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Strategic management cultures: Historical connections with science

Gerardo Abreu Pederzini

Purpose – The implicit and indirect influence of classical science on strategic management has been of utmost importance in the development of the discipline. Classical science has underpinned the main and even contrasting strategic management cultures. Classical science has undoubtedly allowed strategic management to thrive. Nevertheless, important limitations, roadblocks and challenges have also been produced. This paper explores the influence of classical science on the main positivist and interpretive strategic management cultures.

Design/methodologies/approach – A conceptual review is done on the influence of classical science on positivist and interpretive cultures in strategic management.

Findings – The benefits and shortcomings of classical science in strategic management are explored and presented. Furthermore, the convoluted implicit relationship between strategic management and science is shown to be changing but persisting, as in order to face some of the challenges emerging from classical science's influence, a complexity culture, also inspired by science, seems to be developing in strategic management. Complexity appears to be emerging as an alternative, which might allow strategic management to solve some of its current dilemmas, and thus, change its implicit relationship with science.

Originality – The paper presents a novel way to conceptualize historical cultures of strategic management via their connection with academic cultures that have historically emerged from science. Through the analysis here done, a possible candidate for a Kuhnian *normal strategic management* and its potential revolution will be suggested, based on the recognition of the inheritance of classical science and currently complexity theory in strategic management.

Paper Type – General review.

Keywords – Classical science, strategic management, complexity, strategy, reductionism, business studies, culture

The scientific revolution changed the world in an unprecedented manner. The period from Copernicus and the subsequent astronomy revolution (Asimov, 1966) to the remarkable achievements of Newton and his *Principia* marked an era roughly encapsulated between the 15th and 18th centuries that can hardly be compared to any other (Gribbin, 2003; Hatch, 1989). The scientific revolution symbolized a rupture with the intellectual subordination to the church (Boisot and McKelvey, 2010; Thagard, 2010) and the ancient knowledge of the Greek and the Roman cultures (Gribbin, 2003). The consequences of the scientific revolution are manifold. However, its philosophy of science and method are among the most ubiquitous (Gribbin, 2003; McMillan, 2004).

As the scientific revolution and its philosophy of science became deeply embedded in our culture, they came to change and influence in unexpected ways various social sciences. From psychology to economics, social sciences evidence in their philosophical underpinnings and their theoretical and methodological structures a clear influence from the science of the scientific revolution (from here on **classical science**). Management research has not been the exception to this trend. Various disciplines within management have been inspired by classical science (Davis, 2010; Rosenzweig, 2007). Particularly important is the influence on strategic management. Strategic management is concerned with how managers or leaders, in their aim for survival, growth, and competitive advantage, aim for their organizations to fit their external environments

(Denis *et al.*, 2001; Freedman, 2013). Thus, one of strategic management's core topics of study has been firm performance (Peteraf, 1993; Porter, 1980, 1996, 2008).

If we consider culture as related, among many other things, to “cognitive components such as assumptions, beliefs, values, or perspectives” (Sackmann, 1992, p. 141), then it could be argued that classical science has greatly influenced various strategic management cultures, where the assumptions, beliefs, values and perspectives of classical science have been consciously and/or unconsciously followed in strategic management. This exemplifies an intricate historical, sometimes overt, relationship between strategic management and classical science. In a recent article in the *Journal of Management History*, Novicevic *et al.* argue that “strategic management is an eclectic field in scholar background” (2008, p. 343). Within that vast background, in this review I will explore specifically the classical science background of strategic management. Reviewing, then, how classical science's influence on strategic management has opened opportunities for successful theories, while at the same time creating threats and roadblocks for the development of the discipline. In exploring the historical relation between strategic management and classical science, I will also argue that the future of strategic management might lie in a reconstructed relationship with science, where classical science might come to be rejected in favor of complexity (Brown and Eisenhardt, 1997; Stacey, 1995), which could fulfill Chawla *et al.*'s recent call for theoretical perspectives that “incorporate complex constructs of environmental uncertainty within their frameworks while being responsible for the key assumptions being made about the nature of knowledge” (2012, p. 215). In sum, in this paper I will portray the historical evolution of strategic management, as presumably trapped in convoluted implicit relationships with science and the dichotomy of their classical and complexity traditions. Additionally, the paper will end by arguing for a possible Kuhnian conceptualization of strategic management cultures.

Classical Science

First, let us explore why and how classical science came to be such a success, so that an adequate understanding of its legacy to economics, business studies and particularly strategic management can be produced.

The unmatched success of classical science can be explained by several factors. First of all, classical science evolved as a result of the tools that it developed, ranging from the practical such as the telescope or the microscope (Gribbin, 2003; Thagard, 2010), to the theoretical, such as Newton's/Leibnitz's development of calculus (Westfall, 1993). Second, a mathematical ethos emerged, particularly in disciplines such as physics, where it was acknowledged that the laws of nature could/should be explained in mathematical language. A third and key element is thinking in terms of cause and effect. By counterfactual arguing, X would be said to have caused Y, in the case that "if X had not happened, then Y would not have happened" (Sloman and Lagnado, 2015, p. 225). Determining causes is a hard, controversial and problematic process. Classically, three conditions tend to be argued for a causal relation between X and Y: "evidence of concomitant variation, time-ordering, and elimination of alternative explanations" (Highhouse, 2009, p. 554), where overruling alternative explanations tends to be the hardest condition to satisfy. Experimentation is a fourth important element of classical science, where experiments became vehicles to understand causal relations. An experiment describes "the consequences attributable to deliberately varying a treatment" (Shadish *et al.*, 2002, p. 9). In classical science it was acknowledged that to discard alternative explanations, experiments must vary an independent variable(s) to observe its influence on a dependent variable(s) (Thagard, 2010), while holding everything else constant (i.e. *ceteris paribus*) (Davis, 2010; Highhouse, 2009; Shadish *et al.*, 2002). *Ceteris paribus* (Persky, 1990) is essential to understand classical science. For example, it

