

CONCEPTUAL PAPER

Questioning the epistemic virtue of strategy: The emperor has no clothes!

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ABSTRACT

A critical analysis of contemporary strategic management theory and practice suggests that modernist, linear thinking has facilitated the development of an abstracted reality which is misleading to managers and fundamentally flawed. It is argued that formulaic strategic tools such as those propounded by Porter fail to capture the reality of the complex environments that confront firms and falsely suggest that an answer can be derived from a predetermined toolbox.

As an alternative to this dominant paradigm, the complexity of markets is presented not as something to be feared and ignored, but rather as a truth to be embraced. As a basis of taking this step, current knowledge on how complex environments work, perspectives on how they can be better understood and how people and organizations can engage within them, is presented. Ultimately it is recognised that both theoretical and practical foundations need significant, further development.

Keywords: chaos, complexity, epistemology, equilibrium, modernism, paradigms, self-adapting systems, strategy

INTRODUCTION

Organizations throughout the neo-liberal, Anglo-American world, irrespective of size are struggling with the concept of business strategy. Specifically; what it is? What value does it have to the organization and how it should be constructed? These conundrums have developed because the rapidity of change in the organizational

domains and environments has rendered many of the tools of 'Strategic Management' unworkable. This paper will utilise Porter's (1980) concept of the 'Five Forces Model', which is the subject of the first chapter of his 1980 work, to demonstrate that the linearity of this type of thinking has no value for theory in a 'complex' environment. It has been reduced to dangerous dogma in the

pedagogy and praxis of Strategy and must be consigned to the history books.

The first of the significant problems is the failure to recognize and understand the need to change the core epistemic paradigms within which strategy is formulated. Business strategy is a 'Modernist' project, directly represented by the almost universal use of the scientific paradigm which has been relied upon to provide both methodology and structure to the questions of strategy, especially its fundamental nature (Parker, 2002). However, the Radical Humanist approach, specifically the concept of Critical Theory outlined by Burrell and Morgan (1993) might present a better approach. In addition, there is a need to re-examine the system theories which underlie business strategy, especially the concept that almost all management theory is embedded in an epistemological perspective whereby the firm is treated as a closed system, specifically a Cybernetic system (Von Bertalanffy, 1969). There is evidence that the firm should be understood as an open system, specifically as a complex, self-adapting system (Stacey, 2000a) and many management writers do not understand the implications for management theory if firms are such complex, self-adapting systems.

THE IMPLICATIONS OF A CRITICAL EPISTEMOLOGY

Many philosophers have argued that all truths must belong to two logical types, truths of reasoning or truths of fact (Magee, 2001). From an empiricist perspective, David Hume (1711–1776) explored causality and in doing so created the problem of induction. The consequence is that little certain knowledge can be gained by inductive reasoning. Using the scientific method it is necessary to formulate a theory and then attempt to falsify it. 'Popper's theory of demarcation is based upon his perception of the logical asymmetry which holds between verification and falsification: it is logically impossible to conclusively verify a universal proposition by reference to experience (as Hume saw clearly), but a single counter-instance conclusively falsifies the

corresponding universal law. In a word, an exception, far from 'proving' a rule, conclusively refutes it (Popper, in Thornton, 2009).

The consequence of these ideas is that there is very little that we can be certain of even by the exhaustive and repetitive use of the scientific method. Something Porter (1980) and the industrial organization (IO) economists clearly refuse to recognise! Sometimes even scientists and mathematicians forget the problem of induction. In discussing the nature of mathematical problems that are iterative, Gleick (1993) makes the observation that:

Astronomers did not achieve perfection and never would, not in a solar system tugged by the gravities of nine planets, scores of moons and thousands of asteroids, but calculations of planetary motion were so accurate that people forgot they were *predictions* ... Scientists marching under Newton's banner actually waved another flag that said something like this: Given the *approximate* knowledge of a system's initial conditions and an understanding of natural law, one can calculate the *approximate* behavior of the system. (Gleick, 1993, pp. 14–15)

Given a specific starting point, the system will unfold the same way each time. Given a slightly different starting point and the system will unfold in a slightly different way. Computers rely on the same assumption when solving problems and economic forecasters also rely on the same assumption. But underneath are a set of constructs that are essentially linear and in the case of economists the problem is exacerbated by being shackled to the equilibrium assumption – another linear construct. If the system is non-linear, the 'complex-systems' construct of 'sensitive dependence on initial conditions' will move the system rapidly away from equilibrium.

