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CHANCE, CHOICE AND DETERMINISM IN STRATEGY

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Abstract

Experience suggests that strategy entails some interplay of choice, chance, and determinism as causal elements. Specifically, strategy is predicated on causality, or the principle that strategic choices have causes as well as consequences. Yet our discipline lacks a fundamental theory of causation, one that integrates strategic choice and deterministic perspectives and leaves room for chance. In reply, we venture beyond strategy and the organization sciences into intellectual history and complexity theory. Not only does each tradition have a long and respected track record in confronting causation, but when combined they allow us to address epistemological and ontological issues alike. We conclude with three propositions on the nature of causation in strategy, and examine their epistemological and methodological consequences.

Keywords: **strategy, causation, intellectual history, complexity theory, philosophy**

Why do events—the record of which we call history—occur as they do? Is all chaos and accident? Or is there some single, central vision, some unifying principle, which can explain the immense variety of human actions on a battlefield, or in the history of a nation?

– Isaiah Berlin

Strategy, in practice and in scholarship, is predicated on causality, or on the principle that events have causes as well as consequences. Organizations develop strategies precisely because they believe these to contribute substantially to their performance and survival. At the same time our chronicles contain plenty illustrations of chance as a significant contributing factor in firm performance, not least Honda's much discussed success in the US motorcycle market. Moreover, the public domain offers a plethora of explanations of corporate failure, as a consequence not of poor choices but of the inevitable forces of competition, globalisation, government regulations, demographic changes, interest rate fluctuations or bear markets. Obviously, choice, chance and determinism matter; firm performance is likely to reflect an element of each. It is the common-sense view. But, surely, this intuitive view is dissatisfying on account of its triviality? After all, it gives no explanation of the relative importance of each or, crucially, of the relationship between them.

This article seeks to provide a meaningful conceptual approach to causation in strategy. The use of *meaningful* is deliberate as we make no claim of our account being *true*. How can we? After all, the problematic relationship between free will and determinism is tied in with the entire history of human thought, given its complexity and relevance to important philosophical puzzles such as causation, but also ethics, metaphysics, and time (Dorato, 2002: 339). In this respect, Nozick's admission is sobering: "I have spent more time thinking about the problem of free will – it felt like banging my head against it – than about any other philosophical topic except perhaps the foundation of ethics" (Nozick, 1981: 293). Here we merely argue that, in the absence of logical or empirical proof, our approach is rational. It is meaningful to the extent that it tackles one of the most fundamental problems in strategy scholarship, namely the nature of causation: To what extent is strategy 'determined', either by particular resource configurations, by competitive or industry dynamics, by institutional

pressures, or by other elements outside of the organization's control? To what extent are those in charge genuinely free to 'choose'? How can the public hold organizations accountable if it does not also believe these choices to have been made deliberately? What scope, if any, is there for chance to help account for the strategic choices and performance of organizations? More critically, determinism seems to undermine freedom of choice, and thus the value added by the process of strategizing, and yet organizational actors experience a sense of freedom when making choices. Can determinism and freedom of choice be reconciled to produce a concept of strategy that is reasonable as well as consequential? If so, what sorts of implications would this have for scholarship?

The task is to formulate a concept of strategy that allows for freedom of choice and thus grants human agency a constructive role. Strategy, by its very nature, would seem to necessitate a theoretical foundation that provides for freedom of choice. After all, it is the assumption of free will that gives rise to such strategy process orientations as the design, planning, positioning, entrepreneurial, learning and cognitive schools (Mintzberg et al. 1998) Each takes some measure of freedom for granted. It also justifies the significant compensation packages awarded to senior executives, and allows us to hold them accountable for their strategic choices. Even if this assumption is corroborated by our everyday experience, strategy does not appear to have a theoretical basis to account for freedom of choice. Lastly, even claims of correlation, the staple of empirical papers, are pregnant with allusions to causation. Moreover, to explain organizational performance generally means to identify its causes. And it is this bolder research agenda into the nature of causation that this article seeks to revive.

With this aim in mind we formulate three propositions that hypothesize causal conditions as pivotal but leave room for choice and chance. The process by which we arrive at these is as follows. We begin with a review of the strategy and organization sciences literature to characterize deterministic and voluntaristic approaches, as well as attempts at reconciliation. Second, we broaden the theoretical base in which strategy is traditionally grounded by drawing on contributions from two distinct disciplines, intellectual history and complexity theory. This approach allows us to revisit epistemic and ontological positions, in that order. We conclude by means of propositions that posit causal conditions (the raw materials of determinism) as pivotal insofar as choice and chance are necessarily contingent on it. It is, we

argue, rational and practical to think of these as reciprocally implicated. We conclude with a discussion of implications for scholarship.

Consistent with the scope of our argument, we deliberately rely on broad definitions: *Chance* refers to an event of which the cause is unknown or unknowable. A helpful example is the flipping of a coin. If only we were we able to account for every variable (speed, surface, density and humidity of the air, etc.) we would be able to accurately predict its outcome. Yet because the event is sensitive to so many variables, no feasible list of conditions could be singled out as the cause, making it a perfect randomising device (Dennett, 2003: 85). *Choice* is defined as the *freedom* of organizational actors to choose and act of their own will. *Determinism* suggests that every choice is determined by antecedent causal conditions that are *sufficient* to bring about particular choices. For every choice, the conditions preceding it are sufficient in and of themselves to produce *that* choice, and that choice could not have been different unless these causal conditions were different also (Searle, 2001: 277). *Causality* is the principle that events have causes. *Causal conditions*, a concept introduced later in the paper, refers to a plethora of variables such as experience, habit, circumstance, particular dispositions, the structural properties of social systems, institutional pressures, culture, the dynamics of industry and markets, technological developments, resource constraints, and causality itself. Finally, *strategy* is broadly conceived to include strategy *content* as well as strategy *process*.