is easier to argue that temperature variance causes volume change in a gas, if the gas changes its volume when heated while everything else remains constant. However, if the volume of the gas is heated when the mass and pressure are varying too, then it turns considerably more difficult to isolate which and in what proportion was the cause of the measured effect. Experimentation is a paradigmatic example of how classical science evolved through reductionism, a fifth important factor in classical science. Classical science reduces phenomena in various ways, of which, for example, experiments reduce or simplify observations and measurements by studying causal relations under controlled conditions. More importantly, classical science's reductionism is expressed in its belief that if "one can understand the parts of a system, one can understand the whole" (Marion and Uhl-Bien, 2001, p. 393). This derives in the clockwork model of the universe, where the universe could be understood as a collection of individual components which aggregation is compositional: they "maintain the same form in aggregate systems that existed at lower levels" (Lord *et al.*, 2011, p. 108). In short, in reductionism all causal arrows point downwards. The assumption therefore would be that, for instance, "A machine is built up from distinct parts and can be reduced to those parts" (Mikulecky, 2001, p. 342). This ontology is referred to as atomistic (Boisot and McKelvey, 2010).

The success or failure of classical science and its theories was assessed by various norms. The first one is prediction, where classical science particularly excelled in its capacity to predict the phenomena it studied (Allen and Boulton, 2011; Thagard, 2010). Other important standards were repeatability and replicability (Boisot and McKelvey, 2010; Gribbin, 2003). The outputs of classical science are lawlike statements. The scientist of the scientific revolution believed that there existed immutable laws of nature, which external validity was assumed to be all encompassing, an example being Newton's three fundamental laws of motion (Gribbin, 2003; Mikulecky, 2001). A

final important way to assess or discriminate among theories was parsimony. It was simply assumed that “A hallmark of good theory is parsimony” (Eisenhardt, 1989, p. 547). The latter was best captured by Occam’s Razor, meaning the presumption that *ceteris paribus*, simpler explanations are more likely to be right and are preferred (Baker, 2004).

As classical science evolved, the precision of predictions came to be challenged, where precise prediction or description was made impossible in certain phenomena that started to be observed. With the advent of statistical mechanics the idea was introduced of using probabilistic reasoning instead of aiming at full precision (Boisot and McKelvey, 2010; Lyotard, 1979; Staley, 2005). Thus, the dynamics of a system started to be studied as the statistical behaviors of its constituent elements, where variance was usually interpreted as error or noise (Allen and Boulton, 2011). The introduction of probabilistic thinking in physics symbolized a break from the exact and deterministic thinking that predated it, and it introduced the possibility of epistemological limits. The latter was later on best captured, for example, by Heisenberg’s uncertainty principle, which in the realm of quantum mechanics (i.e. the physics of the very small) states “that certain pairs of quantum properties... can never both be precisely defined at the same time” (Gribbin, 2003, p. 938; Lyotard, 1979).

In summary, classical science represents a way of encoding natural systems to produce theories in the language of mathematics, which based on experimentation, reductionism, causality, and parsimony predict either exactly or probabilistically the evolution of dynamic systems (Allen and Boulton, 2011; Boisot and McKelvey, 2010; Ghoshal, 2005; Gribbin, 2003; McMillan, 2004; Mikulecky, 2001; Staley, 2005). Classical science is an expression of modernism -of a progressive ethos-, as “the focus is on a phenomenal world directly and unproblematically observed” and understood (Boisot and McKelvey, 2010, p. 415). Most of our current science and its technology

are the result of classical science, and thus its “success cannot be ignored” (Mikulecky, 2001, p. 343).

From Classical Science to Strategic Management

Let us now look at strategic management, so its connection with classical science is illustrated. The history of the strategic management discipline is intricate. The concept of strategy comes from ancient Greek, Chinese and European backgrounds (Thomas *et al.*, 2013). Sun Tzu’s *The Art of War* (2000), presumably dating from 500 BCE, evidences some of the historical origins of the concept, as Machiavelli’s *The Prince* (1515) among others (e.g. Clausewitz) do too. And thus, strategy is largely a military and/or political concept, which did not see its incursion into management until the 20th century. Allegedly, one could point to von Neumann’s revolutionary work on game theory, first published in the late 1920s followed by his and Morgenstern’s book in 1944 (Nowak, 2012), as introducing competitive -strategic- thinking to social forms of organization. Moreover, the thrust for strategic thinking was largely fueled by practitioners too, given the novel challenges they were facing as organizations and markets expanded. An example of the latter would be the popular spreading of the multidivisional organizational structure, best known as the M-form (Miles and Snow, 1984). Academically, before and certainly by the 1950s, there were traces of strategic management already, especially encapsulated back then in the related concept and discipline of business policy, which “taught students to question whether a firm’s strategy matched its competitive environment” (Ghemawat, 2002, p. 40). The 1950s and 60s saw the emergence of some of the first books relating explicitly or implicitly to strategic management; for example, Penrose’s *The Theory of the Growth of the Firm* (1959) or Ansoff’s *Corporate Strategy* (1965). However, Freedman in his monumental history of strategy, acknowledges

Chandler's *Strategy and Structure* (1962) as the cornerstone in bringing strategy into management: "it was Chandler who gave the concept of strategy prominence in a business setting" (2013, p. 496).