In practice, econometric models proved dismally blind to what the future would bring, but many people who should have known

better acted as though they believed in the results. Forecasts of economic growth or unemployment were put forward with an implied precision of two or three decimal places. Governments and financial institutions paid for such predictions and acted on them. ... But few realized how fragile was the very process of modelling flows on computers, even when the data was reasonably trustworthy. (Gleick, 1993, p. 20)

This assumption lies at the core of science and it is the epistemic virtue of the scientific method as the paradigm for investigating management theory that is questioned in this paper. The foundation for the ideas of business strategy was developed by the early management writers and economists in a philosophical environment where businesses were seen as linear systems and this is one of the fundamental reasons for the debate and controversies in the subject of management. However, the dynamic changes in the economic environment, the perceived breakdown of the efficacy of some strategic theory, and an understanding of other systems approaches from the hard sciences, together with philosophical ideas of epistemology and ontology, have led many organizational and management scholars to question whether the linear paradigm is the best framework within which to set the ideas of management (Camillus, 1996; French, 2009; Hamel, 1996; Hamel & Prahalad, 1995a, 1995b; Kouzmin & Jarman, 1999; Kouzmin, Leivesley, & Korac-Kakabadse, 1997; Mainwaring, 1997; Mintzberg, 1994; Mintzberg, Ahlstrand, & Lampel, 1998; Parker, 2002; Thompson, 1967; Westley & Mintzberg, 1989; Whittington, 1993). Most of the work conducted in the field of strategy has been set in an epistemological paradigm that is essentially Modernist (Parker, 2002, p. 123). But alternative epistemological paradigms exist, within which the ideas of strategic management can be developed, specifically Critical Theory.

In the early 1980s, business strategy was suddenly re-directed by the influence of IO economists shackled to the equilibrium assumption and

their ideas have been summarised as contributing to a school of strategic thought (sic) understood as the Positioning School. IO is a branch of economics that considers the behaviour of firms within industry groups, maintaining that a firm's performance depends on the interactive relationship between the number and distribution of firms in a market and the behaviour they exhibit (Shivasharan & Shashidhar, 2005). Porter (1979, 1980, 1985, 1991, 1997) exemplifies this view that the fiction of the marketplace as an impersonal arbiter of social activity is at the heart of New Right ideology. But there is a crucial mental leap between the individualism used by management to view the organization and the individualism of actors in market economics, which reveals the ideological nature of this faith (Kouzmin, Korac-Kakabadse, & Jarman, 1996).

In contrast to the ideas of complexity, the current dominant ideas of strategy are still those of the Positioning School (Mintzberg et al., 1998). Ezzamel and Willmott (2004) and Levy, Alvesson, and Willmott (2001) agree that the field of strategy is still being dominated by the Modernist conceptions of strategy formulation and implementation, exemplified by Porter (1979, 1980, 1985, 1991, 1997) Positioning School thinking. Minimal attention is neither paid to the institutional context, within which strategic decisions are made nor of any of the characteristics of the people. Porter's world is devoid of people.

Close analysis of Porter's work and subsequent developments provides considerable fuel for critical theorists ... as it highlights the contradictions between the idealised myths of 'perfect competition' and the more grounded concepts of market power. (Levy et al., 2001, p. 5)

However, while Porter's ideas remain dominant, we suggest it is because managers are looking for an easy way out. The Classical Planning school abrogates strategy creation to the 'planners' and the Positioning school to the 'analysts'. Harfield (1998, p. 3) extends this conception by claiming that the entry of the economists allowed

managers to abrogate their responsibility for creating strategy even further: by 'letting the markets do the thinking ... the market becomes the most effective form of weeding out efficiency or lack of adaptation'. The IO economists argued that only a few key strategies, explicit as positions in the market that could be defended against competitors and potential competitors, could provide competitive advantage. This is clearly a concept dominated by the equilibrium assumption.

Economists study complex economic systems by constructing drastically simplified models of economic behaviour, based on incompletely verified time and space evidence, in order to derive partially intuitive judgments about the past and future consequences of changes in the social and political context of economic activity. (cited in Fitzgerald, 1990, p. 24)

Firms that occupy the prime positions could command higher profits than other firms in the market and hence would have the economic power to influence the market. Consequently, there is only a limited number (or number of categories) of strategies that are useful – i.e. their Generic strategies. Positioning School companies could choose between only two Generic strategies – Differentiation and Cost Leadership – and these could be achieved in either a broad or a focused fashion. Other options would leave a company 'stuck in the middle'.

