

**WHY TOP EXECUTIVES DERAIL;  
A Performative-Extended Mind and a Law of Optimal Emergence**

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**ABSTRACT**

This paper defines the mind as an ecosystem within a larger ecosystem. It uses an extended model of the mind and proposes a definition of human values as attractors emerging from ecosystems.

The classical model of the Growth-curve is linked to the time and growth dependent conditions for the creation and destruction of ecosystems. The conclusion of this paper suggests a direct link between top-of-the-growth-curve processes and the loss of values. Top-executives feel a strong responsibility to their shareholders to maximize profits. To do this, they move themselves and their organizations precisely to the stage in the Growth-curve where values are at risk of being lost and derailment seems unavoidable.

The combination of understanding the extended mind as an ecosystem for which the conditions to create or destroy values are related to phases of the Growth-curve might lead to an ecological explanation why many top-executives derail in situations of wealth, profit, power and status.

Keywords: Consciousness, Extended-Mind, Attractors, Values, Ecosystem, Derailment

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*"It has always seemed strange to me," said Doc. "The things we admire in men, kindness and generosity, openness, honesty, understanding and feeling are the concomitants of failure in our system. And those traits we detest, sharpness, greed, acquisitiveness, meanness, egotism and self-interest are the traits of success. And while men admire the quality of the first they love the produce of the second."*

John Steinbeck (1945), Cannery Row, Chapter 23

*"We are not outside the ecology for which we plan-we are always and inevitably a part of it".*

Gregory Bateson, (1973), Steps to an Ecology of Mind

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## **Introduction**

A recent paper by Paul K. Piff (2012) called “Higher Social Class Predicts Increased Unethical Behavior”, might seem like common sense. That power, status and wealth have a corrosive, corrupting or even criminalizing effect on the human mind seems obvious to many people (Smith, 2012, Machiavelli, 1513) Another ‘received opinion’ tells us that leaders work at an ethical border which power, status and wealth tempt them to cross (Jensen, 2004). As John Steinbeck observed, we strive for power, status and wealth, but this drive seems at odds with what we really think is worthwhile. In this article an attempt to bridge this paradox, one that leaders face all the time, will be presented through a falsifiable ecological model which applies to both individual psychology and organizational governance.

The current economic crisis will be used as an example, interpreting it as a leadership and ecological crisis. The financial problems are a “disease” with symptoms such as the abuse of power, greed and other signs of lack of ownership and social responsibility (Jensen, 1976, 2004). This leadership misconduct happens at all levels in government, commercial enterprises, business schools, non-governmental organizations, medical institutions and others. However, it does not occur all the time, everywhere. Every so often great leaders stand out and surface as examples for the many. Many leaders work with the best intentions. Despite this, the pattern of corroding, corrupt or even criminal leadership emerges, particularly in relation to power, money, wealth, status and bureaucracy or any combination of these. The Harvard Alumni who ruined Enron were normal intelligent social citizens yet, at some point, their leadership went awfully wrong (McLean, 2003) . Most dysfunctional leaders started as normal people and would never have dreamt of cheating or behaving badly. In other words “bad leaders” aren’t born “bad”. It is thus not evident that derailing leaders suffer from some innate form of psychopathology as Kets de Vries (2009) seems to suggest.

The process that erodes good people serves as a vivid example of the ecological model. The reasoning in this article draws on sciences that are the foundation of ecology: chaos (modern nonlinear dynamics), self-organization theory, and the thermodynamics of evolution (Goerner, 1994). Cybernetics and information theory are intertwined with those together with neurophysiological and ethological research and concepts. Further expansion of this example and other applications of this approach will be left till the end of this paper, focusing first on its theoretical foundations.

## **Approach**

Attempts to define and apply robust ethical practice have been going on for at least 3000 years and attempting to summarize all these approaches would take many volumes. Although this summary is far too short discussions of (business) ethics have roughly identified three very general approaches (Mill, 2001, Donaldson and Dunfee, 1994):

- Virtue ethics, guided by principles of fairness and courage. However, the principles often involved conflict;

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- Utilitarianism, guided by a desire to benefit the greatest number of people and harm the least. This marginalizes minorities and may suggest ends justify means.
- Rule Compliance, a legalistic approach.

Despite this huge effort we seem no nearer to finding a workable ethics. All individual approaches have problems and none of them resolve the problems of how the guiding principles are formed and therefore why people might be moved to follow them. All of them, and especially rule compliance, treat ethics as norms. From a cybernetical and ecological vantage point this is a fundamental error as, will become clear in this article.

First, the approach will be to combine three vantage points (cybernetical, philosophical, neurophysiological) to support the concept that the human mind is an eco-system within larger eco-systems. Second, the paper will work towards a concept of what values are in the context of eco-systems. Third, it will show that growth will, seemingly paradoxically, always be an eroding force within eco-systems, and will depreciate values, during the second phase of the S (growth)-curve. Fourth, it will return to the example of erosion of good people as leaders and the challenges they face if they want to stay good leaders, explaining the practical implications in more operational terms.

### **Ecology**

In ecological terms a model will be proposed that the mind and consciousness are emergent properties, where the constituent parts derive from both the brain and the environment (Noë, 2009). Then it will be proposed that values are emergent characteristics of patterns of behavior. Bateson (1973) and Varela (1993) will be followed in their thinking. Then the focus will be on growth from a cybernetic perspective: that growth and the increase of feedback-loops always go together and that, in many human cases, this is basically a shift from feedforward-steering (Pribram 1976) to feedback-control. This is a description of the classical growth-curve, most often called the S-curve (Robertson, 2005, 2012). It will be proposed that the natural and unavoidable increase of feedback-loops in any system will make the conditions for creating stable emergence less and less likely. The growth, streamlining and increased efficiency of systems destroys them (Lietaer, 2008). Many examples in history illustrate this point like the rise and fall of the Greek and Roman civilizations or the Commonwealth. The conclusion drawn is that growth first creates emergence and then destroys it. Given that mind and values can be defined as an emergent integrated part of the ecosystem this process of growth will erode them. It will be suggested that mind, values, emergence and eco-systems are almost different words for the same phenomenon. The flip side of the coin is that values cannot exist if there is no growth, which means that values are always caught between a rock and a hard place, time driving them inevitably from emergence to destruction, so that the only way of keeping them alive is starting new growth-curves.

### **Eco-systems and emergence**

The proposed performative-extended mind model assumes that mind is an eco-system that is part of a larger-ecosystem. “Emergence” which is central to this proposal needs a

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short introduction.

The first use of the word in the relevant way is in Lewes (1875). A characteristic modern definition is in Goldstein (1999): “the arising of novel and coherent structures, patterns and properties during the process of self-organization in complex systems” The key characteristics of this definition are: (1) the patterns are unique, (2) there are integrated wholes that maintain themselves over some period of time, (3) there is a property of "wholeness", (4) there is an evolving dynamical process, (5) the patterns can be perceived, (6) the patterns have an optimum of viability (Ulanowitz and Lietaer, 2009) and (7) the unique “surface” complexity these patterns may show is created by a deep simplicity (Gribbin, 2005): they are complicated in appearance, but with deep simple rules (O’Connor and McDermott 1997, Beinhocker 2006).

An eco-system can be recognized by patterns and an optimum of viability (Lietaer 2008). The strengths of a wild prairie (alt.: pasture, meadow), a human personality, a brand like Coca-Cola, the reputation of a country or a leader, a rainforest or an ant-hill can all be looked at as “emergent properties”. The whole is more AND different than its constituent parts.