Subsequently a culture evolved in strategic management, which believes strategy is about planning, control, long-term goals, finding the most optimum ways to reach goals, and a tool to manage in deterministic ways an organization. This was boosted by the continued influence of economics and quantitative methodologies. Game theory is an example of the latter (Teece *et al.*, 1997), as well as it is the industrial organization economics school. The latter presumably began with Bain, who uncovered "the general relation between industry structure and performance" (Ghemawat, 2002, p. 53). Eventually, this approach was epitomized in the 1970s and 80s by Porter's work on industry forces affecting performance (1980), as well as Hunt's introduction of the concept of strategic groups (Barney and Hoskisson, 1990; McGee and Thomas, 1986). Another important revolution of the 1980s was the resource based view, which in its modern form emerged from the works of people like Wernerfelt (1984) and Barney (1991), who revived Penrose's focus on internal organizational factors, although this time hugely influenced by the ethos of economics quantitative methodologies, and a positivist approach.

Important events, including the oil shocks of the 70s (Centeno and Cohen, 2012), challenged the idea that strategy could actually plan, control or predict. Scholars like Mintzberg came to argue for the serendipitous essence of strategizing, as well as the importance of the people and processes of strategic management (1978; Mintzberg and Waters, 1985). Additionally, the classic debate emerged on whether to focus on studying the content of strategies or the process and the people that produce it (Chakravarthy and Doz, 1992). Therefore, in parallel another culture has for long existed beyond the one influenced by economics and positivism. An early example of

the latter would be Pettigrew's work on sociopolitical processes and strategy (1973; 1977), plus other efforts that emerged to consider the role of cognition in strategizing (Eisenhardt and Zbaracki, 1992). These more human or socially centered approaches were aided by the early and historical works from Cyert and March (Lockett and Wild, 2014) as well as Simon's later concept of bounded rationality (1991). Eventually, other social approaches arose, including strategy as practice, where arguably Johnson *et al.*'s 2003 paper on the topic was a cornerstone. In the strategy as practice tradition, strategy "is not something that an organization *has* but something its members *do*" (Jarzabkowski *et al.*, 2007). Other related efforts in this alternative strategic management culture, include strategy as discourse (Langley and Abdallah, 2011; Hardy and Thomas, 2014), where strategy, in a Foucaultian way, is conceived through the communicative interactions that form it. These human centred, interpretive approaches have also differed from positivist ones in their methodologies, as more qualitative, case method, and ethnographic approaches have been usually followed.

This brief historical account is just that: a very short summary. There are many other things that have happened in the development of the discipline (e.g. transaction cost analysis, population ecology, or agency theory). Nevertheless, this account evidences the multi-faceted structure and essence of the discipline, which as Hoskisson *et al.* argue the history of the field could be seen as swings of a pendulum, where "each pendulum swing has taken us to new theoretical paradigms and methodologically approaches" (1999, p. 447). Largely and very roughly, one could say that the various faces of strategic management could be enpsulated in two broad cultures, each with their own beliefs, values, and specific ramifications and specializations. One heavily influenced by economics, quantitative methodologies, positivism, rationality assumptions, and a focus on industry dynamics and/or the reductive role of core assetts. Let us call this the positivist culture.

The second one has differed by looking at the interpretive social and human side of strategy either at the industry or more usually organization level, where qualitative methods have been arguably favored. Let us call this the interpretive culture. Using these two cultures definitely oversimplifies the discipline, as there are certainly exceptions, as well as subcultures within each. However, this rough categorization could be helpful in order to explore the influence of classical science on strategic management. More importantly, what I will discuss and show in this section, is how by analyzing with detail the positivist and interpretive cultures, both will be revealed as having been similarly and greatly influenced by classical science.

The success of classical science was of such magnitude that its culture (i.e. its paradigm values, norms, and beliefs) were inherited by most of the social sciences, including both the positivist and interpretive cultures of strategic management (Allen and Boulton, 2011; Ghoshal, 2005; McMillan, 2004). Thus, economics and subsequently strategic management research have shown a “propensity to imitate as closely as possible the procedures of the brilliantly successful physical sciences” (Hayek, 1974, p. 1), despite the fact that the phenomenon of interest might be significantly different (Ghoshal, 2005; Hayek, 1974). This mimetic process has opened many opportunities for strategic management, as it has provided it with outstanding developments. However, such replication of classical science in strategic management has also generated important threats, challenges and roadblocks. In the positivist culture of strategic management, the embracement of classical science is evidently expressed in its philosophical foundation on positivism (Boisot and McKelvey, 2010), and its more recent variation, post-positivism (Bryman, 1984, 2012; Bryman and Bell, 2007; Burrell and Morgan, 2005; Gephart, 2004; Williams, 2006; Willig, 2001):

Positivism and postpositivism adopt the stance of realism and rely on the assumption of an objective world external to the mind that is mirrored by scientific data and theories. Positivism and postpositivism are efforts

to uncover truth or true reality. Postpositivism... differs from positivism in holding that reality can be known only probabilistically (Gephart, 2004, p. 456).

Thus, between positivism and postpositivism both the deterministic and the probabilistic modes of classical science are covered. Positivism has driven mainly a culture of quantitative research in strategic management, generating theories frequently characterized by “a few causally related variables in which there is little evidence of human action” (Jarzabkowski *et al.*, 2007, p. 7). And even though the history of strategic management might be characterized by parallel swings (Hoskisson *et al.*, 1999; Henisz, 2011) between the interpretive human-inclusive culture and the positivist reductive one, it has been the latter which has probably thrived more intensively.