The application of the Generic strategies was managed by a process of analysis and many analytical tools were developed. The concept of Generic strategies was not new; though McKiernan (1996) suggests that the Positioning School ideas started with Chamberlin in the 1930s, Mintzberg et al. (1998) propose that the strategies of the early military thinkers were essentially generic. In discussing Sun Tzu and von Clausewitz, Mintzberg et al. (1998, p. 85) suggest that these military thinkers 'delineated types of strategies and matched them to the conditions that seemed most suitable'. In an earlier work, Mintzberg, Quinn, and Voyer (1995) describe at some length the strategies of Alexander

the Great and relate them directly to the strategies of many war leaders through the centuries and into the modern era. They put forward that many modern practitioners utilised classical principles of strategy dating back to the Greek era. Perhaps one of the most startling analogies is that between the battle strategies of Patton and Rommel in World War II and those of the Macedonians, which were almost carbon copies of each other – i.e. planned concentration, rapid breakthrough, encirclement, and attack at the rear of the enemy – the same generic strategies, which in the context of World War I, were such dismal failures.

Ohmae (1982, 1985) has much to discuss about competitive position, particularly the competitive positioning of successful Japanese companies. It is his view that the theories abounding in economic and economic policy circles concerning the importance of position have *not* been the drivers of Japanese success. He believes that strategy is not about beating the competition but about satisfying customer needs. Still further, Deming (1986) expounds a fundamental concept when exhorting his audience to consider the concept of competition. It is his argument that people must learn to cooperate with others and to compete with themselves. In the context of strategy, the ideas of Ohmae and Deming, regarding the importance of customers is most important. Concepts of competition and market share are of little use to the business principal and as a consequence there is very little that the philosophies of the Positioning School can add to their strategy knowledge base. As with Ohmae's Japanese corporations, competitive advantage is driven by the ability to serve the needs of customers better.

In addition to Generic strategies, Porter (1980, 1985) developed several other modular concepts, of which the Five Forces Model which he introduced in chapter one of his (Porter, 1980) text is an example. It is chosen as the main subject for criticism in this paper because at least he moves from only two constructs, required for the Generic Strategies concept, to five factors. How is it possible that for nearly three decades, managers

have accepted that the strategic domain of a firm, whether a single operator firm to a multinational corporation could be reduced to five forces?

Porter (1980) suggested that the task facing managers is to analyse competitive forces in an industry's environment. He claimed that only five forces needed consideration. Porter (1980) argued that the stronger the manifestation of each of the forces, the more limited the ability of established companies to raise prices and to earn greater profits. This is pure Modernist, Neo-economic thinking. The simplifying and 'blinding' role of externalities in economics, blinds Porter (1980) who is unable to postulate the role of government, or de-regulation, in his five-factor positioning model at the very time he was proselytizing the case of the US Airline industry under severe conditions of Reaganite, ideological de-regulation of that industry.

Porter preaches that many of these intangible forces are measurable and that, in addition, there is a 'chain of causality that runs from competitive environment to position to activities to employee skills and organization' (Porter, 1997, p. 162). This causal argument is further pursued with Porter (1985) concepts of the Value Chain. The Value Chain analysis is based on the simple linear idea that every activity performed in an organization will add some value to the final products or services produced. The final product is simply the aggregate of values contributed.

The Positioning School is still claimed by some (Ezzamel & Willmott, 2004; Levy et al., 2001) as the dominant force in strategic management. The premises of the Positioning School are that strategies are generic, explicit as positions in the market place, which is economic and competitive. Strategy formulation is limited to the selection of one of these positions based on analytical calculation. Planners are replaced by analysts who influence managers to plan and implement. The Positioning School does not have a theory of strategy creation (Hamel, 1997). Strategies already exist, perhaps like Plato's 'Forms', and the unknowns are supplied by analysts utilising generic tools from the school's philosophical armoury.

The Positioning School took big ideas from macro economic concepts and applied them to single firms. Consulting firms flourished as analytical tools and prescriptive models were developed. Porter (1997) continues to consider strategy creation as a deliberate and deductive process; he does not appear to recognise the existence of strategic learning, cognition, or strategic emergence.