Viable complex systems create their viability from an undefinable large number of dynamic feedback and feedforward-loops between their constituent parts. There is a very strong relationship between the constituent parts and their overall emergent characteristic, but this relationship is not based on cause-effect and is near zero predictable from the interactions of the constituent parts

An example which illuminates the complex appearance and deep simplicity of eco-systems is the flocking behavior of groups of birds when they are foraging or in flight. Computer simulations and mathematical models which have been developed to emulate this phenomenon can generally be applied to the behavior of other species, too. As a result, the term "flocking" is sometimes applied, in computer science, to species other than birds. *"Flocking" is the collective motion of a large number of self-propelled entities and is a collective animal behavior exhibited by many living beings such as birds, fish, bacteria, and insect* (O’Loan, 1998). Flocking is considered to be an emergent pattern arising from simple rules that are followed by individuals and does not involve any central coordination. The three simple rules discovered (Reynolds, 1987) are: *Separation (avoid crowding neighbors =short range repulsion), Alignment (steer towards average heading of neighbors), Cohesion (steer towards average position of neighbors =long range attraction)*. There is no central control in flocking; each bird behaves autonomously.

To give another example of deep simplicity: “no individual ant ever builds an anthill”. The individual ant follows a few quite straightforward algorithms and an anthill is the emergent result. There is diversity in an anthill, because different ants show different patterns of behavior. Sometimes ants of the same type can be seen as “industrious” or “lazy” depending on the frequency of their interactions, for example. (Gordon, 2010).

The seven key characteristics of patterns listed above are used to denote “strong

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emergence”. This means that the emergent characteristics create a system where the system characteristics cannot be reduced to their constituent parts. “Life” can be seen as strong emergence, because it is difficult to relate the simple core of the system to the complexity of the whole pattern we call life. In this paper strongly emergent phenomena are given the name “attractor”. Goertzel (1994) suggested this option from the perspective of chaos theory.

### **The mind as an eco-system within a larger eco-system**

The example referred to throughout this paper is the fact that our minds seem systemically vulnerable to the loss of values: that leaders become corrupt for reasons associated with power, wealth and status.

To make this argument we must attain at least some basic understanding of the hardwired aspect of our brain which generates our mind. In the following sections the brain will be described in terms of a system that is organized in such a way that it ties in with the complexity of the ecosystem around it without needing to copy or mimic it, leading to the suggestion that it's logical to think about the mind as an eco-system following all the same rules that also apply for any eco-system.

It will then be proposed that the dynamic anatomy of the brain is such that it supports the idea that the mind is not within the brain under the skull, but that the mind is a dynamic pattern (attractor) created by the brain and its environment.

The brain may be just what it looks like: a bunch of wires in a near infinity number of endless loops, through which synaptic plasticity creates a pattern-based memory-process. This anatomy does not make sense if we search for “a mind” inside it. Looking for the mind within the brain is the same as looking between the strings of a grand piano for the music.

During the last few decades we have started to look at the mind in an entirely different way. This shift towards a new paradigm about what the mind is and what the relationship between the mind and the brain is can be described as the shift from the representative-brainbound model to the performative-extended model.

The representative-brainbound model is the dominant one (Noë, 2011). Whether or not we call ourselves professionals in understanding the brain, most of us think that the mind “lives” within the brain just as the brain lives inside the body. From the inside of that “dark cave of bone” we assume that our mind peeks into the world through eyes, ears and other sense organs designed for “this purpose.” We assume that there is some “inner place from where each of us operates”. We are convinced that our mind must be extremely complex. Even when we are asleep, it works, sorting out yesterday's issues in something we call the “unconscious.” That “unconscious”, by definition, never sleeps and is unknowable at first hand. Perhaps this model has been adapted slightly in the light of media reports that we have found the ‘gene of homosexuality’ or the ‘place in the brain which lights up when we pray or listen to music.’ But, the basic model still informs most debate. The mind is a complex object, isolated from the world and, indeed, well-protected

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from it.

The performative-extended model of the mind turns this notion upside down: it explores how the mind, far from being isolated in its cave, is connected to and part of the whole ecosystem 'out there'. The brain is not a place within which the mind is happening. It creates the 'mind' through action as an integral part of the world around us. The mind is an emergent characteristic, stabilized by brain connections. The brain is very important in creating the mind, but in itself is just a constituent part of a larger emergent process involving the outer world.

Once we realize that the mind is just another eco-system and, as such, always part of a larger eco-system, we can approach both the mind and its environment with similar paradigms, theories and models. A practical implication of this is the notion that we cannot separate ecological solutions from the people who have to deliver the implementation of those solutions. If we suggest that governments or corporations need to do something for the better, it is more likely that the minds working in those organizations are, in fact, a larger part of the problem than one might have ever imagined. We are not facing an organization with people in it, but simply one total eco-system, of which people and systems are just constituents parts. Obviously we will go into this topic in more detail at the end of this paper.

To understand the literature and research leading to this ecological performative-extended concept of the mind we can follow three intertwined vantage points that support it.

The first is cybernetics, the second is philosophy and the third one is neuroscience.

### **The cybernetical vantage point**

The start of cybernetical thinking on the performative-extended model of the mind is well described by Pickering (2010). The English psychiatrist Grey Walter, an EEG expert and a close colleague of Ross Ashby, an expert in cybernetics, started to create small devices, based upon simple cybernetical principles, using electronic material left over from World War II. These were small electromechanical robots that looked like tortoises from the outside. The purpose of these cute devices was to show how a model of the brain could work if it was, built from very simple components, wired up to provide an extremely rich life through interaction with people. The device-human relationship could initiate and maintain similar emotions and interpretations among human spectators as those typical of human-human interaction. Walter's simple tortoises were 'black boxes' because their behavior was unpredictable. From the interaction between the living or static environment and the tortoise, patterns emerged that were surprising and not programmed in the brain of the tortoise at all. In fact nothing was programmed.

In a 1950 Scientific American article, Grey Walter suggested that, based upon the fact that his 'tortoises' had only two "feed-back systems", one could calculate that it might be possible to create a human being with just about ten of these systems. Understanding that human brains do, indeed, have only a small series of these systems, such as those dealing with food intake, fluid intake, attachment, sex, exploration (as a feed-forward "system"),

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temperature and blood pressure regulation we get close to that number. This is a good example of deep-simplicity and surface-complexity.

What happened to Grey Walter's deep-simplicity-surface-complexity kind of thinking? It got marginalized over many decades until Rodney Brooks rediscovered it again in the mid-eighties and it lives now at the Artificial Intelligence (AI) department of the MIT (Pickering, 2010).

Since the Dartmouth College 1956 conference, AI, sponsored by millions in defense money, has sought to develop a representative model of the brain. This reflects the classical, dominant psychological idea of the mind; the conviction that our brain is a computational device, within which a representation of the world is needed to act upon that world. This reflects the common sense (but here proposed to be wrong) idea in psychology in which our mind works inside our heads.

Since 1956 computers have never been fast enough to deliver real-time control within advanced (or symbolic) AI. Brooks himself got frustrated when he helped Hans Moravec develop a robot which moved so slowly (due to the time taken for computation) that, outdoors, the movement of sun and shadows confused its internal representations (Pickering, 2010, p. 63). The more money thrown at representative AI, the less it produced.

Rodney Brooks describes his frustration on realizing that Grey Walter's robots (Brooks created one himself as a youngster) costing only a few bucks appeared to function better than the million dollar equipment AI used in the mid-eighties (Brooks 1991, 1999). He then threw away the representative model and started where Walter left off, creating a performative robot called Allen. Rodney Brooks' first article in which he proposed this tectonic shift in thinking about intelligence was first rejected by many conferences and journals. Once the world of AI changed because of the success of Brooks' work, the article "Intelligence without Representation" was published in the esteemed Journal for Artificial Intelligence (Brooks, 1991).

Brooks was quite impressed by the level of complexity small animals and insects like spiders can create without anything like a matching brain. There is nothing in a spider's nervous system that even gets close to being able to process the complexity of its web or prey-catching strategies. There must be something else going on rather than a representation of the outer complexity within the neurological system of the spider. How can animals with so little brain - one can hardly call it brain -, still create those complex dynamic structures?

What has happened in the world of Artificial Intelligence from Walter via Brooks to the MIT Media Lab and the development of Robotica up to now is a fundamental shift from a representative to a performative model of intelligence.

### **The philosophical vantage point**

Philosophical thinking on the brain and mind has undergone a similar shift. Andy Clark calls it a switch from a brainbound to an extended mind (Clark, 2011).