The positivist culture in strategic management has amassed significant influence. An important example of a classical science strategy theory in the positivist culture, would be the aforementioned industrial organization economics and its structure-conduct-performance paradigm, which “put the determinants of firm performance outside the firm, in its industry’s structure” (Kraaijenbrink *et al.*, 2010, p. 350). As previously argued, this theory is best portrayed by Porter’s forces framework (1980, 2008; Teece *et al.*, 1997), where five forces, including threat of new entrants, bargaining power of suppliers, bargaining power of buyers, threat of substitutes, and rivalry, determine profitability. In other words, “If the forces are intense... almost no company earns attractive returns on investment. If the forces are benign.... many companies are profitable” (Porter, 2008, p. 80). The latter is certainly reflective of classical science, as it proposes a parsimonious reductive framework in which certain forces pressure -as in physics- firms that are subject to their effect in a given industry. The structure-conduct-paradigm turned out to be just a partial explanation of firm profitability, and came under criticism as it became evident that industry

structure was only a piece of the equation (see, for example, Rumelt (1991), or Quigley and Hambrick (2015)).

Another classical science strategy theory in the positivist culture, would be the resource based view (RBV), especially in its post 1980s conception (Barney, 1991; Dierickx and Cool, 1989a, 1989b; Lockett and Wild, 2014; Wernerfelt, 1984). The RBV explains “competitive heterogeneity based on the premise that close competitors differ in their resources and capabilities” (Peteraf, 1993, p. 997; Amit and Schoemaker, 1993; Barreto, 2010; Eisenhardt and Martin, 2000; Teece, 2007). Particularly, the RBV argues that “Resources contribute to... performance advantages to the extent that they are valuable, rare, costly to imitate, and non-substitutable” (Armstrong and Shimizu, 2007, p. 961; Ambrosini and Bowman, 2009; Oliver and Holzinger, 2008; Pablo *et al.*, 2007). The RBV is certainly consistent with classical science. First of all, it proposes a reductive causal relation between resources -cause- and firm performance -effect (Hoskisson *et al.*, 1999; Kraaijenbrink *et al.*, 2010; Rouse and Daellenbach, 1999). Second, the RBV is reflexive of classical science’s prediction aim, as it predicts that firms with resources with certain attributes will have better performance (Amit and Schoemaker, 1993; Collis and Montgomery, 1995). Third, its claim of valuable, rare, inimitable, and non-substitutable resources bestowing competitive advantage basically meets the “criterion for lawlike generalizations” (Priem and Butler, 2001, p. 27). Later on, an extension of the RBV, dynamic capabilities, emerged to help explain how resources might be re-bundled, reconfigured, updated or upgraded in order to keep up with changing environments. A dynamic capability is, therefore, “a firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments” (Teece *et al.*, 1997, p. 516; Ambrosini and Bowman, 2009; Barreto, 2010; Easterby-Smith *et al.*, 2009; Makadok, 2001). Thus, the introduction of dynamic capabilities

brought together an almost Newtonian motion modelling of the trajectories of firms' performances. The RBV has been subject to criticism too, especially because it says little about how resources impact performance, hence marginalizing human activity within organizations (Johnson *et al.*, 2003). Particularly, the post 1980s RBV ignores the role of managers (Foss and Ishikawa, 2007; Foss *et al.*, 2008), who are key in explaining firm performance, and whose role in strategizing is central to conceive strategy as a human or human-led process (Helfat and Peteraf, 2014; Quigley and Hambrick, 2015). Thus, an alternative approach in the interpretive culture exists that tries to revive Penrose's (1959; Foss *et al.*, 2008) original consideration of managers and their subjectivity. In this type of works, the RBV considers more deeply the role of managers (see, for example, Sirmon (2011), Sirmon (2007), Chadwick (2014), Ambrosini (2009), Eggers and Kaplan (2013), and Holcomb (2009), among others).

At the end of the day, most positivist classical science inspired strategic management theories have tended to be criticized for their incompleteness, particularly their dehumanization of strategy. Another important critique is that experimentation, contrary to classical science, is difficult to do in strategic management (Davis, 2010; Pfeffer and Sutton, 2006; Rosenzweig, 2007). More importantly, even if strategic management phenomena could be isolated to test the effect of the variance of one variable, *ceteris paribus*, on another one, experiments might still be largely limited, since they would have little ecological validity (Willig, 2001). The latter might happen as rarely *in situ* one variable moves as everything else remains equal. Therefore, a different approach is needed that instead of aiming at understanding variables in isolation (or under controlled conditions) it explores variables in interaction. In addition, quantitative methods, such as statistical analyses of surveys or secondary financial data, which might control "stastically for alternative explanations" (Pfeffer and Sutton, 2006, p. 72), could also face other challenges. One, for instance,

is the well recorded phenomenon of unethical accounting and financial data manipulation by executives (Ghoshal, 2005; Henisz, 2011; Mintzberg *et al.*, 2002). Other challenges exist in the case of surveys, such as common method variance (Spector, 2006), and more broadly the risk of researchers' bias and the pre-study probability that a tested relationship is false (Ioannidis, 2005). Other limitations arise from context. If knowledge is derived in a given context, will it be valid in another one? (Syed *et al.*, 2010). For example, Wal-Mart's presumably well-understood and successful USA model, turned out to be a failure when deployed in the German context (Christopherson, 2007). Beyond this mundane arguments there exist the philosophical ones as well. For instance, classical science's belief on immutable laws might be inadequate in strategic management. Imagine hypothetically that strategic management knowledge is internally and externally valid, such that, for example, the RBV's lawlike claims hold true in every context unquestionably. How do we know such knowledge will remain valid in 100, 1000, 1 000 000, or a billion years? Actually, chances are it will not, or as Hume more elegantly put it:

all inferences from experience suppose, as their foundation, that the future will resemble the past, and that similar powers will be conjoined with similar sensible qualities. If there be any suspicion that the course of nature may change, and that the past may be no rule for the future, all experience becomes useless, and can give rise to no inference or conclusion (1910, Section IV, pt. 2, para. 8; Davis, 2010).