If strategy is stretched to include employees and organizational arrangements, it becomes virtually everything a company does or consists of. Not only does this complicate matters, but it obscures the chain of causality that runs from competitive environment to position to activities to employee skills and organization. (Porter, 1997, p. 162)

Mintzberg et al. (1998, p. 119) respond to this by asking two fundamental questions that might be replicated by many of the scholars from outside the Classical Schools, especially with a Critical epistemological approach:

What is wrong in seeing strategy in everything a company does or consists of? and why must there be any such chain of causality at all, let alone having to run in one direction? (Mintzberg et al., 1998, p. 119)

This second question on directional causality is highly significant to this paper because directional causality is a feature of linear systems, although even this was questioned by David Hume (1711–1776) and accepted by many as the 'problem of induction' (Russell, 1946).

EXPLORING EPISTEMOLOGICAL OPTIONS

Much of the work of Modernist scholars can be seen as 'an attempt to develop knowledge about how we and others should behave through employing some version of the scientific method' (Parker, 2002, p. 106). However, the Modernist concept that all things are knowable is not rational in the Complex Self-adapting System paradigm, within which ideas of emergence are rational. In a complexity paradigm, answers to questions such as

what the future might be like, and that are rational in a Modernist paradigm, cannot be known. In the wider literature of organization theory, several writers have explored the fundamental paradigmatic concepts. Kuhn (1970), a historian of science, explored the development of scientific thought and also the paradigmatic changes that would be necessary to underwrite those ideas. Burrell and Morgan (1993) developed a matrix containing four differentiated paradigms, within which the ideas of the social scientists could be developed.

Burrell and Morgan (1993) provide an introduction to some of the ontological and epistemological paradigms that have influenced organizational and management thinking, particularly within the wider subject of organization theory. They propose a four-element matrix which contains four fundamental epistemological paradigms.

Functionalist

The Functionalist view is that all the theories of organization are based on a philosophy of science and a theory of society, which Burrell and Morgan (1993, pp. x–xi) suggest ‘seemed to recur time and again’. Each of the four paradigms represents four different sets of assumptions. There is some overlap between Burrell and Morgan (1993) paradigms of Functionalist and Interpretive and Parker (2002) Modernist Paradigm. The Functionalist paradigm generates regulative sociology in its most fully developed form and seeks to provide rational explanations of social affairs and to emphasise the importance of maintaining order, stability, and equilibrium (Burrell & Morgan, 1993). These are exactly the objectives of the Plan/Control theory of the classical strategists and economists and the characteristics of the Modernist epistemological paradigm.

Interpretive

Interpretive is the second of Burrell and Morgan (1993) paradigms. From the context of the matrix, this paradigm is regulative but more subjective than the Functionalist paradigm. The

ideas contained within this paradigm are firmly rooted in the German idealist tradition, owing much to Kant (1724–1803), where the concepts of the spirit, mind, intuition, and idea are more important than data. It is these uncomplicated assumptions that underlie the whole of German idealism. The Functionalist position came to be seen as increasingly unsatisfactory because human values intruded upon the process of scientific enquiry.

Four distinct but related categories of Interpretivist thought are distinguished largely by their ‘subjectivity’: solipsism; phenomenology; phenomenological sociology; and hermeneutics. However, discussion of these specific ideas is outside the reference of this paper.

Radical Humanism

Radical Humanism is the paradigm that is both subjective and desirous of change and is consequently the paradigm furthest away from a Functionalist, Modernist perspective. It has its intellectual roots in the same Germanic idealism as the Interpretivist paradigm. However, rather than the Kantian (1724–1803) notions of spirit, mind, intuition, and idea, ‘Marx (1818–1883) ... laid the basis for Radical Humanism ... which place[s] the individual rather than ‘absolute spirit’ at the centre of the stage’ (Burrell & Morgan, 1993, p. 238). The link between Interpretivism and Radical Humanism is Solipsism, which in its ‘most extreme form of subjective idealism ... denies that the world has any distinct independent reality’ (1993, p. 238). The other three categories of Radical Humanism are: French existentialism; anarchic individualism; and critical theory.

Critical Theory is the least subjectivist of the Radical Humanist paradigm. It seeks to ‘operate simultaneously at a philosophical, a theoretical and a practical level’ (Burrell & Morgan, 1993, p. 284), and many of the ideas of Critical Theory are congruent with action research. The concepts of Critical Theory and particularly a subset of ideas known as critical management studies (CMS) are explored later.

Radical Structuralism

The last of the four paradigms in the Burrell and Morgan (1993) matrix is aimed at the status quo in social affairs. In accord with Critical Theory it is a perspective which is concerned, not just to understand the world but to change it. The fundamental difference is that Radical Structuralism seeks change through conflict. Much of the philosophy of this paradigm is based on various interpretations of the work of Marx (1818–1883).