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Alva Noë writes: “In a way our problem is that we have been looking for consciousness where it isn’t. We should look for it where it is. Consciousness is not something that happens inside us. It is something we do or make. Better: it is something we achieve. Consciousness is more like dancing than that it is like digestion” (Noë, 2009, p. xi). The phenomenon of consciousness, like that of life itself, is a world-involving dynamic process. We are already at home in the environment. We are out of our heads (Noë, 2009, p. xiii).

Rephrasing and following Clark’s classification (2011, pp. 136-137) which summarizes the thinking behind the extended mind paradigm:

- 1) There is no “magic dust”, neurons are neurons and just conduct electrical impulses, fire, inhibit or stimulate each other and that is all.
- 2) There is no “inner homunculus”. There is no specific area in the brain that “does the thinking”. The brain is a bunch of wires and connections, with mind and reason being the emergent properties of a well-functioning swirl of self-organizing complexity.
- 3) The brain does not care how and where key operations are performed<sup>1</sup>.
- 4) Much human thinking benefits from cycles of self-stimulating activity in which structures that drive and constrain evolving thought processes are created on the fly.
- 5) The flow of control is decentralized, distributed and beneficially actually fragmented.

Obviously this is an oversimplified interpretation of Clark’s classification, but the key to what he and others are stating is basically not very different from what is described in the previous section on historical developments: a migration from a representative/ brain-bound to a performative-extended model of mind.

### **The neuro-physiological vantage point**

What are the neurophysiological substrates of this model? It becomes more and more clear that the best way to look at the brain is as a network of networks (Sporns, 2011). Looking at the wires might be very useful for someone doing brain surgery - but not useful for understanding cognition. By this, the idea is that the existing view (the representative brain model) is not "wrong" so much as it is not "useful" - just as knowledge of electrical wiring is not useful for making a cell phone call (but knowledge of button-pushing is!).

In his massive work on this subject Sporns concludes that empirical studies, agent-robot models, and theoretical work suggest that the application of network thinking to brain-body-environment interactions promises to reveal principles that enable autonomy and intelligence. A key conclusion of Sporns is that this functioning does not reside within control algorithms or the computations of higher brain regions, nor that they are deeply embedded within the brain’s blueprint or wiring diagram. Rather, Sporns concludes, they draw heavily on ideas of information and dynamics within networks.

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<sup>1</sup> A short personal comment: the sentence “the brain doesn’t care” is already a dangerous one, because it could imply that the brain is something that “could care for something else” and as such could be an entity with a will or power to direct, which it is not.

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Building upon this network paradigm, a review by E. Roy John (2005) will be used as a backbone for the following paragraphs. He summarizes a wide range of empirical evidence suggesting the need for a paradigm shift to explain how synchronous and distributed neuronal discharges are transformed into a seamless global subjective awareness.

He describes a theory of consciousness that proposes that constituent parts as elements of consciousness are dispersed as islands of negative entropy (order) within many cell assemblies. Once these local islands of negative entropy are integrated into more whole brain negative entropy (order) it is likely to give rise to consciousness. John describes consciousness as “an inherent property of an electrical field resonating in a critical mass of coherently coupled cells” (John 2005, p.3). He leaves it open where that “consciousness” might be, but reading his article, it seems that he suggests it is “within the brain”.

John (2005) describes a two way process of how the brain organizes information. The first is the creation of a “background”. This background is generated by Local Field Potentials (LFP) on a modular level. A single neuron is far too erratic in its behavior so the module of operation in the brain is always a cluster of neurons that fires in clusters and generate the LFP’s. Modules all over the cortex generate, via a homeostatic, self-organizing process, a state of readiness. There are millions of entities (modules) that can connect with each other throughout the brain which are all part of networks. These networks change all the time with the same neurons working in completely different networks generating completely different meanings. Eccles (1977) compares this with the key board of a piano where the same 88 keys can generate an incalculable amount of melodies, rhythms and accords. If one minute a key is used for playing Billy Taylor, and another minute it is a piece of Ligeti and then Mozart the key doesn’t change at all. It doesn’t care. It doesn’t even know it is playing music. (To be clear, our neurons aren’t any smarter than a piano key).

There is a strong relationship between the QEEG (Qualitative Electro-Encephalo-Gram) and the states of the mind neurologists discriminate from deep coma to alert wakefulness. This is what one calls being conscious i.e. being awake in a resting state ready to deal with information. So the first process John (2005) describes it is just “getting the piano keys ready”, like switching an electronic piano on. It is possible to play, but it is not yet happening.

The second part of the process John (2005) summarizes is that dealing with information runs parallel with observations that relate to the networked state of the brain. This relationship between the amount of integration and consciousness is worked out by John in detail, and also stated by others like Lamme (2010) who argues that we should understand consciousness as the integration of information.

Below the backbone of John’s summary (John, 2005) of his major conclusions is given below, followed whilst by comments and clarifications:

- *‘Attributes of complex stimuli are fractionated and projected by the thalamo-cortical*

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*relays of the sensory specific “exogenous system” to the basal dendrites of ensembles of pyramidal neurons throughout the cortex, and thus encoded as time series of nonrandom synchronization within dispersed cell assemblies rather than by discharges of dedicated cells. These fragments of sensations constitute islands of local negative entropy.’ (John 2005, p. 144)*

Information from the outer world is fractioned by our sense organs and distributed over the cortex to the basal inputs of the cells forming a module. They form patterns.

- *‘Collateral fibers from afferent sensory pathways project to the ascending reticular activating system from which they are distributed as time series of non-randomly synchronized volleys that are propagated to structures in the limbic system, where they are encoded as episodic memories. Those representations of previous experiences most similar to the momentary present input, which have been stored in the limbic system, are simultaneously activated by associational mechanisms and readout as a time series of nonrandom discharges. This “endogenous” readout is propagated via the non-sensory specific nuclei of the diffuse projection system to the apical dendrites of the cortical sheet of pyramidal neurons.’ (John 2005, p. 144)*

The same input as in the first bullet generates a second stream of pulses, activating existing patterns, which are the same as memory. Those patterns do not have a direct relationship with the sensory data. These pulses connect with the same modules but via other dendrites.

- *‘Coincidence detection between the converging time series of inputs to basal somatic and apical dendritic synapses of dispersed pyramidal neurons causes enhanced excitability, converting those assemblies that are currently encoding fragments of sensation into fragments of perception, which further increases the local negative entropy. This coincidence integrates encoded sensory information with output of systems encoding expectations, memories, planned actions, interoceptive, affective, and motivational states.’ (John 2005, p. 144)*

When the excitatory patterns of the two pathways to the cortex “add up”, the level of “information” increases because experience matches the here-and-now. The level of information is defined by even sharper patterns of activation in the cortex.

- *Integration of these fragments is required to yield a global percept. Modulation of membranes by local field potentials (LFPs) facilitates discharge of excited cells as a coherent cortico-thalamic volley, followed by back-propagated high-frequency reverberating oscillations. Coherent interactions of these “cortico thalamo limbic cortical” oscillations cause a state transition of the system into resonance, binding these fragments into global negative entropy that creates consciousness, producing a unified perception. (John 2005, p. 144)*

Activated modules connect throughout the whole brain, where resonance or reverberation creates (for a very short while) a stable pattern, where all sensory and non-sensory past and present information are connected.

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John also describes the research pointing towards perception being created by discontinuous perceptual-frames that define “a travelling moment of perception”. These discontinuities are called “microstates” and last about some 75-100 ms.

Libet (2004), who received the 2003 non-official Nobel Prize in Psychology from the University of Klagenfurt, Austria found, in his most famous experiments, that unconscious electrical processes (the readiness potential) preceded conscious decisions. At least one general conclusion is that conscious experience takes some time to build. This well accepted discovery fits the notion that the timing of things is framed into a microstate and as such quite discontinuous, although we do not notice it.

To cite John in his concluding remarks in the article referred to above: ”The global negative entropy of the brain encompasses all of the momentary information content of the entire system, as an “information field” that subsumes the parallel processing circuits that are simultaneously activated at a nonrandom level in the brain, and comprises the content of consciousness.”