An example of the latter would be the question in strategic management on how much CEOs explain firm performance, where for instance in Quigley and Hambrick's (2015) study, the answer basically depends on when you are asking, since the CEO effect widely varied throughout their explored periods.

The interpretive culture in strategic management, provides a different approach from a different epistemology: interpretivism. An interpretive epistemology (Bryman, 2012; Bryman and

Bell, 2007; Burrell and Morgan, 2005; Marshall and Rossman, 2006; Schwandt, 2007) aims “to understand the actual production of meanings and concepts used by social actors in real settings. A relativist stance is adopted such that diverse meanings are assumed to exist and to influence how people understand and respond to the objective world” (Gephart, 2004, p. 457). The interpretive culture in strategic management is an important step in the direction to accept and define strategic management as a human science. The latter is accomplished by embracing meaning, which is one of the key features (Merton, 1936) in which social phenomena differs from that of the natural sciences (Ghoshal, 2005; Hayek, 1974). “Strategy in the interpretive model might be defined as orienting... frames of reference that allow the organization and its environment to be understood by organizational stakeholders” (Chaffee, 1985, p. 93). This conceptualization on strategy has derived in many remarkable efforts to try to understand, for example, how a managers’ cognition affects the strategizing process (Barr *et al.*, 1992; Bogner and Barr, 2000; Eggers and Kaplan, 2013; Kaplan, 2011), or how the convergence of multiple cognitive frameworks in an organization might produce political processes that also affect strategy (Bradshaw-Camball and Murray, 1991; Pettigrew, 1973). However, interpretive strategic management has also been greatly influenced by classical science, which on the one hand, has allowed it to evolve and develop, but on the other, it has also generated important threats and roadblocks. First of all, interpretive strategic management has sometimes embraced classical science’s reductionism. Consider, for instance, Hardy and Thomas’ exploration of a “telecommunications company... Employing over 100,000 people and operating in over 100 countries, GlobalTel was one of the world’s biggest suppliers of mobile phones” (2014, p. 326). Their paper certainly provides unique insight into the strategy as discourse school in the interpretive culture (Langley and Abdallah, 2011). Nonetheless, their strategy as discourse exploration is still considerably reductive, as for example, it simplifies such a colossal

conglomerate to only a couple dozens of pages, and more importantly, it conceives strategy as generated barely by a couple of underpinning discourses. Such reductive processes are not uncommon, and given practical limitations, some argue they may be unavoidable.

Another challenge in the interpretive strategic management culture is that of method. In order to be able to explore meaning, many interpretive works are rightly done through qualitative methodologies. Yet the challenge of qualitative methodologies is that they are generally carried under uncontrolled conditions. Thus, at the same time that the researcher explores a specific variable, many others continue moving. Therefore, as Allen *et al.* argue, under uncontrolled conditions “all the different disciplines and domains of ‘knowledge’ will interact through reality—and so actions [and research] based on any particular domain of knowledge, although seemingly rational and consistent, will necessarily be inadequate” (2007, p. 403). Hence, one should expect interpretive theories to be holistic and pluralistic, being aware of all the plethora of variables that might be influencing them. Yet we usually see interpretive strategy expressed in the same reductive narrowed focus approach of classical science. This is illustrated, for instance, in the literature reviews of interpretive papers, which generally focus on one or at most a couple of specific types of literature, automatically ignoring others that could be relevant and needed since the work was done under uncontrolled conditions. For example, Danneels’ analysis of Smith Corona does provide a novel interpretive conceptualization of the RBV by combining dynamic capabilities literature with others such as cognition and marketing (2011). Nonetheless, this still necessarily ignores many other types of literatures, such as those on strategy and emotions, politics, economics, social conditions, or stakeholders, which given the uncontrolled conditions of the study might have been relevant.

Reductionism -and its requested narrow focus- is one of the possible legacies of classical science in interpretive strategic management. Another important legacy is the aspiration for lawlike statements, which given the usual lack of experimental controlled conditions in qualitative research, might be an inadequate aim. Let us go back to Danneels' (2011) whose interesting paper is a good example of an interpretive approach to the RBV. Danneels' exploration of Smith Corona is done mainly through an in-depth historical case study based on documents, company products, archival data and qualitative interviews. The paper states that "how and to what extent dynamic capability is exercised depends on executives' cognitions about their firm's resources" (2011, p. 21). This sounds reasonable; however, the main question that arises here is: how valid is it, for a mainly qualitative research project that did not control for the plethora of interacting variables (i.e. no *ceteris paribus*), to make such a classical science type of deterministic causal claim? Let us now look at Kaplan's (2008) engaging exploration on framing contests in strategy development processes. The paper "relied heavily on observations of everyday activities, using other sources of data—such as interviews and documents—to amplify and verify insights" (Kaplan, 2008, p. 733). This paper analyzes the interplay between cognition and politics in the process of strategy development. However, in this research carried under uncontrolled conditions (i.e. no *ceteris paribus*) some inevitable restlessness arises when one reads classical science type of claims, such as "I find that frames influence strategic choices, not in a deterministic fashion, but rather in one mediated by organizational framing contests" (Kaplan, 2008, p. 745).

