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Thinking Differently About Strategy: Comparing Paradigms.¹

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Abstract:

Our paper shows that mainstream strategic thinking and research already challenges the established Newtonian-Cartesian paradigm. Newtonian thought is the customary mode of western thinking, but is that about to change? Some papers from a complexity standpoint have appeared in the mainstream journals but its precise implications and merits have yet to be systematically spelled out and debated. We aim to facilitate this debate by comparing the established Newtonian and emergent complexity paradigms, clarifying the implications of this new perspective for strategy research. We suggest that the complexity paradigm is better attuned to current strategic realities than its Newtonian-Cartesian counterpart.

1. Introduction

How do we think about strategy? Do we need to think about it differently? If so, in what ways? How can we enhance our approaches to strategic issues in the twenty first century? Current strategic thinking is rooted in the Newtonian-Cartesian paradigm. We question that it is an appropriate place to remain in today's competitive environment. Paradigm shifts of course, are difficult to achieve as established paradigms tend to be unquestioningly accepted. Strategy is an academic discipline concerned with how organisations create and sustain competitive advantage. Schoemaker (1990: 1179) has provided a classic definition of this concept linking it to 'above average returns'. We can readily cite research which provides evidence of performance differentials between firms (e.g. Rumelt, 1991; McGahan and Porter, 1997). Strategy seeks to explain such findings, and offer meaningful prescriptions to practising managers. This pragmatic and prescriptive stance is regarded by a number of scholars (e.g. Meyer, 1991; McWilliams and Smart, 1995) as a defining characteristic of the field. It predisposes consultants, managers and academics towards Newtonian thinking because this mode of thought holds out the hope of prescription based upon prediction. Newtonian experimental science seeks causal links predicting the insulated effects of isolated causes. The ideal of a general strategic theory, consisting of systematically related sets of statements, including some empirically testable law-like generalisations has failed to materialise. Nonetheless, research still offers causal propositions within specified limited degrees of applicability, many of which fail to stand the test of time.

The key generic question underpinning much strategy research is: why are some firms better able to create and sustain competitive advantages than other competing or potentially competing firms? This question has been central to strategy research for almost half a century. Despite this, a persuasive case can be made that: 'we have no generally accepted theory - and certainly no systematic evidence - as to the origins or the dynamics of such differences in performance' (Cockburn et al, 2000: 1123). This suggests to us that a re-examination of the appropriateness of the established Newtonian-Cartesian paradigm to strategy research is long overdue. Theories and perspectives which have gained sufficient acceptance to become influential, are predominantly framed within this paradigm of thought which encourages researchers to seek the 'causes' of given performance 'effects'. First, we highlight the need to question the Newtonian-Cartesian paradigm of strategic thought. Then we compare and contrast it with the alternative complexity paradigm and argue that it is more appropriate to the current global strategic environment. We show how history has shaped our current thinking and suggest that it is time to consider the implications of this for future thinking in the field of strategy.

2. Challenges To the Newtonian-Cartesian Strategy Paradigm

A search for new ways of conceptualising issues and problems in strategy was prompted more than ten years ago (Van de Ven and Poole, 1988; Abrahamson, 1991), but today, many existing 'theories' and perspectives are still found wanting. Established Newtonian 'cause' and 'effect' ways of thinking about strategy have failed to address major concerns in the field. There is a notable absence of 'law-like' generalisations, and as the pace of environmental change in the global environment accelerates it

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is increasingly difficult to convincingly argue the case for prescriptions for practice based upon even limited generalizations. Few strategy scholars would suggest that a universally applicable general causal theory of strategy is possible, yet quantitative researches framed in the cause and effect mode of thought continue to dominate the literature. Definitions of scientific theory such as Rudner's (1966) are quoted or cited by various authors as describing the sort of theory which management scholars often seek. (e.g. Mckelvey, 1997; Priem and Butler, 2001):

'A theory is a systematically related set of statements, including some *law-like* generalisations, that is empirically testable' (Rudner, 1966: 10, *emphases added*).

Theories of this type are premised upon the Newtonian view of the universe as inherently stable and explicable through the discovery of objective knowledge and causal linkages which lend themselves to empirically testable predictions. However, as Pettigrew et al observe, 'the challenge of developing knowledge in the image of science whilst also contributing to practice and policy making has proved formidable' (Pettigrew et al, 2001: 697).