Choice, chance and determinism in practice

The development of Pfizer's erectile dysfunction drug Viagra may serve as a useful metaphorical example of strategy in the context of pharmacology, as it involves the interplay of chance, choice and determinism. A research programme into hypertension began by an in-house team of scientists in 1985. Within a few years of starting the research it became clear that the lead compounds for hypertension were causing biological activity through an enzyme that is found in the vascular smooth muscle and blood platelets. As a result, the scientists shifted their focus towards developing a medicine to combat angina by relaxing the blood vessels. In 1989, Pfizer scientists identified a compound, *sildenafil citrate*, which they entered into clinical trials in 1991. With an early phase, still ongoing, Pfizer was granted permission to proceed with a second phase using angina patients, having demonstrated the drug was sufficiently safe. The trial results were disappointing. However, clinicians running the ongoing Phase I seven-day safety studies had learned of some interesting side effects to

the drug: trial volunteers on high dosages of the drug had reported frequent and sustained erections. Pfizer decided to commit another 1,500 individual scientists and $340 million to the project and to repeat Phase II clinical trials using impotent men as a target group. The drug's effectiveness was, this time, beyond doubt. Controversially, in November 2000, the UK High Court of Justice revoked Pfizer's lucrative patent for reasons of 'obviousness'. Lilly ICOS, a joint venture between Ely Lilly and ICOS Corporation to pursue the same disease target (erectile dysfunction) had filed a claim to invalidate and revoke the protection enjoyed by Pfizer for the medical use of a number of chemicals, including sildenafil citrate. One of the chief arguments invoked by Lilly ICOS, the petitioner, was the fact that the patent was 'anticipated by a single piece of prior art' and 'obvious over a number of pieces of prior art'. In other words, Lilly ICOS claimed that Viagra's discovery was inevitable. Although the application to erectile dysfunction may have comprised a random discovery, the effect of sildenafil citrate on blood vessel behaviour was well documented. Although the case of anticipation ultimately failed, Lilly ICOS was successful in persuading the court to invalidate Pfizer's patent for reasons of obviousness.

Chance played a significant role, but so did choice and determinism. In Pfizer's case, the existence of 'prior art' provided Pfizer with sufficient cause for allocating a further $340 million to the research project. This strategic decision made sense in view of the relevant medical knowledge at the time and the prospect of salvaging sunk costs by rescuing a research programme. The chance discovery of the drug's side effects opened up an alternative possibility that was subsequently exploited by Pfizer. Chance (e.g. unexpected side effects), choice (e.g. decision to reallocate old, and commit new, resources to the project), and determinism (e.g. state of medical circumstances, which inevitably lead to the discovery) can be seen as collaborating in Pfizer's R&D strategy, to the extent that to omit any of these would be to render a misleading, or at best incomplete, tale.

Chance, choice and determinism in the organization sciences

As in the above example, chance, choice and determinism appear to be inextricably intertwined in the production of strategy. In some cases, organizational strategies succeed or fail following a succession of choices in response to an unfolding (constraining) context whose creation they contribute to, but cannot accurately predict or control. In others, chance plays an important role. Mintzberg (1987a) employed a pottery-maker metaphor to illustrate

how strategy, affected by random events, is best viewed as a combination of deliberate and opportunistic moves. Strategy emerges, rather than being formally planned and executed. Perrow (1984) examined a related (though not identical issue), namely the process that leads to 'normal accidents'. He described how a sequence of fairly trivial choices can generate unexpected consequences, but also that tightly coupled actions (as is often the case in strategy) frequently produce results that could not possibly have been predicted. In any of these examples there is no doubt that actors exercise freedom of choice in taking action. In each, however, the process appears to develop a dynamic of its own that eludes the control of those who initiated it.

Determinism versus voluntarism: the debate in the organization sciences

Such works contrast with efforts dedicated to the premise that strategies are significantly determined by environmental and institutional pressures (Aldrich, 1979; DiMaggio and Powell, 1983; Hannan and Freeman, 1977, Murray, 1978; Tushman and Romanelli, 1985). Porter's (1980) suggestion that profitability is contingent on five generic forces is still part and parcel of strategy. The resource-based view, as advanced by Barney (1991), Grant (1991) and Rumelt (1984, 1991), remains committed to key resources and capabilities as preconditioning firm success. They also contrast with works that show how organizations can actively shape their future and control their environment (Child, 1972; Pfeffer, 1982; Pfeffer and Salancik, 1978). Two assumptions lie beneath these conflicting approaches. First, resistance and rigidity prevent organizations from adapting to changing situations, allowing the environment to select the fittest from among a given population. In similar vein, internal capacities induce specific paths that firms can take. Second, it entails a belief in organizations as possessing the means to shape their environment so as to provide the necessary inputs for their success. They are able to direct their destinies by creating the sorts of conditions that help them achieve their objectives.

Determinism versus voluntarism: attempts at a reconciliation

Various authors have proposed less dichotomous views of strategy, including Astley and Van de Ven (1983), Bedeian (1990), Benson (1977), Bourgeois (1984), Hrebiniak and Joyce (1985), Lawless and Finch (1989), Weick (1979), and Zeitz (1980). Their contributions seek to span the divide between determinism and voluntarism. Other important exceptions include the works of Whittington (1988, 1992) and Pettigrew (1985, 1987) who, by drawing on critical realism (Bhaskar, 1978, 1979) and structuration theory (Giddens, 1976, 1984),

proposed less dichotomous treatments of organizational processes. Theirs is broadly a view that strategy is unlikely to be the outcome of a linear process. Multiple actors engage in a process of interaction and yesterday's actions induce today's reactions, which in turn produce new courses of action. In strategy formation, rationality fuses with intuition, chance and a myriad of other processes where internal and external agents act, interact, tinker and hesitate, taking advantage of some opportunities while failing to spot others (Mintzberg et al., 1976). Formality, structure, and control are confronted with the informal, non-structured, and autonomous (Fombrun, 1986; Jauch and Kraft, 1986; Nystrom, Hedberg and Starbuck, 1976; Quinn and Cameron, 1988; Weick, 1977; Mintzberg and Waters, 1985). In the former, decisions follow an orderly progression of problem identification, the search for solutions, selection, and implementation (Glueck, 1980; Stagner, 1969). In the latter, decisions originate from organizational 'garbage cans' in which problems are generated from inside and outside the organization, and solutions are the outcome of comparatively random and opportunistic processes between actors (Cohen, March and Olsen, 1972; March and Olsen, 1976; Padgett, 1980; Starbuck, 1983). Yet, emphasizing determinism or choice at the expense of either risks artificiality, as strategy comprises processes that are complex, interactive and dynamic, and seems to implicate chance, choice, and determinism alike.

Despite insightful efforts at reconciling determinism and choice, no comprehensive theory has yet emerged to explain causation in strategy. Specifically, strategy lacks a theory of choice. This observation seems as ironic as it is surprising. After all, choice and causation lie at the very core of the discipline. James' observation is perfectly germane to our quest: "I know of no subject less worn out, and in which inventive genius has a better chance of breaking new ground…but of deepening our sense of what the issue between [determinism and freedom of choice] really is" (1923: 145). It seems we need a theory that corroborates our experience of freedom when making choices. Specifically, this theory would need to address three issues:

1. The extent to we must regard ourselves as free in order to choose, being able to assign priorities to reasons and deliberate their consequences;
2. The extent to which we can be held accountable for our strategic choices, and hold others accountable for theirs;
3. The extent to which freedom of choice and determinism can be reconciled, allowing us to explain strategic choice as it relates to the determinism of e.g. population ecology, contingency, resource-based, and industrial organization perspectives.