As shown through the interpretive papers and theories used as examples, it seems that interpretive strategic management might reject classical science's epistemology; however, it might have not fully rejected classical science's atomistic ontology (Boisot and McKelvey, 2010). As it was illustrated with the examples of strategy as discourse (e.g. (Hardy and Thomas, 2014)), the

interpretive RBV (e.g. (Danneels, 2011)), or cognition, politics and strategy (e.g. (Kaplan, 2008)) interpretivist alternatives to positivist conceptions of strategy have (sometimes) continued following classical science, including reductionism. Furthermore, it seems that interpretive studies might not necessarily have rejected classical science's modernism, as it was seen that at least some interpretative studies are still aiming, somehow, at lawlike statements, as if the phenomena of interest could be fully known or mastered. I should emphasize that both interpretive and positivist strategic management cultures, through their classical science inheritance, have certainly made highly valuable contributions to our understanding of strategic management. This is true for all the papers I have analyzed. However, as my overview of these works has shown, roadblocks have also emerged. For example, I have argued that given the lack of experimental conditions and the difficulty to explore meaning and human doing in strategy, it is probably not fully adequate or appropriate to continue following classical science. Thus, the discussion here presented, evidences that strategic management has been historically entrapped by classical science inspired cultures, where the "Adoption of scientific methods has undoubtedly yielded some significant benefits for both our research and our pedagogy, but the costs too have been high" (Ghoshal, 2005, p. 77).

Beyond Classical Science in Strategic Management?

Given the difference in types of phenomena, it is not only the methodologies of classical science that might need to be rejected, but also its overall culture based on prediction, control, reductionism, and immutable lawlike causal claims (Allen and Boulton, 2011; Marion and Uhl-Bien, 2001; McMillan, 2004). The question has, thus, existed for many researchers in the past and currently, on how should strategic management be re-conceptualized. How could a new culture emerge in strategic management which detaches itself from classical science? Unfortunately, there

are not definitive answers. While some continue emphasizing the positivist strategy culture, others have kept arguing for interpretive strategic management, yet perhaps where better possibilities exist is in complexity.

Complexity theory explores systems made of interacting and interdependent parts (Holland, 2014; McMillan, 2004). In a complex system a plethora of interacting elements produce a system that is nonlinear, where the whole that emerges is not the mere sum of the parts (Lord *et al.*, 2011; Marion and Uhl-Bien, 2001; Uhl-Bien *et al.*, 2007). Thus, a peculiar yet truly important feature of complex systems is that of emergence, where in certain conditions the whole can, for example, self-organize (Lichtenstein and Plowman, 2009). Feedback networks are especially important in complex systems, where the output of an element could get recycled through the intricate networks to come back as a distorted input to influence again the original element (Stacey, 1995). This sometimes produces particular events in complex systems, such as when signals get amplified through the feedback networks producing then infrequent and radical events that could affect or sometimes even collapse the system (Anderson, 1999; Boisot and McKelvey, 2010; Holland, 2014). Moreover, complex systems are paradoxical, they are always changing, and yet their states might usually fall within a limited region (i.e. an attractor) of their state-space (Anderson, 1999; McMillan, 2004). In short, complex systems are likely to exhibit the property of chaos in some region of their state-space. Chaos simply means that the nonlinear system is still deterministic (i.e. its past still defines its future), while nonetheless, being sensitive to even tiny variations in its conditions that can derive in unexpected, yet sometimes restricted, divergences (Smith, 2007). Particularly important to strategic management are complex adaptive systems, which are characterized for their capacity to conceptualize their environments in order to learn about them and hopefully adapt to them (Holland, 2014; Mikulecky, 2001; Uhl-Bien *et al.*, 2007).

Given the intricate networks of multiple interacting elements, complex adaptive systems can be difficult to understand, with cause and effect relationships getting blurred (Stacey, 1995). Particularly important for complex systems is Ashby's principle or the principle of requisite variety, which states that "The adaptive capacity of complex systems is thought to depend on the match between internal complexity in an organization and the complexity of its environment" (Lord *et al.*, 2011, p. 105). In sum, complexity theory challenges classical science in various ways.

Recently, complexity has opened up a new door for strategic management. From a complexity perspective, organizations come to be seen as possible complex adaptive systems (Anderson, 1999; Stacey, 1995), which therefore demands a re-conceptualization of strategy and strategic management. First of all, organizations, as possible complex adaptive systems (McMillan, 2004), are conceived as looking to climb "uphill toward higher fitness" (Anderson, 1999, p. 224). Here fitness has to do with both survival and growth, and probably with the Holy Grail of competitive advantage too (Armstrong and Shimizu, 2007; Ghemawat, 1986). In other words, fitness in strategic management relates to competitive advantage, especially a sustained one (Hamel and Prahalad, 2005; Miles and Snow, 1984). After all, if organizations are aggregates of biological entities (i.e. human beings) it sounds plausible that beyond mere survival and growth, they aim to become dominant (Wilson, 2014), in spite of how impossible or ephemeral that might be. Consistent with Ashby's principle, organizations continuously morph (Rindova and Kotha, 2001; Uhl-Bien *et al.*, 2007), in efforts to link with their environments and to mirror their complexity. Strategy from a complexity perspective, therefore, is precisely what emerges (Mintzberg, 1978; Mintzberg and Waters, 1985) from that process or pattern of environmental adaptation. Thus, in strategy theories inspired by complexity, strategy is seen as the result of "an endless series of organizational microstates that emerge from local interactions among agents

trying to improve their local payoffs” (Anderson, 1999). Hence, strategy in strategic management becomes the emergent organizational response to “the demands of survival in a harsh physical environment” (Freedman, 2013, p. 5).