So we are left now with a conclusion that whatever happens in the brain that we can relate to conscious information processing involves networks, the creation of patterns and emergence, and that “time” is a pivotal factor.

This idea is shared by many thinkers including Sporns (2011) and Nunez (2010). Clark (2011), Clark and Chalmers (1998), Noë (2011) and others states that we do not need to find anything special, but that reality itself is the set of constituent parts that create consciousness by emergence.

It seems more and more evident that the brain is creating from external and internal stimuli and integrated patterns that flow in microstates, where consciousness is positively related to the level of global (whole brain) integration.

John (2005, p. 164) sums this up (abbreviated slightly):

- *‘The content of consciousness is based upon integration of momentary perception of the external and internal environment with the working and episodic memories activated by associative reactions to that perception. I contend that the conscious organism, and particularly the human being, is continuously interpreting awareness of the present in the context of both the recent and the remote past, to attribute “meaning” to the present events. A further major hypothesis of this theory is that information in the brain is not encoded by the firing of dedicated neurons in particular brain regions that represents specific stimulus attributes or features, but rather by distinctive temporal patterns of synchronized firing dispersed among many brain regions. Individual neurons can participate in numerous such temporal patterns.’*

### **Integration of the three vantage points: the mind as an eco-system**

The key question in the science of consciousness concerns where that consciousness is.

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Based upon the three vantage points above, it seems credible to suggest that the very question points us in the wrong direction. “Where” asks for a location and that location isn’t there. To clarify this let us start from a neurophysiological vantage point. As has been shown, there is a broad consensus that the brain is a big pattern generator, translating multi-modal information into time-framed patterns that are created by constituent parts all over the brain.

The challenging observation is that, within the boundaries of this consensus, most observers still localize mind within the brain and it is difficult to find references to the critical role of time. The implication of the model proposed here, supported by many thinkers is that “time” is a critical condition for the mind. The mind can only exist dynamically.

The brain is one big dynamic rhythmic pattern sponge and through interaction with the outer world generates a continuous loop of emergent microstates which we can call the mind.

It is interesting that Walter and Ashby (Pickering, 2011), using their cybernetical background started precisely from this point. Simple dynamic feedback loops in interaction with the outer world created patterns that observers felt to be human. Brooks’ work suggests that it seems to be possible to create a performative kind of brain.

The integration of the three sections above make the notion of a performative-extended mind plausible and provide further evidence for the proposition of defining the mind as an ecosystem within larger ecosystems, and of working out some consequences.

### **The ecological definition of values and other intangibles**

In the next section an attempt will be made to frame the concept of human values in ecological terms, using frameworks and concepts used to give an ecological account of the brain in the earlier sections.

The line of thinking is as follows: the mind is an emergent property of the interaction of the brain and its environment. Cyberneticists and philosophers point us in this direction and receive increasing support from the field of neurophysiology. The performative-extended brain model increasingly fits with the way the brain seems to work in relation to the world around it.

If our brain creates a mind that is part of a larger eco-system and if values can also be explained in ecological terms, mind and values (and other such phenomena) can be explained within a similar frame of reference, allowing us to suggest ways of dealing with seemingly intractable, non-material topics such as values which are of such a pivotal importance for the human condition.

To stress the importance of this, reference can be made to the research done under the umbrella of The Union of International Associations (UIA) , a research institute and documentation centre, based in Brussels. It was founded one hundred years ago, in 1907, by Henri La Fontaine (Nobel Peace Prize laureate of 1913), and Paul Otlet, a founding

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father of what is now called information science .

The purpose of this research was and is: “What are values, how do they relate to one another, and how do they change? How do they relate to the problems with which society is confronted? Knowledge of these matters remains primitive relative to the needs of the time. And, no problem can be recognized, or adequately formulated, unless the values involved, and the apparent threat to them, are stated. Many world problems can be specifically associated with the values which they threaten or violate in some way.”

A result of their research is that there is no agreed worldwide definition of values, although very general patterns are observed (Schwartz,1992). The UIA’s Human Values Project (Union of International Associations, 1907-2012a) is an unrivalled piece of work focusing on how values relate to each other and how they change. In the commentary on this project a suggestion is advanced that values might be seen as (strange) attractors: “One of the key insights of chaos theory is that of strange attractors. Is there a sense in which human values can be usefully understood as attractors?” (Union of International Associations, 1907-2012b)

To cite further: “A prime characteristic of a strange attractor is that it is defined as the focus of a pattern of seemingly chaotic behaviour. But it is the pattern that signals the presence of that focus which cannot be identified in any other way. Like strange attractors, human values do not manifest in any tangible manner but rather through interpretations of the way behaviour is governed. But the intangible attractor may indeed be a matter of direct subjective experience under appropriate conditions of human development.” (Union of International Associations, 1907-2012c)

“There is also a sense in which behaviour may be described as trapped by particular attractors. However, it may also drift in such a way as to be temporarily captured by another. From this perspective behaviour may be seen as swinging between and around attractors. Chaos theory may offer insights into the laws governing such behaviour.” (Union of International Associations, 1907-2012c)

This paper builds on this insight but goes a step further, using this route to connect values to emergence and to define values as the connected emergence characteristics of the environment and the brain, generating a performative-extended mind.

The definition of values used here is:

*“Values are strong emergent, self-organizing properties of complex, diverse, dynamic systems”*

Strong emergence means that a pattern is systemic and sustaining itself as a complex system of feedback- and feedforward-loops, not different than any other ecological systems sustaining itself. These patterns, as mentioned before, could be called “attractors”. This might lead to an even shorter definition of values:

*“Values are attractors”.*

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Values come in clusters, interact and, while they, because of their very definition, cannot be precisely defined, it is probably wise to assume that an “ecological definition” is more useful than a static “hierarchical definition and classification or simply re-naming”. You cannot act on one in isolation without finding lots of others jostling for attention.

If we ask ourselves how we recognize a value like “honesty” we will quickly realize that unwavering honesty will actually cause a great degree of uncertainty. For example for an unfailingly honest person it’s unlikely that even his best friend would ask his advice about an affair he or she is involved in and agonizing over because the situation will not remain confidential. In such a situation, honesty clashes with other values such as ‘having respect for others’ or ‘keeping agreements’. The paradox here is that, in order to trust a value like honesty, people need to see others adapting to the demands of everyday life and of other values. The irony is that a solitary value, pursued without exception is an obsession, not a value and, in ecological terms, a single-minded obsession with one virtue lacks diversity.

What would destroy my delegates’ trust in my honesty? One ‘accident’ might be allowed, but if I show one moment of pure dishonesty, they’d reappraise me completely.

Emergence can be placed on a continuum from weak to strong emergence. A practical example, often used, is a bouquet of flowers. The beauty of a bouquet of flowers is an emergent property created by the flowers and their dynamic interaction with us as observers, but the beauty is NOT contained in one single flower, or just two. There must be a critical mass of flowers, a certain degree of diversity (even when the flowers are the same species and are the same overall colour) to make a bouquet a bouquet. We cannot logically trace the bouquet’s beauty back and find a cause-effect relationship with a single flower. The whole emergent beauty of a bouquet can be destroyed by just a single withering, foul-smelling blossom. As we’ve seen, values work the same way. We look at an individual or an organization, gather individual behavioural incidents, arrange them in a ‘vase in our brains’, and when we get a critical mass of them, observe a pattern and give it a name: ‘truthfulness’; ‘honesty’; ‘concern for others’ or ‘selfishness’, ‘dishonesty’; ‘greed’. This is not a logical process but the result of self-organization. The whole emergent judgment can be destroyed by one counter-instance though there needs to be diversity – messiness – in how we negotiate between values for a value to exist.

Only a pattern of deeds over a period of time, none of them necessarily perfectly fitting the value, will create a value. We recognize values as values when they endure rather than just display themselves in one act, so they are attractors. Once a value is established, we focus on the value, not on individual, detailed incidents. On this basis we can make a decision about someone’s values almost instantaneously. Attractors such as values emerge after a period of information and instance gathering. Once they’re established we can jump straight to a judgment without thought.