CRITIQUING THE EPISTEMOLOGICAL OPTIONS

Willmott (1993) is highly critical of the simplicity of the Burrell and Morgan (1993) matrix, particularly with his accusation that Burrell and Morgan (1993) advocate the restriction of theory development to within the constraints of one of four mutually exclusive paradigms. An alternative view that Willmott (1993) acknowledges, but does not accept, is that the mutual exclusivity of the four paradigms was intended as a strategic device for protecting innovative forms of analysis from the imperialistic designs of functionalism. Willmott (1993) prefers the paradigmatic ideas of Kuhn (1970), who in his discussion of scientific revolutions (a concept similar to paradigm change) claims that 'scientific revolutions are here taken to be those non-cumulative developmental episodes in which an older paradigm is replaced in whole, or in part by an incompatible new one' (Kuhn, 1970, p. 92).

Critical Theory, especially Critical Management Studies (CMS)

Critical Theory, in the history of philosophy and the social sciences, was developed by several generations of Germanic philosophers in a Western European Marxist tradition known as the Frankfurt School. Burrell and Morgan (1993) suggest that the works of Georg Lukas (1885–1974) and Antonio Gramsci (1891–1937) were highly influential, and that the Frankfurt School's claim on Critical Theory is the result of an essay written by Horkheimer in 1937. Critical Theory

is distinguished from traditional theories because it seeks human emancipation: 'to liberate human beings from the circumstances that enslave them' (Horkheimer, 1982, p. 244). Critical Theorists have claimed that social inquiry ought to combine rather than separate the poles of philosophy and the social sciences, and, that consequently explanation and understanding, structure and agency, regularity and normativity, are important considerations. Critical Theorists argue that this approach allows their enterprise to be practical in a distinctively moral sense.

Whereas traditional science rested upon the distinction between the observer and his subject and the assumption of value freedom, critical theory emphasised the importance of the theorist's commitment to change. (Burrell & Morgan, 1993, p. 290)

Although Critical Theory is often thought of narrowly as referring to the Frankfurt School, any philosophical approach with similar practical aims could also be called a Critical Theory. It follows from Horkheimer (1982, 1993) concept, that a Critical Theory is adequate only if it meets three criteria: (1) It must explain what is wrong with current social reality (2) It must identify the actors to change it; and (3) It must provide both clear norms for criticism and achievable practical goals for social transformation. Any truly Critical Theory of society 'has as its object human beings as producers of their own historical form of life' (Horkheimer, 1993, p. 21) to transform contemporary capitalism into a consensual form of social life. For Horkheimer, a capitalist society could only be transformed by becoming more democratic, so 'all conditions of social life that are controllable by human beings depend on real consensus' (Horkheimer, 1982, pp. 249–250).

Several related epistemologies have developed along the 'critical' path. Of particular interest is a 'critical' ideology specific to management and organization theory, known as CMS. Sotirin and Tyrell (1998) reviewed various critical texts and suggested that there was a general form of

theoretical agreement as to the constituents of CMS: particularly, a suspicion of Modernism; attention to historical–empirical specificities; the assumption that language is constitutive and non-representational; and a commitment to intervene in relations of oppression. In terms of the literature, there is a tendency to:

use guru literature as a foil; some intention to transform management education curricula and pedagogy; an emphasis on non-US knowledge and concern with the negative effects of globalisation; a concern to use metaphorical and utopian languages; as well as the promotion of alternative theories and methodologies. (Parker, 2002, p. 118)

Levy et al. (2001, p. 9) suggest that the ‘learning’ scholars have not disentangled themselves from the ‘managerialist orientation of strategy’ and should look towards Critical Theory for a more fundamental critique. However, before justifying this position it is necessary to return to systems theory, discuss systems thinking in a Modernist epistemological paradigm, and discover whether Complex Self-adapting System Theory is consistent with a CMS epistemology.

SYSTEMS THINKING IN A MODERNIST EPISTEMOLOGICAL PARADIGM

From early in the history of management writers, there has been an implication that business organizations could be viewed as systems. Weber’s ‘Bureaucracy’ was a systems concept, and the writers of the Scientific Management group, especially Weber (1947), viewed businesses as systems. Scientific Management was conceived with the view that machines could be used as a metaphor for business; in post-Norbert Wiener parlance, a Cybernetic System. The term ‘cybernetics’ was coined by Norbert Wiener in 1948 to describe a particular family of systems. Von Bertalanffy (1969, p. 17) suggests that cybernetics is a:

theory of control mechanisms in technology and nature ... founded on the concepts of

information and feedback, which is but a part of a general theory of systems; cybernetic systems are a special case, however important, of systems showing self-regulation.