In reply, we broaden the theoretical base in which strategy is traditionally grounded by drawing on contributions from intellectual history and complexity theories. The reasons for this are as follows. Most decisively, intellectual history (or the history of philosophy) provides epistemological arguments for causation, specifically on the relationship between determinism and freedom of choice. By contrast, complexity theories originate in the natural sciences and are therefore concerned primarily with ontology. Consequently, these distinct traditions allow us to study intellectual positions on causation (epistemology) alongside observations derived from empirical experimentation (ontology). Second, intellectual history and complexity theories are fields in which causality has been extensively discussed, allowing us to take advantage of the rigour and maturity of these discourses. Third, the two disciplines are no strangers to the strategy field. Complexity theories have been applied to organizational analysis by, for example, Drazin and Sandelands (1992), McKelvey (1997), and Thietart and Forgues (1995), while philosophical arguments have been put to use by Singer (1994), Mir and Watson (2000), and Powell (2002; 2003), among others. Our paper thus follows in the footsteps of comparatively recent but promising developments, but is relatively unique in our field by comparing contributions from both. Philosophers, incidentally, increasingly call upon developments in such natural science disciplines as quantum physics, neuroscience, biology, and complexity theory to inform their theorizing (Dennett, 2003; Searle, 2001). Finally, by engaging three disciplines we hope to develop a genuinely inter-disciplinary framework.

Chance, choice and determinism in intellectual history

Aristotle may have been the first to formally attempt a systematic analysis of causation, assigning it four categories: material[1], formal[2], efficient[3] and final[4]. Yet it is this final cause that seems to have permeated the writing of history, namely an unswerving faith in and orderly and purposeful world. As Isaiah Berlin repeatedly emphasized, historical writing is driven by the belief that behind the variety and chaos of human experience there lies one single objective world of facts and values that is discoverable, if only we apply the proper method of investigation. This undercurrent of purpose, order, and necessity has been particularly prominent in intellectual history, as in historical writing generally. A relevant example is Tolstoy's epic *War and Peace*, for it challenges traditional treatments of causation, not least by questioning teleology as a driving force in history. At over 1,200 pages

in length, it comprises a detailed account of the Napoleonic wars, based on factual historical records. Tolstoy always described himself as genuinely interested in historical accuracy, as opposed to the writing of fiction per se and, notwithstanding criticisms, his novel may reasonably be seen as accurate in matters of historical fact.[5] In it, Tolstoy disposes of the heroic theory of history. He emphasizes the relative unimportance of those in charge, and the degree to which battles are shaped by spur-of-the-moment, localised initiatives. "In every battle", Tolstoy argued, "there is a necessary lie": the act of artificially removing from official accounts the fear, shame, and presence of death that characterize and shape any battle. His counsel to historians is thus not surprising: "to study the laws of history we must completely change the subject of our observation, must leave aside kings, ministers, and generals, and study the common, infinitesimally small elements by which the masses are moved. No one can say in how far it is possible for man to advance in this way towards an understanding of the laws of history; but it is evident that only along that path does the possibility of discovering the laws of history lie" (1998: 881). Incidentally, this council has relevance for scholarship in strategy. First, it suggests that strategy is likely to be a function of multiple, complex processes, only some of which are under managerial control. Second, it follows that strategy research needs to account for the 'common and infinitesimal', the general and the particular. It may thus need to entail 'thick' description and "a more penetrating and reflective approach to the study of organizations" Van Maanen (1979: 526).

The persistence of determinism in historical writing

While Tolstoy took pains to describe the voluntary initiatives of his characters, he deeply believed these to be guided by a deep-seated determinism. Free choice is an illusion—there is a natural law by which the lives of human beings are determined. For this Tolstoy had no empirical evidence, but he thought it true on philosophical grounds. Freedom of the will was thus an illusion, derived from our ignorance of true causes (Berlin, 1999: 28). Hence the paradox of Tolstoy's view of history: his keen eye for that which set people apart and the freedom by which they made their choices, and yet his unrelenting belief in determinism and the impossibility of genuine freedom of will. Isaiah Berlin, arguably the most important intellectual historian of recent history, described Tolstoy as the "most tragic of the great writers", and wryly concluded that Tolstoy's acute sense of variety in reality proved at odds with any moral ideal he sought to construct "out of the fragments into which his intellect shivered the world" (Berlin, 1999: 81). Thus, in Tolstoy's determinism there was no scope

for genuine freedom of choice. By implication, there remained no room for chance, for he thought chance to signify no more than a lack of understanding. Were one omniscient, one would not speak of chance. Chance, remarked William James, is a notion no sane mind can, even for an instant, tolerate in this world (1923: 153). Tolstoy's is a viewpoint in sharp contrast with one of the oldest and most poignant documented references to chance from the author of Ecclesiastes: "Again I saw that under the sun the race is not to the swift, nor the battle to the strong, nor bread to the wise, nor riches to the intelligent, nor favour to the skilful; but time and chance happen to them all" (Ecclesiastes 9:11, NRSV).

Isaiah Berlin takes issue with Tolstoy. The notion that history obeys certain laws, wrote Berlin, has deep metaphysical origins and is fed by an infatuation with the natural sciences. Its principal source lies in the teleological outlook of Western philosophy, whose roots reach back to the very beginnings of human thought. This attitude, argues Berlin, is profoundly anti-empirical. We attribute purposes to all things and persons not because we have evidence for this hypothesis: "We are plainly dealing not with an empirical theory but with a metaphysical attitude which takes for granted that to explain a thing is to discover its purpose" (Berlin, 2002: 103-4).

This principle of determinism is a subtle and pervasive force not just in the religious or metaphysical thought of Aristotle, the later Tolstoy, and, for that matter, Augustine, but even in the secularised and rationalised works of Hegel, Marx, Ranke, Carlyle, Michelet, Montesquieu and Comte (Geyl, 1970: 279). Of relevance is Berlin's claim that to apply such determinism to historical explanation may be misleading. The divide between determinism and choice may be a legitimate concern for philosophers and theologians but cannot be so for historians, for even if all actions and events did fit together in a closely knitted, purposeful order, the sheer complexity of articulating this pattern would require omniscience, rendering it impossible (Geyl, 1970: 281).

Consistent with Berlin, the historian Carr deduced that history entails the lining up of events in an orderly sequence of cause and effect, a selective process in which the intellect is implicated. By it we select according to purposes. "The axiom that everything has a cause is a condition of our capacity to understand what is going on around us" (Carr, 1961: 122). Thus, throughout human history we have found it meaningful, even necessary, to think of events as somehow interconnected, as contributing to a grand narrative. Its plot conveys its purpose,

and causes the variety of experience to appear as connected and coherent. Strategy, by most definitions, is intrinsically teleological in focusing on means to ends. This is true even when broadening the definition of strategy to incorporate plans, patterns, positions, perspectives or ploys (Mintzberg, 1987b). Purpose lies at the heart of each of these, either via design or post hoc rationalization. Whether determinism exists aside from the teleology imposed by human agency, and whether freedom of choice can exist *if* determinism is true, remains to be addressed.