This conception of strategy leads to the classic debate on whether strategy is bottom up or top down (Hart, 1992). Certainly, for example, bottom up activities, such as the “autonomous strategic initiatives of individuals at the operational levels” (Burgelman, 1983, p. 241; Noda and Bower, 1996), influence and define strategy. However, the importance of top down processes cannot be denied either. In spite of the disparate and changing evidence (Helfat and Peteraf, 2014; Quigley and Hambrick, 2015), top management does probably have an important impact and influence on strategy and firms’ performances (Hambrick, 2007; Hodgkinson and Sparrow, 2002). Such influence might sometimes be properly planned, although is rarely purely rational (Bailey *et al.*, 2000; Shepherd and Rudd, 2014). More importantly, planned strategies usually are merely the result of looking for a “response to specific problems or opportunities and consider but few potential alternatives” (Gavetti and Rivkin, 2007, p. 424). Or, in Lindblom’s (1959) terms, sometimes top managers barely muddle through. Thus, there are both top down and bottom up processes shaping strategy, and additionally when these two meet, convoluted interactions happen, such as organizational politics (Bradshaw-Camball and Murray, 1991; Buchanan and Dawson, 2007; McDermott *et al.*, 2013; Pye and Pettigrew, 2006), among a myriad of other affecting factors that further complexify what can only be described as a difficult to simplify strategizing process. Therefore, complexity is forming a new culture in strategic management, where strategy is whatever emerges from the resulting interactions of such convoluted bottom-up and top-down processes. Let us call this the complexity culture.

Some important empirical papers have started to work with complexity reconceptualizations of strategy. It could be argued that works as classic as those from Mintzberg (1978; 1985) and his argument for realized and emergent strategies as well as other strategy as practice research (Jarzabkowski *et al.*, 2007; Langley and Abdallah, 2011) might already relate somehow to the culture of complexity. Other works more explicitly invoke complexity, such as Orton's (2000) exploration of the reorganization of the United States' intelligence service, which he portrays as messy strategizing with unintended consequences, where causal relationships get blurred and intentions lost. Another illustrative work is, for example, Browne and Eisenhardt's *The Art of Continuous Change* (1997, p. 1), which promotes the idea that organizations that thrive in hostile environments may be characterized "by remaining at the poetically termed "edge of chaos" that exists between order and disorder" (1997, p. 29). Another example would be MacKay and Chia's (2013) exploration of a Canadian automotive company. Basically, the strategy that took this company to its demise was probably the result of countless interacting factors, both internal and external. Regarding this plethora of interacting factors, managers in the company were sometimes able to do something to adapt to them; however, more generally managers' decisions tended to be incomplete and with unintended consequences, which ended up shaping an unexpected and undesired destiny.

The complexity culture in strategic management would be more holistic than simplistic and reductive. Thus, complexity's holistic approach might come to illustrate van Baalen and Karsten's claim that the "Incompleteness of disciplinary solutions will be corrected by new emerging inter-disciplines" (2012, p. 233). However, the complexity culture in strategic management has not seen many empirical papers as it would be needed in order to understand what its methods will be and whether these could correct the limitations of the influence of classical

science on the positivist and interpretive cultures of strategic management. Some papers like the one by Brown and Eisenhardt or the one by MacKay and Chia still use standard methodologies. For example, MacKay and Chia used an inductive approach based on semi-structured interviews. Thus, questions may still arise about whether or not these are enough. Nevertheless, such possible challenges might be solved with the shift in the underpinning science. One of the problems with classical science in the positivist and interpretive cultures of strategic management is that in spite of the differences in phenomena of interest, sometimes we still try to aim for the same outcomes of classical physics, especially accurate and full understanding and prediction. Nevertheless, complexity's culture acknowledges that if organizations are complex adaptive systems then cause and effect become blurred and difficult to distinguish. Therefore, the methods might remain, at least until now, the same but their values and aspirations have changed. In the classical science influenced positivist and interpretive cultures of strategic management, the parsimonious theorization was valued and accurate prediction was aspired, whereas in the complexity culture requisite theorization is valued (i.e. theory that mirrors the complexity of the phenomena it studies). And, more importantly, "Anticipation rather than prediction is, then, the best that we can hope for" (Boisot and McKelvey, 2010, p. 424). Table 1 offers a summary of the influence of science (i.e. classical science and complexity) on the cultures of strategic management (i.e. positivist, interpretive and complexity).

Strategic Management Cultures

	<i>Positivist Culture</i>	<i>Interpretive Culture</i>	<i>Complexity Culture</i>
<i>Influence from Science</i>	<p>Influenced by <u>classical science</u>. Its philosophical foundations acknowledge classical science's realism and objectivism, where theories allegedly mirror reality. There is a significant quantitative ethos. As in classical science, causal thinking governs the theories here. Following classical science's beliefs, we see efforts to construct lawlike -perhaps immutable- theories, like the RBV's generalization on which types of resources are important. In the spirit of classical science, there are some efforts done to track the trajectories of strategies in their state-space. This culture has been influenced by economics and rationality assumptions, although as always exceptions exist. Given important obstacles for experimentation in strategic research, experimentation is usually substituted for other types of statistical methodologies. Reductionism plays a key role here, where systems are still disintegrated into their parts (i.e. ontologically atomistic), as in the RBV.</p>	<p>Differs from the positivist one, as it partially rejects realism and objectivism. Here subjectivism is appreciated, and the social side of strategy is explored. Qualitative methods are usually preferred. In spite of this methodological, epistemological and arguably partial ontological differences with positivism, the interpretive culture is still influenced by <u>classical science</u>. We saw this in analyzing interpretive work, such as the interpretive RBV, or work on politics and strategy as well as strategy as discourse, where authors still strived for lawlike theorization. As in classical science, a reductive ethos permeates here, and thus, research tends to reduce intricate phenomena to that which is considered key. Classical science's causality assumptions survive in this culture, as it is generally assumed that one could explore the causal regime of a system by decomposing it to its parts (i.e. ontologically atomistic). And so, as in classical science, causal arrows keep generally pointing downwards, although exceptions as always exist.</p>	<p>A novel although still young and not fully developed culture seemed to be emerging. This complexity culture breaks away from classical science, as it follows <u>complexity science</u> instead, which is philosophically incompatible with classical science. Here we see people trying to understand strategy at the systemic level, and thus detaching themselves from reductionism. Organizations are perceived as complex adaptive systems, where the whole is more than the sum of the parts. And therefore, emergence occurs. Strategy comes to be conceived as emergent from bottom-up and top-down intricate systemic processes. The methodologies of this culture are still undefined. Some authors have used qualitative approaches, while others have used mixed methods. However, an important step in leaving classical science behind, might be the acceptance of complexity's rejection of causal thinking, as in complex systems causal links get lost.</p>