Several writers have suggested that systems theory, particularly cybernetics, appear to have been incorporated into the mainstream of organizational and managerial studies (Buckley, 1967; Forrester, 1961; French, 2009; Masuch, 1985; Morgan, 1986; Senge, 1990; Weick, 1979). However, systems theory as a specialty has developed a considerable body of its own, of which cybernetics is only one of several models of systems.

Stacey (2000a) suggests that an appropriate model of systems thinking for business organizational thinking, particularly in the field of strategy, would have five categories, starting with Cybernetics and developing through System Dynamics, Open Systems, Chaos and Dissipative Systems, to Complex Self-adapting Systems. The ideas of the Classical Schools of strategy are set in a cybernetic paradigm; the ideas of the Learning Scholars require a Systems Dynamics paradigm; and emergence is a fundamental characteristic of Complex Self-adapting Systems (Stacey, 2000a).

The epistemologically Modernist systems theory that underlies much of classical management theory implies that organizations are physical entities with clear boundaries, structures, and functions. Allied to this is the concept that the theories present individuals as deterministic machines and ignore the political, emotional, cultural, and conflicting aspects of operating a business (Trist & Bamforth, 1951). Checkland (1981) and Checkland and Scholes (1990) advocate an interpretive approach to systems thinking, in which the social rules and practices of participants in the system are taken into account. They define a model – a learning cycle with a number of steps that constitutes the soft systems methodology (SSM). This is a methodology for systems designers to use when facing soft, ill-structured problems that include social practices, politics, and culture. This theoretical

background uses the philosophical systemic paradigm of Systems Dynamics, or Open Systems Theory (Stacey, 2000b). Boundaries of systems become moveable and social practices are 'shoehorned' into a scientific, Modernist paradigm, when actually the epistemological paradigm of CMS (Parker, 2002) would be more appropriate. However, it is possible that these ideas would be even better understood if the authors were to accept that the model of a business as a Complex Self-adapting System might provide more interesting answers.

COMPLEXITY – A SPECIAL CASE OF CMS?

Complex Self-adapting Systems and related concepts as metaphors for organizations have been described by several writers (Daft & Lengel, 1993; Morgan, 1986; Polley, 1993; Wheatley, 1992), who suggest that the complexity paradigm might provide a better explanation of behaviour in organizations than the classical linear paradigm. However, there have been very few attempts to turn metaphorical ideas into specific concepts which can be operationalised. Richards (1990), Gregersen and Sailer (1993), and Parker and Stacey (1994) looked at Chaos Theory, Drazin and Sandelands (1992) and Contractor (1999) at Self-organization, and Serman (1989), Senge (1990), and Kelly (1999) at Complex Systems. Nevertheless, there seems little doubt that Complex Self-adapting Systems Theory has an application in the social sciences and consequently in business systems theory.

Complex Self-adapting Systems are a family of systems, some of whose behaviours and characteristics have been described in the hard sciences (Gleick, 1993; Holland, 2000; Kauffman, 1995; Prigogine, 1997; Waldrop, 1992). The essential difference between Cybernetic Systems and Complex Self-adapting Systems is that the former are closed systems whose behaviour is linear. Concepts of predictability and causality are rational in this paradigm. Reductionism is possible because the total system is directly equal to the

sum of the parts. The system can be reduced and studied because the elements of the system can work in isolation and then be re-combined. The epistemological paradigm is Modernist. Complex Self-adapting Systems, on the other hand, are open systems whose behaviour is non-linear. Ideas of predictability, causality, and reductionism become meaningless, but concepts of learning, synergy, innovation and emergence are specific to this paradigm.

From a different perspective, the former constructs are also the conditions of a Modernist epistemology. If a system's specific long-term behaviour is unpredictable, then setting specific goals for it is a questionable activity. Scholars of the learning concept for strategy, who use the Systems Dynamics paradigm, conclude that humans can identify leverage points and stay in control (Checkland & Scholes, 1990). Conversely, Complexity Theory models lead to the conclusion that long-term states cannot be predicted, making it *impossible* for humans to stay in control. If Systems Dynamics and Complexity Theory *both* have relevance to human action, then the current dominant Modernist perspective of management is severely undermined.