Perspectives on the relationship between determinism and freedom of choice

The history of philosophy contains three contrasting viewpoints on the relationship between determinism and freedom of choice. On the one hand there are those who believe that determinism is fundamentally incompatible with freedom of choice. These divide into the *hard determinists* (on the side of determinism) and *libertarians* (on the side of freedom). On the other hand there are the *soft determinists*, who suggest the two can be reconciled. These three factions are connected by a common belief that human actions (and, by implication, organizational strategies) may be subject, in principle, to causal explanation (Dorato, 2002: 342). Their central contention focuses not just on whether determinism is true, but whether we can be free *if* determinism is true. Sophisticated, divisive arguments have been developed around each position, given the absence of any definitive, objective proof. It is worthwhile reviewing each briefly.

Hard determinism

Hard determinists, such as Laplace, d'Holbach, and Calvin subscribe to the view that all actions are causally determined and that their causes can be traced to events preceding our own existence, and are thus beyond our control (Dorato, 2002: 342). As put by Dennett (2003: 134), if determinism is true, our choices are fixed by the laws of nature and events in the distant past; given that it is not up to us what these laws and past events are, our choices are fixed by circumstances outside of our control. Hence, we are not free. By implication, we cannot be held accountable for our choices.

Soft determinism

In contrast, soft determinism (or compatibilism) suggests that reconciliation between determinism and freedom of choice *is* possible—after all, we have an experience of freedom when choosing. Agency is determined in that it is no exception to the way other natural

events are caused when caused deterministically. In other words, the will is regarded as any other natural mechanism, fully determined by preceding causes (Dorato, 2002: 343-4). To use Spinoza's metaphor, human agency might be seen as akin to a stone in free fall under its own weight, but convinced that it can choose the place, velocity and time of its fall. While organizational actors may think they make free choices, this is, in fact, an illusion fuelled by their ignorance of each and every cause determining these choices. Freedom, according to the soft determinist, is the power to do what one wants, even if this 'want' is itself determined. We may think we are free but these thoughts are, in fact, wholly determined (in the manner by which causal laws regulate the physical world), a position not dissimilar from that held by Tolstoy, Hobbes, Locke, Hume, and, more recently, the behavioural psychologist Skinner (Dorato, 2002: 342). It assumes causation in nature and imposes this on the mind also. Reason, argued Hume famously, is thus slave to our passions for our desires use reason merely as a necessary means to their fulfilment. Sophisticated arguments exist to argue for the possibility of genuine, rather than imagined, freedom even if determinism is true (e.g. at the molecular or cellular level). For instance, Dennett's (1984, 2003) recent suggestion that freedom is the product of a Darwinian evolutionary process is a good example, as is Searle's (2001) hypothesis on the possibility of physical determinism and psychological freedom coexisting (despite Searle's own reservations regarding this hypothesis). Whether it actually matters that we are free in a real sense or, instead, operate under some illusion of freedom is a debate better left to philosophers.

Libertarianism

Libertarians, such as Kane and (it appears) Searle, take issue with soft determinism by suggesting that we are, in fact, able to reflect upon our passions. Surely, we have a sense of being free when deliberating about a choice? There exists a 'gap' between desires, beliefs and impulses and the actual process of choosing. This gap between cause and effect must be presupposed if one is even to begin a rational decision making process (or else we would be simply acting on impulse), and it is this gap that constitutes freedom of choice. As Kant surmised long ago, the process of deliberation can proceed only on the premise of freedom—on the presupposition of a gap between causes (e.g. beliefs, desires) and effects (i.e. choices) (Searle, 2001: 14). Hence, any causal conditions preceding choice are not in and of themselves sufficient to produce that choice. This also requires the availability of alternative possibilities, each with its own payoff structure, from among which a choice can be made (Searle, 2001: 15). Based on such alternatives, organizational actors develop preferences by

assigning importance to reasons for, and against, specific choices. Preferences are thus a consequence of successful deliberation, rather than a precondition for it, and not the inevitable corollary of desires, impulses or beliefs. In fact, Searle suggests that some choices may well be wholly independent of desire (2001: 29).

The libertarian position has relevance for strategy as follows. First, it endorses the view that we must regard ourselves as free in order to rationally deliberate about what to choose. Even if this deliberation is ultimately itself be determined, in the absence of logical or empirical proof we will never know. In practice, organizational actors are unlikely to feel enslaved to their passions as they can choose to disobey them occasionally (e.g. 'one time won't hurt'). Also, beliefs and impulses may occasionally be incompatible—for instance, when belief tells us it is right to jump in a fast-flowing river to save a dog's life but impulse advises self-preservation—forcing deliberation and choice. Finally, organizational actors may at times be indifferent to a given set of alternatives (e.g. working on Christmas Day or spending time with the in-laws), which wouldn't make sense if not for freedom of choice. Given that many strategic decisions involve tradeoffs of some kind, this process of assigning degrees of importance to reasons entails freedom.

Second, many of our deep-seated attitudes make no sense without freedom of choice. There is no reason why one should feel resentful, administer punishment, assign blame or praise if not for the belief that others are free to choose and act as they wish. If determinism were true then it would be quite irrational to celebrate the achievements of Warren Buffet, Bill Gates and Jack Welch or to point accusingly at the likes of Dennis Kozlowsky and Bernie Ebbers. After all, they could not have chosen differently, as their choices would have been fully determined and outside of their control (even if they themselves felt they were acting freely).

Third, organizational actors need not only regard themselves as free but need the concept of causation to be free. Causality is meaningful to the extent that actors need to be able to predict the likely consequences of their choices so as to freely make these choices. How could they be genuinely free if unable to anticipate their outcomes, however crudely? It may not be necessary to anticipate these very precisely so long as our vantage point can give us significant advance warning to make necessary adjustments, rendering navigation and suppleness important strategic skills. Causation and strategic choice are thus implicated in a relationship of necessity: genuine freedom of choice cannot exist without the belief in

causation. But, unlike the determinist position, these causes are not in and of themselves sufficient to bring about a choice. Choosing requires deliberation. This does not imply that our deliberations are unaffected by constraints, such as the structural properties of social systems, dispositions, habit, background conditions, legal or physical constraints or institutional pressures. It merely suggests that these causal conditions are not sufficient to produce choice. Hence, determinists and libertarians alike accept the presence of causal conditions. But whereas the determinist will find their presence sufficient to account for particular choices, the libertarian insists on a gap between these and the actual process of choosing. This gap is freedom.