As suggested, values, are just one small set of examples within a far broader set of similar phenomena. Other attractors include identity, brand, image, loyalty, flexibility, emotion, happiness, sadness, changeability, service, motivation, culture, climate, beauty, spirit and uniqueness. They all have similar characteristics.

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Rephrasing Bateson (1973) these non-tangible, abstract, reified descriptions carry some dangers with them:

- a) to create the idea that they can be localized “at some place” ; and
- b) they can be dealt with as entities in cause-effect relationships.

To use the organizational/leadership example, such dangers might lead to situations in which a) one thinks the organization “has” (instead of “is”) a culture and that b) it is “the people” making that culture so that c) we expect to solve a low level of client service by training, for instance.

By contrast, we observed a more systemic approach in a global service firm where some thousand plus stories were generated around one single question: why clients stayed with the firm or left. Those stories became the basis for building three USA-based centres where partners and consultants could relive and enact, as pilots in a flight simulator, the emergent characteristics of the messy and dynamic client-firm relationship. The dynamic and ecological necessary messiness was shaped in a more practical format by the concept of critical incidents turning themselves into “defining moments” that surface, test and shape the values and can only be solved by so-called good-versus-good decision, where managers decide between right and right, with the consequences that shaping values, most often goes along with making some “dirty hands” (read “messiness”) somewhere down the line of the process. (Badaracco, 1997).

Descriptors of the non-material phenomena we now call attractors, such as values, can be understood and addressed using the same principles, which are actually not that difficult once we realize that complexity-theory can provide us with a well-developed account of how emergence is created and sustained.

There are three key conditions for emergence:

- Dynamism (time, movement, continuity and other synonyms)
- Diversity (information, differences, variety, some sloppiness or messiness)
- Tangibility (a certain mass of concrete things)

This leads us to the following illustration, that might be used as a template to understand most (if not all?) “intangibles”. For the context of this article, it focused mainly on values.

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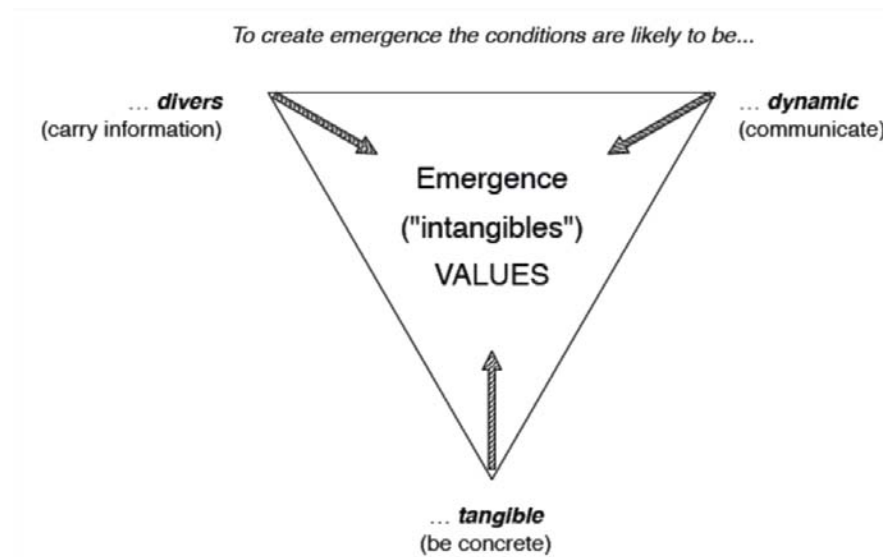


Figure 1: Basic conditions for emergence

This definition of intangibles might look complicated but one can feel its practical use easily. Imagine listening to a piece of music, say a pianist playing a Beethoven Sonata. How does beauty ‘emerge’. Obviously to experience this you need a number of things: time or movement; a good pianist; and, of course, a piano. The pianist and the piano are pretty tangible. So far time and tangibles are covered. But where is the aspect called diversity? A musician needs structure to anchor himself into a rhythm, but a good musician never plays a piece exactly the same way twice and no two musicians play even a tightly scored piece identically. Good musicians always play around, experiment, make mistakes. They break rules every second to create the music. You can prove this by asking our pianist to play the sonata with a metronome. You will immediately hear that the beauty (the emergent characteristic between you as a listener and the piano) has disappeared. The performance is not attractive but mechanical.

This is an example of how a lack of diversity kills emergence. Rules, procedures and all kind of norm-controlled repetitive structures block the process. Without some “messiness” there can no emergence.

### **The growth-curve and the time window for optimal emergence**

In the next section we look at the well-known growth-curve or S-curve which we use to explain the process of emergence and its inevitable failure (Modis, 1998, van der Erve, 1994, Robertson, 2005). The connection between the S-curve below and the triangular model addressed above will become clear in the paragraphs below.

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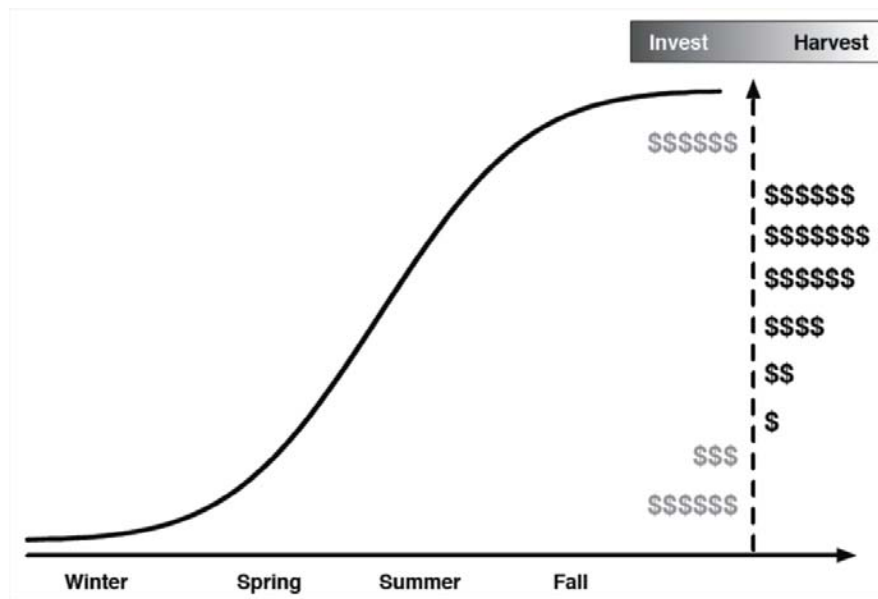


Figure 2: The Growth-Curve

The S-curve is in general used as a standard model for growth and Modis' (1998) metaphor using the seasons of the year to describe its main characteristics is accepted and used widely. The dollar signs in the picture symbolize phases of investment and phases of harvest.

Everything seems to emerge from seeming nothing to seeming something. Attractors like values are no different from other living systems. Time always drives this process in one direction, moving from feed-forward-steering to feed-back-control. At the beginning of a growth-curve there is very little tangibility. Growth and emergence start through a highly diverse range of options and possibilities, which Beinhocker (2006) calls the design space. Then stability increases and growth and emergence start to become faster and easier. Feed-back-control (=structure, repetition) is created and as this increases, the dynamism of the systems and thus growth and emergence slows down. Finally so many feed-back loops are added that diversity, time and movement fail, emergence stops and the system dies.

The figure below (figure 3) illustrates the changing characteristics of each phase. The left column of words relates to the beginning and first half of the growth-curve and the right column of words relates to the end and second half of the growth-curve. The arrow in the picture illustrates a continuous relationship between growth and the change in the cybernetical make-up of the growth-curve.