Von Bertalanffy (1969, p. 37) maintains that 'in many cases, isomorphic laws hold for certain classes or sub-classes of systems irrespective of the nature of the entities involved. There appear to exist general system laws which apply to any system of a certain type, irrespective of the particular properties of the system and the elements involved'. If business entities are members of the category of systems known as Complex Self-adapting Systems, then von Bertalanffy's isomorphic laws are likely to be valid in the same way for businesses as they are for other Complex Self-adapting Systems that have been researched more thoroughly. Consequently, an option considered by many management writers (Coleman, 1999; Goldstein, 1999; Lissack & Gunz, 1999; McKelvey, 1999; Stacey, 2000a, 2000b; Syantek & DeShon, 1993) is to reject the cybernetic view and to embrace the concepts of non-linearity,

especially in the form of Complex Self-adapting Systems.

Pascale (1999, p. 85) argues that the science of complexity has yielded four principles relevant to strategic thinking:

1. Complex adaptive systems are at risk when in equilibrium. Equilibrium is a precursor to death.
2. Complex adaptive systems exhibit the capacity of self-organization and emergent complexity.
3. Complex adaptive systems tend to move toward the edge of chaos.
4. Complex adaptive systems cannot be directed or managed, only disturbed. The phenomenon of emergence arises from the way simple patterns combine.

Several writers from the complexity sciences have been able to expand on Pascale (1999) four principles and explain their relevance (Gleick, 1993; Holland, 2000; Kauffman, 1995; Prigogine, 1997; Waldrop, 1992):

1. Complex adaptive systems are at risk when in equilibrium. Equilibrium is a precursor to death.

Cybernetic systems are working efficiently when they are in equilibrium. One of the fundamental principles of economic theory is to bring the economy into equilibrium; 'economics had come to mean the investigation of equilibria' (Waldrop, 1992, p. 255). The purpose of control in Plan/Control Theory is to 'control out' perturbations in the system and return it to the stable equilibrium of the plan. By contrast, Complex Self-adapting Systems have many niches that can be exploited by agents adapted to fill them.

The economic world has a place for computer programmers, plumbers, steel mills, and pet stores, just as the rain forest has a place for tree sloths and butterflies. Moreover, the very act of filling one niche opens up more niches – for new parasites, for new predators and prey, for new symbiotic partners. So new opportunities

are always being created by the system ... it's essentially meaningless to talk about a complex adaptive system being in equilibrium ... if it ever does reach equilibrium, it isn't just stable. It's dead. (Waldrop, 1992, p. 147)

The implication of these ideas for management theorists is that the effort by the Classical Scholars (French, 2009) to bring the business system into equilibrium may be the very thing that eventually suffocates and 'kills' it.

This concept of staying away from equilibrium is central to the ideas of this paper. The plan and control concepts of classical strategic theory are designed to deliver equilibrium behaviour and, if Von Bertalanffy (1969) isomorphic laws are applicable to businesses, equilibrium could be part of the reason for business failure.

2. Complex adaptive systems exhibit the capacity of self-organization and emergent complexity

Holland (2000) book is dedicated to a study of emergent processes. There are no emergent processes in cybernetic systems. Holland states that 'most systems that exhibit emergence can be modelled in terms of the interaction of agents' (p. 224). For example:

In the brain the agents are nerve cells, in an ecology the agents are species. ... In an economy the agents might be individuals or households. Or if you were looking at business cycles, the agents might be firms. ... A complex adaptive system has many levels of organization, with agents at any one level serving as the building blocks for agents at a higher level. ... Complex adaptive systems are constantly revising and rearranging their building blocks as they gain experience ... at some deep fundamental level ... all these processes of learning evolution, and adaptation are the same. (Waldrop, 1992, pp. 145–146)

In addition, Kauffman (1995) describes a series of experiments with neural networks. Initially he

simulates the system, with 10,000 buttons as agents and strings used as connections between agents.

Randomly choose two buttons and connect them with a thread ... As you continue to do this, at first you will almost certainly pick up buttons that you have not picked up before. After a while however, you are more likely to pick at random a pair of buttons where you have already chosen one of the pair. So when you tie a thread between the two newly chosen buttons, you will find three buttons tied together. In short, as you continue to choose random pairs of buttons to connect with a thread, after a while the buttons become interconnected into large clusters ... as the clusters get larger, they begin to become cross-connected. Now the magic! ... a phase transition occurs. ... As the ratio of threads to buttons passes the 0.5 mark, all of a sudden most of the clusters have become cross-connected ... This giant component is not mysterious; its emergence is the natural expected property (Kauffman, 1995, pp. 56–58).