The necessary connection between choice and causal conditions appears consistent with Berlin's later views. A firm advocate of free will and individual responsibility, Berlin nonetheless believed in the applicability of causal laws to human or organizational history (a proposition which he would have considered it insane to deny). As he wrote in the introduction to his celebrated *Four Essays on Liberty*, history cannot be viewed as a mere conflict between individual wills (and thus void of determinism). Knowledge, especially of scientifically established laws, renders us more effective whilst also extending our freedom, which is "liable to be curtailed by ignorance and the illusions, terrors, and prejudices that it breeds" (Berlin, 2002: xxxv). Moreover, there is plenty of empirical evidence for the view that the frontiers of free choice are a good deal narrower than many men have in the past supposed (2002: xxxv). Thus, objective patterns in organizational life may be discernable but need not preclude freedom of choice.

Fourth, a libertarian position is accepting of chance. This position is, according to some, enhanced by developments in quantum physics, where randomness appears to exist at the subatomic level. And if so, there is no reason why this should not also be the case at higher levels (cf. Dennett, 2003: 98). Hence, libertarianism has no difficulty in allowing chance to affect the decision-making behaviour of organizational actors.

In summary, in strategy we have good practical reason to hold to some form of libertarianism for (a) it allows us to hold companies and individuals morally responsible for their strategic actions; (b) it helps legitimise deep-seated attitudes (e.g. resentment or appreciation); (c) it explains the experience of freedom when deliberating about strategic choices (e.g. by assigning a relative importance to various reasons for, or against, a particular strategic

decision); and (d) it emphasizes the importance of anticipation, or the belief (central to our discipline) that strategic choices have causes as well as consequences. In the absence of logical or empirical proof of the precise mechanism *causing* individual and collective choices, this attitude can be held rationally.

Chance, choice and determinism in complexity theory

Complexity theory, likewise, is concerned with understanding the processes by which complex, irregular phenomena can achieve an appearance of order, and those by which simple deterministic phenomena can become apparently driven by chance. Complexity theory was not originally intended to speak to social forms of organizing, but has nonetheless been found useful in a metaphorical sense by explaining process in organizations, and also in an ontological sense by informing contemporary philosophy. Typically, organizations are viewed as comprising multiple actors with diverse agendas, internally and externally, who seek to coordinate their actions so as to exchange information, act, and interact in a non-linear and dynamic fashion.

At least three observations from the study of non-linear dynamics and complex systems are scientifically well established, and relevant to our inquiry. First, "processes that appear to be random may be chaotic, revolving around identifiable types of 'attractors' (a limited area in a system's state space that it never departs) in a deterministic way…". Behaviour of these complex processes "can be quite sensitive to small differences in initial conditions... Consequently, historical accidents may 'tip' outcomes strongly in a particular direction". Second, "complex patterns can arise from the interaction of agents…. These patterns are emergent". And third, "complex systems tend to exhibit 'self-organising' behaviour: starting in a random state, they usually evolve toward order…." (Anderson, 1999: 217-218). These results stress the fact that deterministic systems can exhibit an apparent randomness that is nevertheless contained within a limited domain (Ruelle, 1991). They also highlight that, within this domain, behaviour is sensitive to initial conditions (Lorenz, 1963). Moreover, in case of increasing return (positive feedbacks), they are process dependent (Arthur, 1994). Furthermore, from random interactions between system's entities, complex patterns may emerge (Holland, 1995). And, finally, some systems, in a random state, can gradually self-organise to achieve an order (Kauffman, 1993) larger than the aggregated interactions of the independent entities they are made up of.

These findings derive from different branches of complexity theory. One stream (attraction and sensitivity) is typical of chaos theory. A second (path dependency) is related to self-reinforcing non-linear dynamic processes. A third (emerging regularities) belongs to complex adaptive systems theory. A fourth (order creation) is representative of self-organising systems theory. In all these theories, conjunction of chance, choice and determinism in the shaping of systems behaviour is clearly present.

Deterministic chaos

Chaos theory has received a considerable amount of attention in the natural sciences (Allen and Sanglier, 1978; Ruelle, 1991), and, more recently, in social sciences (Brock and Malliaris, 1989; Cheng and Van de Ven, 1996). It is a mathematical approach to the evolution of dissipative non-linear dynamic systems characterized by low dimensionality. Interactions between simple relationships can evolve into a highly complex network, the behaviour of which is impossible to anticipate. Any such systems can be stable, periodic in behaviour, or chaotic. The transition, or bifurcation, from stability to periodicity to chaos takes place when the coupling between forces of stability (negative feedbacks) and instability (positive feedbacks) increase. The coupling between forces can be changed by fiat (choice) or when subjected to random (or chance) shocks. Once put into motion, however, the combination of these forces may lead to a deterministic route the end of which can, nonetheless, not be predicted. When in a chaotic state, behaviour is attracted and contained within a strange shaped frontier called 'strange attractor' (Ruelle and Takens, 1971). Within the attractor, even though behaviour is deterministically driven, prediction is impossible except for the very short term. Determinism leads to surprising and unpredicted results. In fact, a small change, the effect of which is multiplied over time, can easily produce a dramatically different evolution. Choice, based on past experience, will typically not generate the anticipated outcome. Chance challenges the state of the system, which can derail towards chaos where apparent uncertainty prevails. In this situation, strategic choice rarely guarantees a particular outcome but for the very short term. The complex system of decisions and actions develops determinism of its own. This theory has already been applied to the study of organisational events such as innovation (Cheng and Van de Ven, 1996) and crisis (Thietart and Forgues, 1997). These studies show that what appears to be a random event is deterministically driven. The succession and interaction of decisions create a very complex behaviour which develops a dynamic of its own based on the multiple choices made by the

organisational actors. Freedom of choice appears to create its own determinism which outcome is impossible to predict.

Path dependency

Unrelated to chaos theory, but similar in its sensitivity characteristics, positive feedback economic systems (Arthur, 1990) illustrate the mechanism of path dependent evolutions. According to Arthur (1990: 92) "once chance opens up a particular path, it may become locked in regardless of the advantages of other paths" giving some firms a self-reinforcing initial advantage. Small perturbations, then, determine the optimal pathway, which need not be the most efficient. They tend to tilt parts of the economy "into new structures and patterns that are then preserved and built upon…." and which are in part "the result of historical chance" (1990: 99). In those situations described by Arthur (1994), an initial strategic advantage, which could be the result of the combination of past strategic choice and chance, is the "cause" behind market domination. In similar vein, Kuhn (1970) and Sterman and Wittenberg (1999) emphasized path dependency in the crucial role played by situational contingencies in paradigm dominance in the context of scientific revolution. They find that "the fate of a particular new theory or paradigm is strongly conditioned by the circumstances surrounding its creation and weakly influenced by its explanatory power" (1999: 338). Even if, in the latter course of scientific development, choice and chance play a role, the reinforcing process is nonetheless driven primarily by initial conditions.