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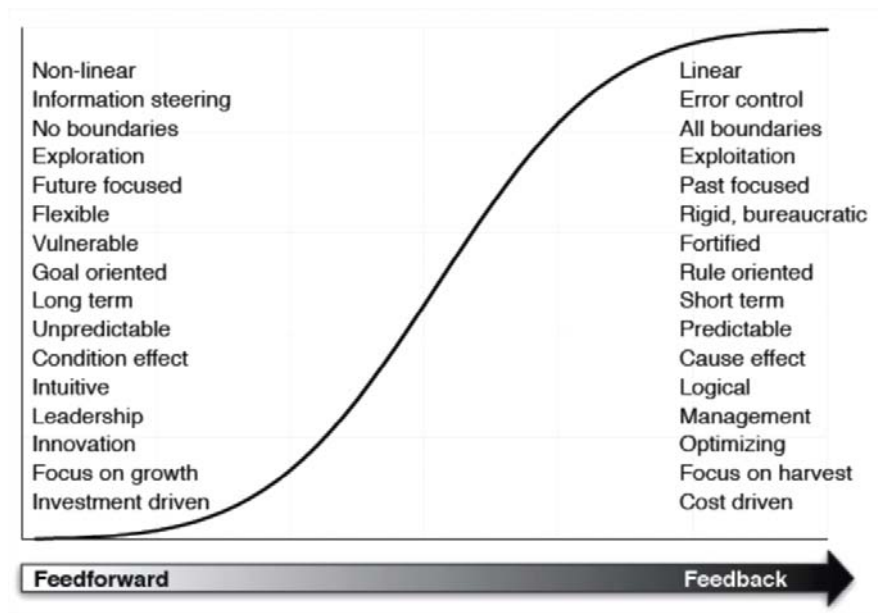


Figure 3: The change in dynamics in the Growth-Curve

If we look back at the conditions of emergence and the triangular representation explaining the physics of intangibles you can see that it is difficult to create emergence at the beginning of the growth curve because there are too few tangibles and too much diversity (=more or less chaos). You lack a pianist and piano. By contrast, at the end of a growth-curve, there are too many heavy tangible things, too much structure and almost no dynamism and no diversity. The metronome rules! It is around the middle part of a growth-curve that the conditions for creating emergence are optimal. This can be illustrated by the following diagram.

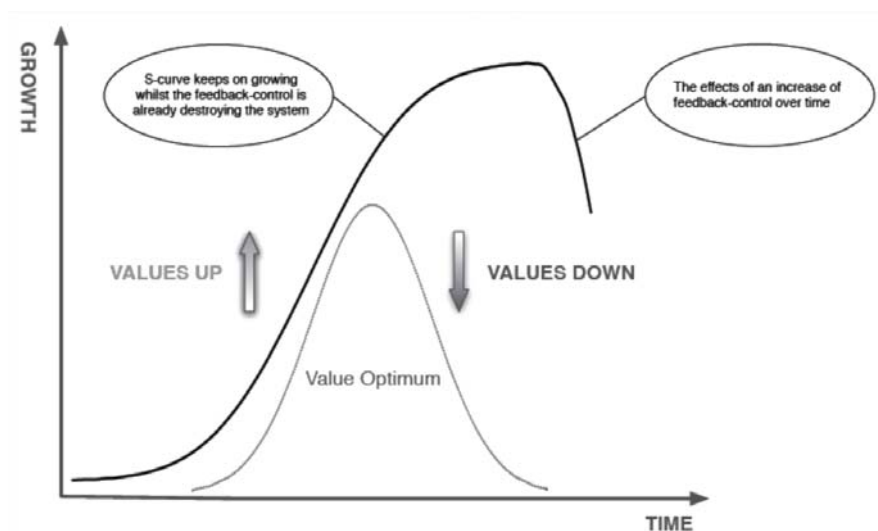


Figure 4: A proposed law of optimal emergence

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This dynamic pattern shows that emergent properties such as values are always on the move along the path laid out by the growth curve. It is proposed to explore this dynamic pattern as a law, also based upon research finding similar patterns and relationships; see Lietaer, Ulanowitz & Goerner (2008), Van der Erve (1994) and Boisot & McKelvey (2010). As a person, a leader or as part of an organization, one has to work hard to create values. Once all your dreams come true (= tangible) the very same process that created the emergent values will destroy them. This is inevitable. So, there is only one solution it seems: give up the old heavy, 'metronomic' system and start a new growth-curve.

Occupy versus The Tea-Party; Democrats versus Republicans; innovators versus investors. Binary oppositions are endemic to human society. By contrast, the law of optimal emergence proves that there is a need for cooperation rather than war between all two 'party' systems. The key question is whether any two 'party' system is capable of behaving ecologically in the long term or, rather, whether they lurch from explosive crisis to explosive crisis such as economic recessions, bankruptcies, social unrest and even civil wars. It might well be that a viable social system should involve a much larger number of parties or pressure groups who struggle within an ecosystem, balancing each other out and preventing the system from derailing.

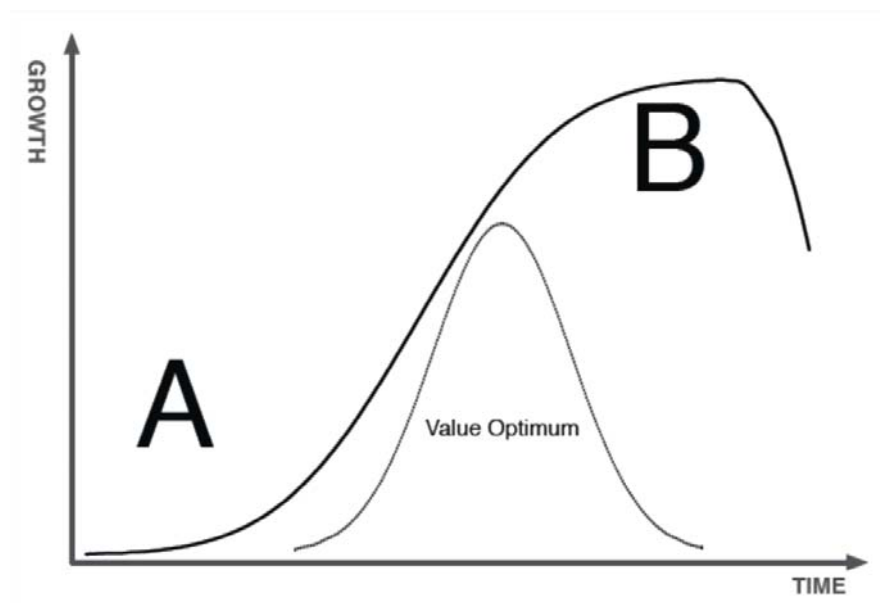


Figure 5: Polarization Examples

Large polarizations in the world, mentioned earlier, are often the result of the clash between feed-forward and feed-back control. You can use the picture above and fill in for "A" or "B" whatever you want: Inventors (A) versus Investors (B), Democrats (A) versus Republicans (B), Artists (A) versus Technologists (B) or any other binary division. In other words they involve an opposition between the beginning and the end of the process of growth and emergence. Both groups feel they are right (and they may well be) but rather than seeing themselves fighting each other, society at large could benefit more if the conflicting groups could see that they are fundamentally connected, contributing to different phases of growth-curves. The opposites are not divided by space, they are

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connected by time. Such oppositions leave a big “execution gap” in the middle of the growth curve and the result is that not much gets done while a lot of heat is generated.

To prevent the decline of values and to optimize the real added value of “the two opposites” the only effective strategy is “surfing the waves of time” or, less poetically, jumping S-curves by continual transformation rather than sticking with the S-curve until growth dies. When you do this B can contribute a sense of reality while A can innovate.

