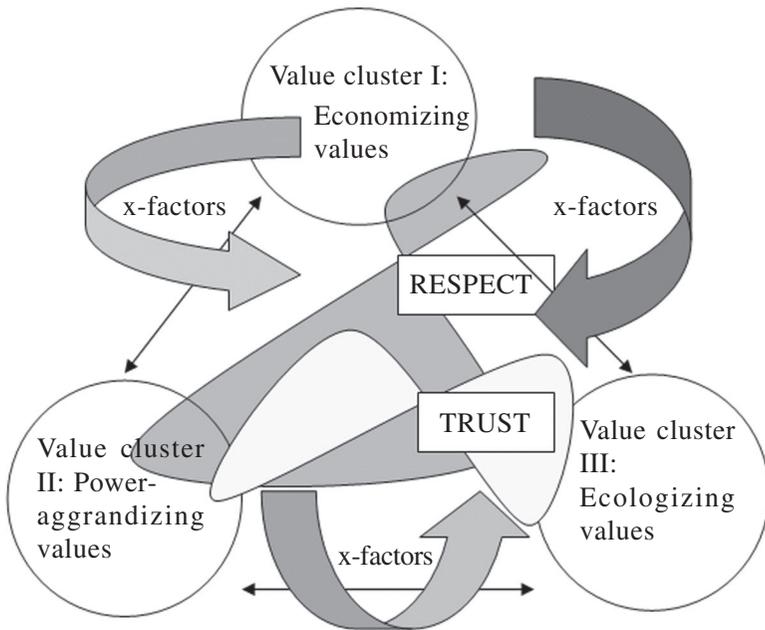

Diagram 1

6. Answering the "So What" Question: What Practical Insights Can Be Gained for Business Ethics?

6.1. Dealing with Diversity

Complexity models show that the emergent order in a complex adaptive system will be richer, more creative and adaptable if there is a diversity of agents in the system, agents with different characteristics and different behaviors. I believe this is caused by the interaction between the unique x-factor configurations of individuals, and the increased pragmatic capabilities of actors in complex systems, which creates the conditions necessary for the emergence of mediating concepts that can enhance the system's performance at the edge of chaos. This sends a strong message to business leaders to enhance diversity if they wish to enhance creativity. Agents who are part of the system must also attempt to enhance the conditions within which diversity and pragmatist, creative logics can flourish. Therefore "managing," or rather facilitating the organization as a complex adaptive system requires a specific form of leadership.

6.2. Leadership and Management

Complexity science argues against the managerial control advocated by traditional Taylorism. It argues that managers must give up the illusion of control, and instead create an environment in which creativity can flourish. Yet the message of complexity science does not merely amount to a new version of determinism that paralyzes managers by forcing them to accept the system's natural selection and self-organization. Too little direction and involvement is as misguided as too much. Management practice guided by complexity theory does not necessarily replace mechanistic management, but instead encompasses it in a larger context. Managers can no longer control their organizations from a mechanistic perspective, but they can influence where the company is going and how it evolves (Collier and Esteban 2000, p. 207).

6.3. Dealing With Internal Contradictions in Organizations

Paradox denotes contradictory yet interrelated elements—elements that seem logical in isolation but absurd and irrational when appearing simultaneously. These elements include perspectives, feelings, messages, demands, interests or practices. A further characteristic of paradoxes is that they are constructed. It is the way in which actors attempt to make sense of an increasingly ambiguous world by polarizing reality into either-or distinctions that conceal complex relationships. Paradoxes become apparent through self- or social reflection that reveals the seemingly absurd and irrational coexistence of opposites (Lewis 2000, p. 761). Paradoxes can therefore be reframed by the creative generation of mediating concepts. Complexity science makes it possible to break out of

the either-or logic that makes it impossible for actors to deal with contradiction, ambiguities and absurdity. It allows contradictory elements to become important components of the complex system by which order and meaning is temporarily and contingently created through the emergence of mediating concepts.

The simultaneous existence of contradictions such as structure and flux, of new and old, of individual and group has been identified as the origins of certain organizational paradoxes. Lewis (2000, p. 765) indicates the following common paradoxes in organizations: 1) the paradox of learning, i.e., the coexistence between old and new, 2) the paradox of organizing, i.e., the balance between control and flexibility, and 3) the paradox of belonging, i.e., the relationship between the self and the other. Complexity science advocates the recognition of paradoxical elements in a system and accepts these tensions as a typical feature of the high-level energy condition at the edge of chaos. The important thing is that people be allowed to creatively come up with pragmatic solutions to moral dilemmas in the workplace. In this way, value-systems will be a living part of the organizational dynamics and the system will function at its creative and performative best. At the "edge of chaos," small changes can also have huge effects. This presents both opportunities and dangers. A single creative solution or positive action can create many additional positive results, but a single negative or destructive event can also cause the system to crash into chaos. Given these conditions each individual's efforts and sense of personal responsibility becomes crucially important.

7. Conclusion

I agree with Frederick that we have to look nature in the eye—without blinking. What is more, I believe we can do so optimistically. I see a lot of creative opportunities for ethics to become more than just abstract ideals or pleasing principles. Ethical decision-making in the business contexts challenges us to engage in the messy realities of business in a way that allows it to become part of the core of business activities at the edge of chaos.

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