Complex adaptive systems

Complex adaptive systems and self-organised systems theories rely on an entirely different paradigm. Here the issue is not the search for simple causes to complex outcomes but to understand how simplicity emerges from complex interactions. In complex adaptive systems theory, complexity arises from the aggregated behaviour of interdependent adaptive agents driven by a set of rules (Gell-Mann, 1994; Holland, 1995). Agents, following rules, adapt to each other to create an emergent order. A given set rules governing interaction, a specified number of interacting agents, and random events, seem to uncover a 'hidden' process. Once in motion, the process follows a route towards a stable end, periodicity, or even apparent randomness. Ever since Conway's game of life (1976), successful and more comprehensive computer applications have developed in the field of organisation: from the study of emergent social behaviour (Epstein and Axtell, 1996) to organisational adaptation (Carley and Svoboda, 1996) and culture formation (Harrison and Carrol, 1991). In these models,

emerging behaviours are achieved through the interaction of agents. Stable patterns are not just the outcome of random encounters. Internal dynamics and random events coalesce and produce (following multiple paths) different orders. Questions thus arise concerning the role of causation and the nature of the order that emerges, and in which chance plays a key role. The nature of the interaction itself, however, is deterministic; rules are fixed by choice or by nature. Once chance has opened up opportunities for viable alternative combinations, the system evolves towards an un-programmed, emerging order.

Self-organising systems

Self-organising systems theory, autogenesis or synergetics (Haken, 1977; Kauffman, 1993; Nicolis and Prigogine, 1977; Prigogine and Allen, 1982), aims at studying the emergence of order out of the interaction between entities such as DNA and RNA molecules (Kauffman, 1994), chemical elements (Prigogine and Stengers, 1984), and organisational actors (Drazin and Sandelands, 1992). Self-organisation is a naturally emerging process of organising found in dissipative systems subject to energizing tensions. There is no specific programme to create a given form of order. Ongoing interactions may generate any form of organisation. In the physical world, autocatalytic processes help to reinforce whatever order emerges. In organisations, order can result from learning processes by social agents who look for local solutions to budding problems. As a consequence, order may result from synergies among individual initiatives. Many debates have occurred on the origins of self-organisation. Once put into motion, systems' entities adapt following their interaction. It is in the zone of instability, far from equilibrium, that changes are taking place, allowing some order to emerge. From a given initial state, dynamic interactions might lead to similar states as if systems' entities were attracted to a pre-ordained configuration. This is consistent with Prigogine and Stengers (1984), according to whom a determined order is created because it was there to be discovered in the first place.

A co-evolutionary perspective

Within the realms of the organisation sciences more broadly, new orientations emerge following random encounters of competencies which create something different from a simple arithmetic totting up (McKelvey: 1997, 1999). These encounters do not take place in an ordained manner, nor do they evolve in a completely disorderly manner. Through their interactions agents learn and adapt to each other to create something new. McKelvey (1997) likened organisations to quasi-natural phenomena, where human intentions and natural

processes are intertwined. In his view, organisational processes should be viewed in a co-evolutionary perspective. Order, then, is the result of many "Darwinian variation, selection, retention, and competitive struggle effects at different levels…" (1997: 360). Here "Darwinian machines at a higher level operate to create order at lower levels; order that may be governed, in part, by simple rules." (1997: 361). According to his theory, idiosyncratic intentions are present at a micro-level. However, "micro-evolutionary order…emerges in the context of macro-evolutionary selection and competitive pressure." (1997: 361). There is choice to the extent that individuals create the context for such encounters to unfold. There is determinism too, by virtue of the institutional contexts of organisations and their environments. And there is chance. Once put into motion the emerging behaviour assumes a life of its own unless interrupted by fiat.

In summary, if we accept that strategy is a function of complex processes, determinism, choice and chance are likely to be mutually implicated in these processes. From the preceding review of complexity theories, we can draw the following tentative conclusions: (a) strategic choice may create its own determinism (chaos theory); (b) chance can open up paths that deterministically lead to strategy (path dependency); (c) strategy is an emerging outcome, being the result of random encounters between various strategic choices that interact following a set of deterministic rules (complex adaptive systems); (d) strategic order is found following multiple interactions driven by choice and chance (self-organization); and (e) strategy mostly emerges through a trial and error process (co-evolution).

Strategy as the outcome of complex processes

Intellectual history and complexity theories seem able to deepen our understanding of causation in strategy and clarify the nature of strategic choice. On the one hand, intellectual history contributes to our understanding of how strategy is constructed and narrated by managers. It emphasises the human need for rationality and causality in reconstructing strategic events. Its contribution is mainly (but not just) epistemological. The belief in causal laws, the presence of causal conditions, and the presumption of rational deliberation are presented as driving forces behind strategizing. Complexity theories, on the other hand, aim at a physical explanation of strategy. Their contribution exists at the level of ontology, explaining how strategy originates from a combination of free will, inevitable dynamics and random encounters.

Both traditions help legitimise the 'messiness' of strategy in which multiple forces are seen to interact in a non-linear and dynamic fashion and where choice, chance, and determinism interact. Within the complexity theory domain, organisational actors, by virtue of their choices, create a context that they help shape but are unable to predict and control. Once created (usually through multiple decisions, actions, and chance events) this context becomes a constraint for the very same actors who contributed to creating it. In the context of chaos theory, for instance, once the system enters its apparently random chaotic state, actors have no power to control the system behaviour and, as a consequence, the strategies they contributed to creating. Prediction becomes impossible and circumstance dominant. Choice and chance, here, bear the seeds of determinism.

Second, organisational actors frequently place bets on the future since they cannot entirely rely on forecasts. As in the case with self-organised systems, it is the context and internal organisational dynamics (or circumstance) that appear to matter most. In this situation, firm strategy emerges, through a process of adaptive tension, as the result of chance rather than choice. For example, Korn and Baum's empirical analysis of multi-market contacts among commuter airlines supports this conclusion. Their research "casts doubt on…[strategic intent]…and points to a more complicated, emergent relationship between multi-market contact and mutual forbearance that is less straightforward than is commonly presumed" (1999: 186). It shows that "contrasting chance, imitative, and strategic antecedents to multi-market contact supports a combination of influences, among which chance is one of the strongest" (1999: 187).

Third, due to the multiplicity of dynamic interactions it is unlikely that one particular course of action, taken twice, will produce the same result. For instance, Miller (1990) based on his thorough empirical study of organisational failure, concluded that the very actions that once produced excellent results might, one day, contribute to failure. Not only are the outcomes unpredictable but in the case where actions are based on past experiences under similar, but never fully identical circumstances, their consequences are very different. As a result, no cause in one situation can produce the same effect in another context. Choice alone cannot determine strategy.