What is formidable is not so much the problem of developing knowledge in the image of science, but developing it in this particular image. Even the natural scientists have found this task formidable, but while they have moved on to embrace a 'new science' or complexity perspective on the universe, strategy has lagged behind in retaining its classical science one. Research is often driven by the questions: 'What constitutes effective strategy?' and 'How is effective strategy achieved?' The Newtonian–Cartesian paradigm prompts a search for causal links to performance. As Meyer notes 'true to its general management orientation, strategy has consistently used firm level performance as the definitive dependent variable' (Meyer, 1991: 824). He cites the belief of one researcher he interviewed that 'research questions are inherently uninteresting unless they include an explicated linkage to performance' (Meyer, 1991: 825). Clearly, research approaches and attitudes pre-empt the kind of knowledge that will be produced. We know a great deal about likely antecedents to competitive advantages and why some can generate or sustain them, but we know much less about the dynamics of competitive advantage (Cockburn et al, 2000; Pettigrew et al 2001). One key reason may be that the dominant strategy research paradigm is not conducive to the development of this kind of knowledge.

Answers to the question 'What constitutes effective strategy?' have produced three major 'strategy content' theories. In the 1960s and 70s, the strategy-structure-performance model derived from Chandler (1962) was prominent. In the 1980s, Porter (1980; 1985) built on Bain's (1956) work to offer his market-product positioning theories. In the mid 1980s, inspired by Selznick (1957), Penrose (1959) Chandler (1962) and others, the RBV emerged (Wernerfelt, 1984; Rumelt, 1984). During the 1990s it also rose to prominence. The RBV was in part a response to a less stable world, but offered new internal 'causes' for competitive success. In short, all three perspectives reflect the image of Newtonian science. Strategy process theories respond to the second question: 'How is effective strategy achieved?' They describe how strategies are formulated and implemented and how organisational change takes place and have led to prescriptions about how strategy should be formulated or implemented, or how to manage change. In the 1960s and 70s, researchers focussed on strategic planning, decision-making and leadership (e.g. Cyert and March, 1963; Ansoff, 1965; Bower, 1970; Herold, 1972; Cohen, March and Olson, 1972; Tannenbaum and Schmidt, 1973;). Long range planning and organisational performance were linked (e.g. Herold, 1972). During the 1980s and 90s, social complexities like organisational politics (e.g. Bower, 1970; Mintzberg, 1983) and increasing turbulence in economic and industry environments suggested the importance of managerial competencies for strategic change. Many writers realised that the dynamics of implementing organisational change were complex (e.g. Tichy, 1983; Barney, 1986; Lorsch, 1986; Beer et al, 1990). They were sceptical that consultants and managers could engineer it, but the practitioner focused literature continued to extol the virtues of re-engineering into the 1990s (e.g. Hammer 1990). The prevailing assumption was that if we knew enough about the causal interconnectedness of the factors involved, premeditated strategic change might be effectively planned and managed. Unfortunately, research still leaves questions to answer about how to remain competitive in turbulent environments.

Early researchers sought universal 'one best way' approaches and prescriptions, but effective competitive strategy in one organisational setting is not always effective in another. Environmental

and organisational settings give strategy its context. Contextual analysis therefore became central to research. Strategy and innovation studies adopted longitudinal methods to study strategy and innovation in context (e.g. Pettigrew, 1985; Van de Ven et al, 1989). The process content and context dimensions of strategy have been widely used as a framework within which to conceptualise the scope of the strategy field (e.g. Pettigrew, 1988; DeWitt and Meyer, 1994). The framework has been reproduced in many textbooks, but this historical conceptualisation has led to recognised flaws in our thinking about strategy. It has led researchers and practitioners to treat issues which are interrelated and interdependent as if they were distinct and separate. Content and process issues are a case in point. This problem has attracted criticism from academic strategists and managers (Schendel, 1992). Scholars have also noted that the internal context is not always sufficiently related to the external context. Some RBV theorists (e.g. Barney, 2001; Priem and Butler, 2001) call for a better integration of the resources and capabilities and product-market dimensions of competitive advantage. Finally, we note that traditional models of the strategic management process (e.g. Johnson and Scholes, 1993) paint a picture of a rational linear top down process of context analysis, strategy formulation and implementation. Once again, this has fostered an erroneous tendency to treat interrelated issues as if they were distinct - in this case strategy formulation and implementation. (Pettigrew, 1992).