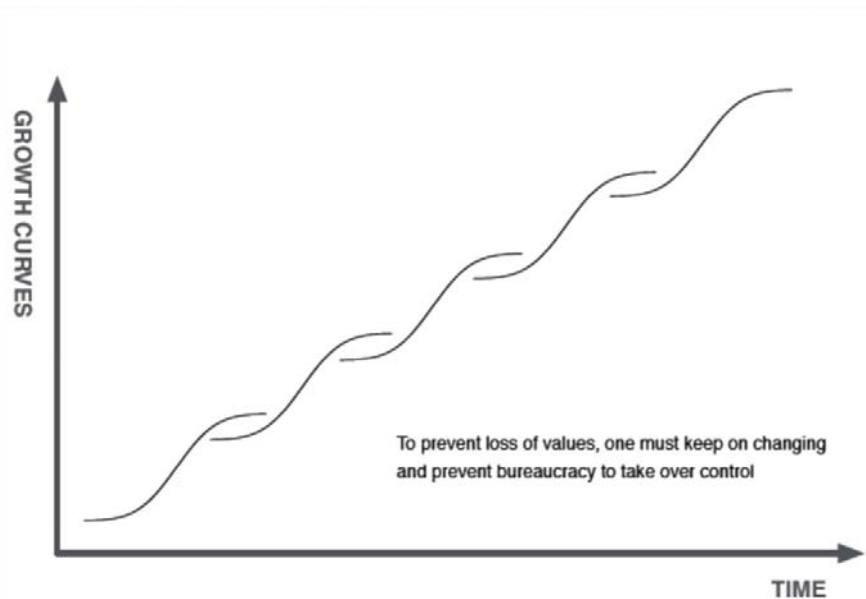


Figure 6: Permanent Change is Essential for keeping Values alive

To summarize: the law of optimal emergence shows how systems inevitably destroy their values. Values are self-organizing emergent characteristics of a system inseparably connected with the viability of a system. We recognize them as patterns, with no cause-effect relationship but a condition-effect relationship between their constituent dynamic parts and the emergence itself. Time always drives in one direction and will create and kill values through the same process, involving the shift from feed-forward-steering to feed-back-control.

A similar account of this optimum of emergence is described by Lietaer, Ulanowitz and Goerner (2008), Van der Erve (1994) and Boisot & McKelvey (2010). Lietaer et al developed a sustainability curve that looks very much like the curve showing the dynamic of optimal emergence. On the left they call their phase “Resilience” as a combination of diversity and interconnections. This is precisely what could be called the more exploratory, feed-forward driven context of the growth-curve where tangibles and a certain level of diversity are essential. If there is complete diversity, there is basically chaos and nothing can exist. On the right hand side they define the sustainability curve as efficiency or streamlined. That is where, on the S-curve, a lot of structure and feed-back-control comes into play and, as with the S-curve, a maximum of efficiency will lead to destruction of the eco-system. Lietaer, Ulanowitz and Goerner have developed this observation mathematically (Ulanowitz, 2009). Van der Erve (1994) developed a similar

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model and connected this more dynamically with the growth-curve concept (van der Erve 1994). Boisot and McKelvey (2010) used a complexity interpretation of Asbhy's law of Requisite Variety to define "the Asbhy Space" which is again, another but basically similar perspective on the optimum conditions for creating emergence and attractors in a complex-dynamic system.

In this paper elements are added including time which drives growth in only one direction and the connection with values (and other traditionally reified phenomena). In a complex and sustainable ecosystem it is the whole diversity of the constituent parts in different phases of S-curves that keeps a system viable. Underlying the sustainability-curve there is a whole ecosystem of S-curves in different stages renewing themselves all the time. As soon as those S-curves start to resonate in a single phase, i.e. they are all in the same stage, the whole system will become weaker, because the diversity is lost.

A second, linked question which returns to the opening of this paper, will now be addressed. We have referred to how this process works in systems in general, nature and organizations, but why do individuals, most specifically leaders, follow the same path leading to the loss of values? The answer, for which we needed the large digression in this article, is that our mind, is an emergent property of our brain (Libet, 2004): our mind is an ecosystem within the larger ecosystem. Our minds follow exactly the same ecological process as organizations or any other living system.

So we can answer that early question by stating that the corruption we saw in the financial collapse was not the result of bad personalities, but was an unavoidable characteristic of nature and of the minds of the leaders driving that very industry. Good people inevitably do bad things because of the way ecologies work. It is, therefore no surprise that the most famous examples of value-driven leadership (such as Gandhi, Lincoln and, in more recent times Aung San Suu Kyi) instinctively (or ecologically?) kept themselves away from creating any excess number of feed-back-loops in their mind by detaching from possessions and signs of status as possible. What you possess possesses you. This last sentence is also an example of how dangerous language is: this sentence is only describing a loop and not a Cartesian "you" existing somewhere and possessing something! It is just a feedback-loop and for that reason, in excess of them, so dangerous for the emergence of the ecosystem whether that is human values or the organization it is part of.

Perhaps business school students should not focus on learning to become better leaders (they were probably already good when they entered and passed the selections) but need to learn how natural processes underlie leadership derailment. They need to learn ecology.

### **Conclusions and suggestions for further thinking.**

This paper moves towards an understanding that the mind is an ecosystem which is part of a larger ecosystem, and is subject to the laws and rules of ecology. The paper builds on the ideas of those who propose a paradigm shift from the model of a representative-brainbound mind towards a performative-extended mind. The focus on the hardwired

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constitution of the brain is used to add evidence for the model that the brain itself is designed to have the mind outside herself as an emergent phenomenon created by both internal patterns (connections) and external data.

Systems are strongly emergent (creating, on a behavioural level, what has been called attractors) and as such our brain is part of a system creating attractors. In this account, human values are, being attractors, a subset of those strong emergent characteristics.

As a consequence of this, human values can only exist within the same window of viability of any other ecosystem: that is, when there is a balance between diversity, dynamic and material (=behavioural) constituent parts or in other words within the boundaries of an “ecological space” between “too much diversity” and “streamlined efficiency”. Because growth drives any system towards streamlined efficiency, all growth drives values out of any system (i.e. towards “streamlined efficiency” where values cannot emerge). For this reason, a sustainable eco-system for values emergence should have a highly diverse set of subsystems in different stages of the growth-curve in order to keep the diversity just high enough to be sustainable. It seems to be a general principle that systems of this sort support values-failure at all levels of the organization. This principle of “value-failure” cannot be “cured”, but it can be dissolved in diversity: if there are enough constituent processes (smaller and shorter growth-curves) chances are that the whole system self-organizes as a healthy (read “value-driven”) ecosystem. The solution is NOT to “manage the person” with methods such as more policing or more restrictive rules (which would lead to more stability more rigor and faster collapse). Rather, the optimal approach suggested here is to “manage the organisation” to shake it up to reorganize it to create the impetus for multiple s-curves. Other approaches would be to “manage the environment” by creating some new stimulation in other areas. Based upon this notion it seems that over-controlled, efficient, streamlined, bureaucratic systems are not promoting the existence of values or, in other words, are simply not-self-sustainable systems. This is what Franz Kafka (1999) described almost a century ago in ‘The Trial’ a novel set in a nightmare bureaucracy. An ecological view on bureaucracy seems to confirm his observations.

This paper provides a proposition towards developing an underlying grammar for scientifically tackling a huge number of human issues: ones which before this breakthrough in our understanding of the brain and mind seemed to be the province of discursive philosophy, theology and theories of citizenship, the law and politics. Put simply we can see that the mind is one element in an engine which creates emergence. Growth both starts and stops emergence and the conditions for creating long-lasting emergent properties (attractors) can be analysed using the proposed law as described. This grammar is ecological. By understanding how this process works we can begin to suggest practical strategies to address critical problems,

We have looked at how inevitable loss of values led to financial collapse but this is only one area which this grammar of emergence and the performative-extended view of the mind can be applied. Other organizational and business areas are cases in point: the creation of conditions for the emergence of genuinely customer-oriented cultures and the creation of brands are instances. So are issues of public policy such as the encouragement

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of healthy lifestyles, anti-smoking campaigns and decreasing tax avoidance. Issues of anti-social behaviour and crime are obviously amenable to an ecologically based approach. In cybernetics this account is beginning to bear fruit. While hard AI approaches seem to have stalled, projects applying evolutionary and emergent processes to very simple base components seem to be bearing fruit in machines which learn through adaptation to their environment. The new performative-extended mind model has an obvious application in various branches in psychology. It calls into question many aspects of the multi-billion dollar psychometrics industry, suggesting different processes and different measurement parameters. It can cut through the fundamental binary genetics vs. environment debate about the nature of mental illness which still rages. And it would make sense that the most fundamental problem facing us should be addressed by an ecological view of human minds and brains. Bureaucratic legislation does not seem to be energizing our critical reaction to environmental destruction and global warming. Understanding and applying the processes of growth, emergence and related topics will help to develop more effective strategies. Global norming is not the answer to global warming.