Fourth, complex systems, characterised by a large number of agents in simultaneous interactions, reveal other relevant behaviours. Typically, emergent forms appear. No single

agent has a good idea as to the nature of this emergent form. But, ironically, every agent contributes to its creation in the absence of a co-ordinated effort or blueprint. Through numerous interactions they help shape an order they could not have envisioned beforehand. Choice drives each agent but the random aggregation of individual initiatives is transcended by an emerging outcome.

Intellectual history makes two additional contributions. First, it emphasizes the role of determinism as teleology, imposed on observation and experience by organizational actors. Over an epoch stretching two millennia, scholars have found it difficult to free themselves from the pervasive principle of determinism through final causes, or the assumption of an internally consistent and purposeful world. This teleological outlook may take the form of religious faith, or of a subscription to the realms of metaphysics, but is evident also in the rational and secular works of Hegel, Marx, Carlyle, Montesquieu and Comte. Advances in the natural sciences, particularly in the 18th century, have done little to dissuade scholars from this.

Second, a libertarian attitude seems to provide something close to the explanation of choice that corroborates our experience of strategic choice. Specifically, it addresses our three concerns, namely (1) the extent to we must regard ourselves as free in order to choose, being able to assign priorities to reasons and deliberate their consequences; (2) the extent to which we can be held accountable for our strategic choices, and hold others accountable for theirs; and (3) the extent to which freedom of choice and determinism can be reconciled, allowing us to explain strategic choice as it relates to the determinism of population ecology, contingency, resource-based, and industrial organization perspectives. As for (1), libertarianism is predicated on their being a gap between desires, impulses and beliefs and organizational actors acting on them. This gap entails our freedom of choice in allowing us to deliberate rationality on the possibilities facing us, to weigh up their costs and benefits, and think through their consequences. As Sartre suggested, it is this ability to imagine what might be that constitutes the core of our freedom (Sartre, 2003). As for (2), because it assumes freedom of choice, it allows us to hold organizational actors responsible for their choices, and they us for ours. As presaged by Hume, "if nature did not aid us in this particular 'twou'd be in vain for politicians to talk of honourable and dishonourable, praiseworthy and blameable. These words wou'd be perfectly unintelligible." (Hume, 1739: 500) As for (3), libertarianism accepts that causal conditions precede choices but refuses to accept that these are, by

definition, sufficient in and of themselves to bring about certain decisions. It allows our deliberations to be restricted by physical, legal or resource constraints, or informed by institutional pressures, habit, politicking, etc. It simply suggests that reflection and deliberation are part of parcel of choosing, and it is this out of which freedom in strategy consists. In addition, it helps make sense of the deeply entrenched attitudes that characterize organizational life (e.g. assigning blame or praise), and emphasizes the importance of the assumption of causality in making strategic choice possible. Finally, in the absence of logical proof in what has become a myriad of carefully argued philosophical opinion, this attitude can be held rationally.

In conclusion, causal conditions precondition strategic choice but in a process quite unlike that entailed in determinism. Causal conditions are tied to choice in a relationship of necessity, *not* sufficiency. This is consistent with complexity theory observations, and even their application to organizations. For instance, its concurs with Burgelman's research on Intel which "reveals the complex reciprocal causation between Grove's strategic intent and the structures and processes that he put in place and how the very success of the strategy vector resulted in the emergence of co-evolutionary lock-in and impeded new business development… He and Intel were subject to inescapable evolutionary dilemmas associated with the dynamics of co-evolutionary lock-in" (2002: 349)

Organisational actors have freedom of choice precisely because they are able to predict, albeit imprecisely, the consequences of their choices. This is consistent with McKelvey's (1997) suggestion that organisational evolution cannot be properly viewed as independent from a simultaneous evolution of the organisational context. Further, strategic choice and causal conditions are recursively implicated insofar as choices have consequences that, in turn, add to the stock of raw materials that inform future choices. One can explain the first only in terms of the second.

But causal conditions are a precondition for chance also to the extent that organisations rely on a particular context to ascribe meaning to it. Random events are likely to go unnoticed if not for specific conditions to render them meaningful. And as with choice, chance draws on these conditions but also contributes to them. As the late historian Carr (1961: 129) reminds us, even if certain historical events can be, to a degree, determined by chance; it is the circumstance in which they happen that renders them both meaningful and consequential. Or

as two sociologists quoted from an 1876 issue of the *Chambers's Journal* in discussing serendipity: "…the important point to notice is that the value of the accident [chance] depends on the kind of man, on the kind of mind, by whom or by which it is first observed. If the soil is not sufficiently prepared, the seed will not grow. Thousands of men had seen the light reflected from distant windows, and variations in the light according to the angle of reflection, but a well-prepared mind on one occasion suddenly drew from the phenomenon an idea which established the beautiful science of the Polarization of Light" (Merton and Barber, 2004: 45). The aphorism 'twist of fate' is telling in this respect, as is the Viagra example in highlighting the necessity of causal conditions in recognizing the relevance of a chance event. The importance of matching chance and circumstance is relevant also in complexity theory, where an emerging order in complex adaptive and self-organised systems typically results from random interactions between agents. It is because order is there to be uncovered that chance events become significant. In the same vein, in systems with increasing return characteristics, chance determines which path will be inevitably followed. Path dependence ascribes meaning to chance that might otherwise pass unnoticed. Hence our first two propositions:

Proposition 1: Causal conditions are a necessary precondition for freedom of strategic choice.

Proposition 2: Causal conditions are a necessary precondition for chance in opening up strategic alternatives.

In a causal world, random coincidences provide for alternative possibilities. As Starbuck (1994: 212) points out a "random event does not merely affect a single period; it becomes part of the foundation for future periods" and the effects of the created perturbations "may accumulate over time until they dominate the behaviour of a causal process". This observation is consistent with Darwinism, where chance mutations enrich the population and may produce fitter species. We think this particular relationship to be one of *sufficiency*, not necessity. In other words, chance coincidences are by themselves sufficient to warrant alternative possibilities. As in Cohen, March and Olsen's (1972) garbage can model of organizational choice, chance draws together problems and solutions in waiting. It is a precondition for choice in opening up alternative causal paths. This is also consistent with work by Burgelman on Intel which "shows how Andy Grove was able to take advantage of

the fortuitous circumstances Intel faced…and turn good luck into a strategy vector"(2002: 349). Hence our third proposition:

Proposition 3: Chance is a sufficient precondition for strategic choice.

Concluding remarks

Organizational actors develop strategies precisely because they believe their choices contribute to performance. At the same time, they recognize their dependence on variables over which they have little or no control, such as the economic, political and cultural context in which they operate, structural forces which influence their strategy-making, and the extent to which past performance was in part a function of chance. Clearly, strategy is some configuration of strategic choice, chance, and causal conditions.