In the relatively stable environment prior to the 1980s, rational top down strategic planning could be perceived as a route to potential organisational success. From the mid 1980s onwards, the accelerating pace of environmental change called into question the efficacy of a succession of content and process models. Even the relatively immature RBV was perceived as flawed by the year 2000.

'RBV breaks down in high velocity markets where the strategic challenge is maintaining competitive advantage when the duration of that advantage is inherently unpredictable, where time is an essential aspect of strategy and the dynamic capabilities that drive competitive advantage are themselves unstable processes that are challenging to sustain' (Eisenhardt and Martin, 2000: 1106).

In the modern rapidly changing world of organisations:

1. Not all cause and effect relationships are constant.
2. Sometimes, small changes in an organisation will have major competitive consequences over time.
3. Sometimes, small changes in the environment will produce large variations in outcomes, conceived here in terms of the effects upon the performance of different competitors in an environmental sector.
4. Such outcomes and effects are often unpredictable.

Pettigrew et al (2001) suggest that today, 'the task becomes to identify patterns in the process of changing' (Pettigrew et al, 2001: 700) - a task which resonates strongly with the complexity paradigm. We believe this paradigm holds out the promise of addressing these issues.

3. Paradigms Compared

Capra (1996) compares the Newtonian-Cartesian world view with that of the complexity paradigm. He shows clearly the differences between the two and the implications they have for the thinking that underpins strategic theory and practice. We have built upon this comparison and expanded Capra's work to construct a more comprehensive categorisation for use in organisational analysis.

Figure 1. Here

A Newtonian-Cartesian perspective considers organisations as a series of controllable moving parts that may be 'fixed' or replaced as needed to keep the machine going. A complexity perspective sees organisations as dynamic living entities that are not controllable and which are essentially complex adaptive systems that learn and experiment as they exist in the world. The machine model is a linear one that is classically reflected in the traditional hierarchical layered structures of organisations, whereas dynamical systems are non linear and non hierarchical. The machine model is an artificial construct that does not mirror the realities of a complex, complicated, multidirectional, multifaceted, constantly changing world. It can only exist in theory whereas complex, living, dynamical systems have evolved over millennia in the real world. The complexity perspective considers how in the living world there are many advantages to being highly networked and highly connected. Complex adaptive systems, such as ant colonies, are very effective at handling a range of situations without any centralised control. They are highly connected and work together in a networked fashion. They have a

built in flexibility and adaptability that centralised loosely connected organisations find difficult to achieve. Lewin (1993) refers to the importance of connectedness in evolution and the essential role it has in ensuring that vital perturbations take place in living systems, thus avoiding ossification.

When organisations merge or are taken over the tendency is for the dominant one to expect conformity to its organisational patterns and procedures. From a complexity perspective the possibilities for learning and adaptation that diversity offers is key to survival. As Allen (2001: 177) states: 'the "exploratory" activity within a system **can only arise** from some inherent microdiversity.' Further, this diversity will occur naturally in an organisation unless stifled in favour of uniformity. A complexity perspective explicitly recognises the difficulties that classical notions of cause and effect impose and managers today are only too well aware of the fact that we do not live in a predictable world. A complexity perspective acknowledges that an organisation, its underpinning design principles, its values and core belief systems are all important aspects of its existence and cannot be pulled apart nor divorced from the reality of the many contexts in which it exists. The organisation operates as an emergent whole. As an alternative perspective on strategy, the complexity paradigm allows a much broader perspective than the Newtonian-Cartesian mode of thinking. It recognises that many phenomena cannot be measured nor understood with existing levels of knowledge and technology and that the inevitable intrusion of the subjective and the intangible has a legitimate place in serious science. Some would argue that classical science has erected a façade of objectivity that ignores the intrusiveness of the subjective reality, making attainment of a perfect objectivity unattainable. Strategy with a focus on 'entity' tends to concern itself with tangible, concrete, discrete attainments. A 'process' view of strategy as emergent (Minzberg, 1994) is more in tune with the complexity paradigm. A complexity perspective considers strategy as a constantly unfolding, flowing process that is not content or output driven. Influenced by fractal geometry, it seeks to understand and explain things by looking for and interpreting patterns rather than seeking for matches and correlations.