Hence, at the phase transition, emergent properties occur. The phase transition is approached when the system is 'rich and deep' enough, when the interconnectivity of agents is high enough. The implication of these ideas for management theorists is that if a collection of agents, and that collection of agents can be at any level, is appropriately interconnected then emergent properties can occur. This concept, of the cross-connection of large clusters of agents to produce conditions where a phase transition can occur and emergent behaviour identified, is crucial to the ideas of strategic emergence.

3. Complex adaptive systems tend to move toward the edge of chaos

One of the strange phenomena of matter in the physical world is the 'phase transition', and there appear to be two types. An example of a Class I phase transition can be observed at the freezing

point of water, 32°F. Below this temperature (at atmospheric pressure), which is also known as a critical point, the water molecules are vibrating slowly. Hence, molecular bonds can form and they can make the decision to form an orderly crystal (i.e. ice). Above this temperature, the vibrations are faster and the molecular bonds break much more quickly than they can form – fluid water is the result. The change happens rapidly, as if a simple dichotomous choice is made, and precisely at the critical point the 'phase transition' occurs. Class II phase transitions are rarer under conditions that can support normal human life, but are more common at greater ranges of temperature and pressure. The molecules do not have to make an 'either – or choice' (Waldrop, 1992, p. 229). Class II phase transitions are therefore less abrupt than Class I phase transitions and allow the matter on each side of the phase transition to exhibit a mixture of the characteristics.

It would appear that, in the world of matter, the pattern is:

Solid → Phase Transition → Fluid

and in Dynamic Systems, it is:

Order → Complexity → Chaos

Complexity in a dynamic system is equivalent to the area of the Class II phase transition – the area between order (so no innovation is possible) and chaos, understood in the literature as 'the edge of chaos'. It would appear from the research in the hard sciences, particularly the field of computer-simulated biological systems but also from other explorations of Complex Self-adaptive Systems, that a 'state of complexity' is necessary for the longevity of the system. Too much order and the system will achieve equilibrium and die. Too much chaos and the system will self-destruct. Just the right amount of complexity, somewhere near the edge of chaos, and the system will self-organise; the agents will be active and creative, managing feedback,

co-evolving, exploiting opportunity, learning, and growing – essentially, generating emergence (Waldrop, 1992, pp. 224–230).

The implication is that classical Plan/Control ideas prevent the development of phase transitions. If the generation of ideas in an organization can be encouraged rather than controlled, emergent properties manifesting as behaviour might be observed. Whether these emergent properties are desirable is another matter.

4. Complex adaptive systems can not be directed or managed, only disturbed

The phenomenon of emergence arises from the way simple patterns combine. Each system is in one of three states: order, complexity, or chaos. If the system is orderly, it is very difficult for change to occur. The system is approaching equilibrium and the ultimate consequence is that the system will atrophy and die. If the system is in a state of complexity, especially if it is operating close to the edge of chaos, then self-organization and dynamic change and growth are possible. However, if the organization crosses into the region of chaos, then it is possible that the behaviour of the system will become so extreme that it is no longer viable and/or sustainable.

A characteristic of Complex Self-adapting Systems, with the exception of human systems such as firms, is that they are truly self-organising. The control of a Complex Self-adaptive System tends to be highly dispersed – there is no master neuron in the brain, or a master cell in an embryo. Even in an economy, as much as a government or central banks might like to intervene or interfere in the system, the overall behaviour is dependent on the everyday economic decisions of multi-millions of agents. In a firm, however, the management interferes *directly* in the process. The role of the linear-thinking manager is to plan and control, to remove the very power of the adaptive system to create and innovate by damping down perturbations in the system and seeking equilibrium. Functionally organised hierarchies were designed to achieve just this purpose.

Scholars of strategic management are at an important stage in theory development. Most of the current theories, indeed the foundation/'bed-rock' theories of general management, are built on a classical, cybernetic foundation of plan and control, where things are generally predictable. This allows strategists to take short-term planning concepts and apply them to a longer time-frame. If it becomes more accepted in the mainstream of management thinking that Complex Self-adapting Systems Theory is a better framework for developing concepts of managerial behaviour, new foundations will need to be built, and simplistic, ideologically driven concepts such as Generic Strategies and Five Forces must be utterly rejected. Like the little boy in the fairy tale we must be prepared to stand up and declare to the world, 'that the emperor has no clothes'.

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