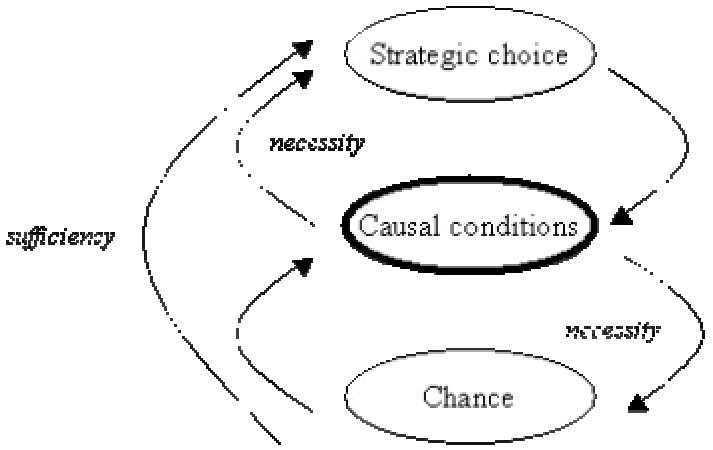

Figure 1: Causal conditions as pivotal to strategic choice and chance

Contrary to dichotomous treatments of causation where determinism and strategic choice have been emphasised in turn, and in which chance is notably absent, we put forward three propositions on their interrelationship (see Figure 1). These propositions are intended as broad conclusions rather than as testable hypotheses in any scientific sense. In these propositions, causal conditions take centre stage, to the extent that freedom of choice and chance are directly contingent on them. We cannot view organisational actors as free to choose unless also able to anticipate the consequences of alternative choice possibilities. But causal conditions are also a precondition for chance insofar as random events are meaningful only if, and precisely because, they transpire under certain circumstances. Finally, we

hypothesised chance to be a sufficient precondition for choice by enlarging the spectrum of opportunities open up to organisations. The French microbiologist Louis Pasteur said it well when deducing that "fortune favours the prepared mind".

Implications for research

Even if the aim of this article is that of illuminating causation in strategy, the conceptual view proposed in it produces several implications for causal explanation. Most obviously, one cannot speak of strategy, or account for performance, without explicitly referencing causal conditions. One can be explained only in terms of the other. Similarly, any reference to chance is barren outside the context of circumstance. Causal conditions are pivotal to freedom of choice and 'meaningful' randomness. Second, it invites a review of the nature of causation in a range of disciplines. Given its prominence in disciplines as varied as physics, history, and music composition, each of which has a longer track-record than the organization sciences, these fields may well supply useful insights. Third, a methodological implication is the value placed on interdisciplinarity, given the near-universal relevance of causation, and on thick description as a means to study the interplay of chance, choice, and causal conditions in practice. Understanding the nature of causation requires a level of detail not easily achieved but quite clearly worthy of pursuit. Fourth, a practical way forward might be that of setting up chance as a hypothesis to be falsified. For instance, scientific discoveries such as Penicillin, Ether, or Minoxidil, technological innovations such as HP's Inkjet printer, Canon's Bubblejet printer, 3M's Post-It Note and Scotchguard, or Dupont's Teflon, or strategic U-turns of companies such as the French agri-food firm Danone can be revisited to expose causal conditions and choices so as to erode any 'urban myth' that may have evolved around the role of chance. After all, each of these has been characterized as a consequence of serendipity. For instance, moulds were used to treat bacterial infections well before Fleming's famed discovery. In-depth reconstructions (e.g. in the form of case studies) may serve this purpose well. Aside from such qualitative methodologies, statistical techniques, often used in economics and finance, could be usefully used for that same purpose. Assuming that one disposes long enough time series and right proxies for measuring strategic events, analysis could be organised in three phases. In the first phase, data is filtered through a linear process. Then in a second phase, BDS statistics[6] can be used to test the null hypothesis that the series is IID (independent and identical distribution). If there is a significant departure from IID, we can conclude that process is deterministic. To capture the chance element of the series, new filtering (phase three) can be made with non-linear models. Residuals can be used to test

several distributions (Gaussian, Poisson or mixed) to determine the nature of chance events (normally distributed, random shock, or perhaps a combination of both).

Fifth, a reciprocal view of chance, choice and causal conditions has the potential to unlock a Pandora's box of fresh research questions: Are some organisations luckier than others, and if so, why? If Pasteur was right, and fortune favours the 'prepared mind', what does preparedness mean in the context of organisations? More generally, how do organisations respond to chance? What degree of inefficiency is tolerable or necessary to enable occasional exploitation in an exploration-type environment? What are the legitimacy-granting mechanisms that allow for the pursuit of certain research trajectories but not others? Sixth, a view of chance, choice and causal conditions as necessarily reciprocally implicated enables one to use multiple theoretical lenses to illuminate what is, after all, a key question in strategy: How may we account for performance variations within and between firms? For instance, the industrial organization viewpoint expressed in the Structure-Conduct-Performance paradigm is not incommensurable with the Resource-based View. After all, strategic choices are, for the most part, informed by industry and market characteristics. They help legitimise strategic decisions and decide the relevance of core assets and capabilities. Industry characteristics set the stage for firm effects, while choices and random events leave their imprint on industry. Environment-based and resource-based explanations are not irreconcilable but recursively implicated. This conclusion is consistent with the position adopted by Child (1997), in which rival theories, while perhaps difficult to reconcile in their own philosophical terms, are not incommensurable when applied to the analysis of strategy. The propositions outlined above call for the application of multiple lenses by suggesting how they might be related. Finally, given our principal interest, namely that of deepening our understanding of causation in strategy (specifically the relationship between chance, choice and determinism), we hope to have made marginal progress towards that instant so skilfully described by William James: "Of some things we feel that we are certain…There is something that gives a click inside of us, a bell that strikes twelve, when the hands of our mental clock have swept the dial and meet over the meridian hour" (James, 1923: 13).

But of course the proposed framework and conclusions may be seen as too self-evident. Yet the obvious is easily obscured by the lenses we bring to bear on our observations. And it is for precisely this reason that we looked to quite different disciplinary fields, in search of fresh approaches to a common, but far-reaching, matter.

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[1] A material cause is "that out of which a thing comes to be and which persists", e.g. the bronze of a statue
[2] A formal cause is "a statement of essence", e.g. the statue of Cupid
[3] An efficient cause comprises the collective inputs into the phenomenon, e.g. the materials, care, labour, skil
are involved in building a ship or, alternatively, the father as the cause of the child
[4] A final cause is that to which a thing aspires. It is popularly known as teleology.
[5] As Tolstoy stated in his second epilogue to 'War and Peace': "Wherever in my novel historical persons sp
act, I have invented nothing, but have used historical material of which I have accumulated a whole library d
my work. I do not think it necessary to cite the titles of those books here, but could cite them at any time in p
what I say" (Tolstoy, 1998: 1312).
[6] BDS is the abbreviation of a statistical technique known as Brock, Dechert and Sheinkman.