The N-C paradigm precludes things which cannot be precisely measured, for example, complex non linear systems. Kauffman (1996) has observed that all organisms and organisations are evolved forms. Classical science has viewed evolution as a gradual incremental process and this has had a major influence on notions of strategic change. However, modern research has shown that life on earth developed both incrementally and also with massive leaps and unexpected developments. This resonates with research supporting the punctuated equilibrium model of organisational change (e.g. Romanelli and Tushman, 1994). Embracing the complexity paradigm is all about thinking and seeing differently and recognising that strategic thought and strategy research have developed in a larger historical context. We believe that there are sufficient indications from the existing body of strategy literature to suggest that it offers a promising approach to the further advancement of strategy.

4. Historical Influences and Impediments to 21st Century thinking

Why does the N-C perspective exercise such a powerful influence, when it can be argued that it is already failing to address some key current dilemmas? The answer lies in part, we would suggest, in the fact that this mode of thinking has been an unquestioned historical legacy for many years. As McMaster (1996: 59) points out, the way we think about organisations is heavily governed by principles 'so old that we think the way we see things is the way they should be'. These principles are those derived from the Newtonian-Cartesian world paradigm which, as Winograd and Flores (1991: 15) point out, has been 'the mainspring of Western science and technology' for some 300 years. In the Western world, people have become accustomed to thinking in a linear fashion and are predisposed from more than three hundred years of history to see the world from a linear perspective (Senge 1992). This poses real problems when such thinking is used to address issues in a world that is complex, unpredictable and non-linear.

The 17th and 18th century saw Descartes and Leibniz views spread. Both were philosophers and distinguished mathematicians and scientists. At this time there was no clear distinction between 'natural philosophy' and the physical sciences (Hampshire 1956). A powerful symbiotic relationship between physics, mathematics and philosophy existed and philosophers were trying to introduce the 'rigor of mathematical demonstration into all departments of knowledge' including philosophy

(Hampshire 1956: 17). This prepared the way for mathematics and science to dominate as the prime languages we use to explain our world. Kepler, Copernicus, Galileo and Newton initiated a phenomenal change in mankind's view of itself and its place in the universal scheme of things. With 'a mere three laws of motion and a universal law of gravitation in hand, Newton ... unleashed on the Western mind a clockwork universe' (Kauffman 1996: 6). Thus in the 17th and 18th centuries the N-C, or classical scientific paradigm emerged to present the world as a giant clockwork machine operated by a series of predictable universal laws. It underestimated or even ignored the interconnected complexity of the world and how one action or event interacting with another created a wave of 'difference' that affected all other complex systems in a non linear unpredictable way. The virtues of the intellect, logic and reason, were extolled over intuition and the senses, along with an analytical, empirical, reductionist approach to understanding the world. This view was not seriously challenged until the 20th century with the advent of quantum physics and the development of complexity science and computer technology.

Economics has been a key formative influence upon strategy. The idea of the stability of the ordered Newtonian universe continued to influence classical economists well into the twentieth century. Before and after Keynes (1921; 1931; 1936) they continued to look, like Smith (1776), Spencer (1844), Marshall (1920) and Hayek (1944; 1960) for the *causes* of the wealth of nations in a constitutionally limited stable government and a legally regulated free market economy. Despite Mach's nineteenth century challenge, the Newtonian paradigm dominated the twentieth. In Mach's view, Newtonian science does not explain why causal sequences exist, it merely formulates covering laws governing regular patterns of observable change in physical states in cases amenable to quantification and expressed in the form of mathematical equations.