Table 1. Summary of the three identified cultures of strategic management. In no way these represent an exhaustive or comprehensive categorization, important exceptions exist, although these cultures do describe a significant part of strategic management theories.

Conclusion

In conclusion, the history of strategic management is messy and intricate. However, classical science's powerful influence on strategic management's positivist and interpretive cultures, seems to have guided the discipline for a long time now. The influence of classical science on strategic management seems to be paradoxical, as it has emerged or is illustrated in even contrasting epistemologies, including the positivist and the interpretive traditions of strategic management. Due to classical science's influence on strategic management, lawlike parsimonious reductive theories have been constantly looked for by both the positivist and interpretive strategy cultures. Sometimes this has derived in an effort to fully describe, predict and/or prescribe our phenomena of interest. However, limitations have been identified within both the positivist and interpretive cultures of strategic management, which might be related to their embracing of classical science. In looking for alternatives, it appears that the alternative ironically comes again from science, as their complexity theory appears to be slowly developing a different culture within strategic management. As in many other disciplines where complexity has been applied, in strategic management too "overall impact and importance of theories based on chaos and complexity is still uncertain" (Bryant, 2007, p. 130). Yet, in principle, the emerging complexity culture in strategic management seems to start defying reductionism and other limitations of the positivist and interpretive cultures and their underpinning classical science ethos. Nonetheless, complexity remains a younger alternative in which much more work is needed. And, more importantly, it seems evident that the key step of losing "the nostalgia for the lost [classical science] narrative" is still to be taken (Lyotard, 1979, p. 41).

The tension discussed in this article regarding the various cultures that have evolved in strategic management, some heavily influenced by classical science and a new one influenced by

complexity theory, is a crucial tension in order to understand the future of strategic management as a discipline. For a long time, people have complained that strategic management is fragmented in terms of its paradigms. This was clearly shown here, as I discussed a positivist, an interpretive, and more recently a complexity cultures (i.e. paradigms) in strategic management. These three cultures of strategic management differ on the methodologies they value, the approaches they take, and the theories they promote. And therefore, some claim that in strategic management there does not exist what Kuhn would call normal science (1996). In his legendary exploration of science, Thomas Kuhn observed that between scientific revolutions, a normal science is usually achieved, which allows scientists to share common beliefs, methods, approaches, theories and definitions of what science is. As Michael Polanyi noted (1946), it is this homogeneity in the beliefs among scientists, which allows science to self-organize, as scientists broadly agree on what science is and how science should be done (i.e. they basically share a common culture of science). In strategic management, it is argued that we have not reached a state of normal science. A situation that, on the one hand, causes significant struggles, as people do not agree on what strategic management is or how research in strategic management should be done. On the other hand, as the phenomena of interest for strategists is considerably more complex than that of physicists and chemists, I believe the variety of cultures that characterize strategic management provide great value, so that different perspectives and angles could be discussed when approaching our very complex phenomenon of interest. Some might say, nonetheless, that for the discipline to develop further more homogenization might be required. For which I feel confident the analysis made in this paper provides a unique insight. For long people have tried to portray the positivist and the interpretive cultures in strategic management as enemies, almost as complete opposites. Yet in this paper I have shown that there is something really important that both these cultures share: classical

science. In other words, I have shown how both the positivist and interpretive cultures in strategic management do share a common significant influence from classical science. This is important, because if strategic management is evolving in a Kuhnian way (1996), here we have found one step towards what we could call *normal strategic management*. Of course, as shown in the paper, the problem actually is that even as the positivist and the interpretivist have both classical science as a common ancestor, this might not be that good, as many of classical science's beliefs, methods and values could be inadequate for strategy. Thus a complexity culture was discussed as slowly and recently emerging in strategic management, which could potentially (although not necessarily) solve for some of the shortcomings of the classical science inspired positivist and interpretive cultures of strategic management.

In sum, a possibility has emerged. It could be possible that there is already a Kuhnian *normal strategic management*, which even though on the surface could have contrasting expressions (i.e. positivist and interpretive strategic management), at its deepest and most foundational level it is clearly supported by a common and almost shared faith on classical science and its methods, values, paradigm and ethos. It is that classical science common (shared) core that sets the ground for some sort of *qua normal strategic management*. In this context, many shortcomings were evidenced, as classical science was not found to be wholly appropriate for strategic management. And it was, then, that an alternative seemed to loom: complexity. A new and novel culture in strategic management that would defy the classical science underpinnings of both the positivist and the interpretive cultures. In other words, what if, in Kuhnian terms, complexity will mark a revolution in strategic management? The latter is, unfortunately, a question I cannot answer. Its answer will only come as the future becomes the past, and a new history is written.

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