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### References

- Arkin, R.C. (1998). *Behavior Based Robotics*. Cambridge: Massachusetts Institute of Technology Press.
- Badaracco Jr, J.L. (1997). *Defining Moments: When Managers Must Choose Between Right and Right*. Boston: Harvard Business School Press.
- Bateson, G. (1973) *Steps to an Ecology of Mind*. London: Granada Publishing.
- Beinhocker, E.D. (2006). *On the Origin of Wealth*. Boston: Harvard Business School Press.
- Boisot, M. & McKelvey B. (2010). Integrating Modernist and Postmodernist Perspectives on Organizations: A Complexity Science Bridge, *Academy of Management Review*, 35, 3, 415–433.
- Brooks, R. (1991). Intelligence without Representation. *Artificial Intelligence*, 47, 1–3, 139–159.
- Brooks, R. (1999). *Cambrian Intelligence. The early history of the new AI*. Cambridge: Massachusetts Institute of Technology Press.
- Brooks, R. (2002). *Robot: The future of flesh and machines*. London: Allen Lane.
- Clark, A. (2011). *Supersizing the mind: embodiment, action, and cognitive extension*. New York: Oxford University Press.
- Clark, A. & Chalmers, D. (1998). The Extended Mind. *Analysis*, 58, 1, 7-19.

Why Top Executives derail; A performative-extended mind and a law of optimal emergence

- Donaldson, T. & Dunfee, T.W. (1994). Toward a Unified Conception of Business Ethics: Integrative Social Contract Theory. *The Academy of Management Review*, 19, 2, 252-284.
- Goerner, S.J. (1994). *Chaos and the Evolving Ecological Universe. The world Futures General Evolution Studies, Vol. 7.* Luxembourg: Gordon and Breach Science Publishers.
- Goertzel, B. (1994). Chaotic Logic: Language, Thought, and Reality from the Perspective of Complex Systems Science. *IFSR International Series on Systems Science and Engineering*. Berlin: Springer Verlag.
- Goldstein, J. (1999). Emergence as a Construct: History and Issues. *Emergence: Complexity and Organization*, 1, 1, 49–72.
- Gordon, D.M. (2010). *Ant Encounters. Interaction Networks and Colony Behavior.* Princeton: Princeton University Press.
- Gribbin, J. (2005). *Deep Simplicity: Bringing Order to Chaos and Complexity.* New York: Random House.
- Jensen, M.C. & Meckling, W.H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure, *Journal of Financial Economics*, 3, 4, 305-360.
- Jensen, M.C. (2004). The Agency Costs of Overvalued Equity and the Current State of Corporate Finance, *European Financial Management Journal*, 10, 4, 549-565.
- John, E.R. (2005). From synchronous neuronal discharges to subjective awareness? In: *Steven Laureys (editor), Progress in Brain Research*, Vol. 150, 143-171  
Amsterdam: Elsevier.
- Kafka, F. (1999). *The Trial.* A new Translation based on the restored text. New York: Schocken Books.
- Kets de Vries, M. (2009). *Reflections on character and leadership.* London: John Wiley and Sons.
- Lamme, V.A.F. (2010). How neuroscience will change our view on consciousness. *Cognitive Neuroscience*, 1, 3, 204-220.
- Lewes, G.H. (1875) *Problems of Life and Mind, Vol. 2.* London: Kegan Paul, Trench, Turbner.
- Libet, B. (2004) *Mind time: The temporal factor in consciousness.* Cambridge: Harvard University Press.
- Lietaer, B., Ulanowitz, R. & Goerner, S. (2008). *White Paper on All the Options for Managing a Systemic Bank Crisis.*  
Retrieved from [http://www.er.ethz.ch/inspire/systemic\\_bank\\_crises](http://www.er.ethz.ch/inspire/systemic_bank_crises)
- Machiavelli, N. & Donna, D. (1966). *The Prince and Selected Discourse.* New York: Bantam Books.
- McLean, B. & Elkind, P. (2003). *The Smartest Guys in the Room.* New York: Penguin Group.
- Mill, J.S. (2001). *Utilitarianism.* Indianapolis: Hackett Publishing Company.
- Modis, T. (1998). *Conquering Uncertainty: Understanding Corporate Cycles and Positioning Your Company to Survive the Changing Environment.* New York: McGraw Hill.
- Moss, F. (2011) *The Sorcerers and their Apprentices. How the Digital Magicians of the MIT Media lab are creating the Innovative Technologies that will transform our lives.*

Why Top Executives derail; A performative-extended mind and a law of optimal emergence

New York. Random House.

Noë, A. (2009). *Out of our Heads. Why you are not your brain and other lessons from the biology of consciousness*. New York: Hill and Wang.

Nunez, P. L. (2010). *Brain, mind and the structure of reality*. New York: Oxford University Press.

O'Connor, J. & McDermott, I. (1997) *The Art of Systems Thinking, Essential Skills for Creativity and Problem Solving*. San Francisco: Thorsons.

O'Loan, O.J. & Evans, M.R. (1998). Alternating steady state in one-dimensional flocking. *Journal of Physics A: Mathematical and General*, 32, 8.

Pickering, A. (2010). *The Cybernetic Brain. Sketches of another future*. Chicago: University of Chicago Press.

Piff, P.K., Stancato D.M., Côté, S., Mendoza-Denton, R. & Keltner, D. (2012). Higher Social Class Predicts Increased Unethical Behavior. *Proceedings of the National Academy of Sciences of the USA*, 109, 11, 4086–4091.

Popper, K. & Eccles J. (1977). *The Self and its Brain*. Berlin: Springer-Verlag.

Pribram, K.H., Gill, M.M. (1976). *Freud's 'Project' Re-assessed: Preface to Contemporary Cognitive Theory and Neuropsychology*. New York: Basic Books.

Reynolds, C. W. (1987). Flocks, herds and schools: A distributed behavioral model. *Proceedings of the 14th annual conference on Computer graphics and interactive techniques*, 25 - 34

Robertson, P.P. (2005). *Always Change a Winning Team*. Singapore: Marshall Cavendish.

Robertson, P.P. (in press). *De Ecologische Leider. De natuurlijke cyclus van kernwaarden en organisaties*. Amsterdam: Business Contact. (Proposed English title “The ecological leader. The natural cycle of core values and organizations”).

Schwartz, S.H. (1992). Universals in the content and structure of values: Theoretic advances and empirical tests in 20 countries. *Advances in Experimental Social Psychology*, Volume 25. Orlando: Academic Press

Smith, G. (2012). Why I am leaving Goldman Sachs. *The New York Times*. March 14<sup>th</sup>.

Sporns, O. (2011). *Networks of the Brain*. Cambridge: Massachusetts Institute of Technology Press.

Stear, R. (2009). *Ethicability*. London: Roger Steare Consulting.

Steinbeck, J. (1945). *Cannery Row*. New York, NY. Penguin Group USA

Ulanowicz, R.E., Goerner, S.J., Lietaer, B. & Gomez, R. (2009). Quantifying sustainability: Resilience, Efficiency and the Return of Information Theory. *Ecological Complexity* 6, 27-36.

Union of International Associations. (1907-2012a) Derived from <http://www.uia.be>.

Union of International Associations. (1907-2012b) Derived from <http://www.uia.be/rationale-0>

Union of International Associations. (1907-2012c) Derived from <http://www.uia.be/human-values-project-commentaries?kap=10>

Van der Erve, M. (1994) *Evolution Management*. Oxford: Butterworth-Heinemann.

Varela, F.J., Thomson, E. & Rosch, E. (1993). *The Embodied Mind*. Cambridge: Massachusetts Institute of Technology Press.

Walter, G. (1950). Imitation of Life. *Scientific American*, 182, 5, 42-45.