Early strategy theorists developed ideas within a framework whereby an organisation existed in a kind of strategic isolation. Strategic activities were planned on a cause and effect basis in the belief that pre planned goals were attainable in an essentially non dynamic environment. Insufficient consideration was given to the impact of these actions on the complex dynamical systems in which they were embedded. Thus, the early planning models (e.g. Ansoff, 1965), though iterative were essentially linear. Classical science also advocated the separation of the head or the intellect from the hand or the senses. In the early work of Chandler (1962) top down strategic decision making was assumed and in the post war era, white collar workers and blue collar workers developed distinct cultures. These distinctions persist in our working culture today and spring from the patterns of work evolved during the industrial revolution (Fowler 1997). Early writers on organisations like Weber and Taylor drew on classical scientific notions for their ideas and began an approach which continues in many of today's organisations (Handy 1990, Morgan 1986). Planning and forecasting activities, for example, reflect a Newtonian view of the world (Handy 1990) with many data collection and analysis techniques reflecting in Wheatley's (1994) view a reductionist, cause and effect approach.

5. Conclusions

Newtonian science still has its place in some types of investigation, but leading edge scientists have become more preoccupied with the patterns, rhythms and flows of a changing universe. Organisational studies in general and strategy in particular has lagged behind the natural sciences in exploring the potential of the complexity approach to facilitate the development of a more dynamic understanding of the organisational universe. In the rapidly changing environment of the twenty first century, cause and effect approaches to strategy can be expected to have a more restricted application than in the past and competitive advantages of shorter duration. The N-C and complexity paradigms make different assumptions about the nature of the world and have consequently followed different path dependent development routes. Strategy scholars have tended to primarily assume that competitive advantages are created and sustained by complex causal chains. They have made determined efforts to unravel them and at various times, some factors have been accorded a greater causal significance than others in prescriptions for practice. For example, prior to the 1980s, rational decision-making (e.g. Cyert and March, 1963) strategic planning (e.g. Ansoff, 1965) and effective leadership (e.g. Selznick, 1957; Andrews, 1971) were persistent process themes. After the 1980s change management became a more prevalent focus and more recently, knowledge management has found a central place in the literature.

Strategy content models have also evolved. Chandler's (1962) strategy/structure thesis was an important formative influence in the early years. His strategy/structure/performance model, which addresses issues of scale, scope and organisational structure, underpinned important research for more than twenty years (Rumelt, 1982). In the 1980s Michael Porter's work (1980,1985) rose to prominence. His techniques for structural analysis and competitive positioning found popularity amongst managers as they sought to arrive at better understanding of their organisations in their environments. Since the mid 1980s, global competition coupled with deregulation and political and economic changes such as the collapse of the Soviet block have changed the nature of the competitive world. The pace of technological change has accelerated noticeably and factors such as high barriers to entry and dominant market share are no longer seen as infallible sources of sustained competitive advantage. The organisational environment has become less predictable and the problem of formulating a response increasingly formidable. The emergent RBV turns attention towards potential internal organisational sources of competitive advantage and found increasing popularity. However, as we indicated above, none of these developments have provided managers with the answers they seek to questions of creating and sustaining competitive advantages in highly turbulent environments.

We have indicated that the bulk of established strategy is founded upon the N-C paradigm. On its own, this paradigm had been found to be an inadequate framework for developing twenty-first century science. We suggest that it is equally inadequate for the development of twenty first century strategy. There are, of course, historical reasons why people can find it difficult to consider alternative paradigms, but once we are aware of those reasons the initial barrier can be surmounted. Complexity may or may not in the fullness of time transpire to be the hallmark of twenty first century thinking, but as we have argued, it is a paradigm with considerable merit. Our comparison between the Newtonian-Cartesian and complexity paradigms suggests that the latter may be better attuned to the actual economic and environmental conditions we face than the established Newtonian modes of thought.

FIGURE 1.
Organisational Implications of the Two Paradigms

Newtonian–Cartesian Paradigm	Complexity Science Paradigm
Essentially mechanistic	Essentially dynamic / self organising
Linear	Non linear
Controllable	Uncontrollable
Centralised	Networked
Hierarchical	Non hierarchical
Limited connectivity	Highly connected
Uniformity	Diversity
Cause and Effect	Effect and Effect
Predictable	Unpredictable
Reductionist	Holistic
Objective explanation	Subjective & Objective explanation
Entity focussed	Process focussed
Correlation	Patterning
Highly preclusive	Highly inclusive
Evolutionary	Revolutionary & Evolutionary

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