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A Holistic Synthesis of the Organisation Theories

Abstract: Much literature exists on the topic of ‘organisation’. Many different academic disciplinary areas stake their claim to aspects of business organisation. The social sciences offer many different perspectives of the phenomena associated with it; as different lenses, through which the object is perceived very differently. According to social constructivists, the business organisation is socially constructed. For psychologists, it exists at the nexus of individual human needs. For economists, the business organisation operates as a mechanism responding to signals of supply and demand. In this paper the business organisation is re-imaged as an entity existing within, and comprised of, chaotic systems. On the basis of a synthesis of seminal theory this paper attempts to offer a holistic perspective of business organisations; that ‘pulls together’ these multidisciplinary perspectives. On the basis of this synthesis, it is argued that the organisational context is inherently endogenous, and that qualitative research methods might offer management scientists a more valid perspective of the relationships within organisations than empirical methods can.

Introduction

This paper argues that the study of the business organisation parallels that of other areas of science. A metaphor that has arisen over time in the scientific

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research context is the story of the Tower of Babel (Caterino, Cho, Sperling, 2000). This story relates to the failure of a community to build a tower to reach heaven because of increasing difficulties in communication due to the emergence of different languages, notwithstanding their common purpose (Caterino et al., 2000). In the scientific research context this analogy is used to explain the increasing inconsistency in the different ‘languages’ that are developing between different branches of the sciences (Caterino et al., 2000). In this paper, it is argued that this is a trend in organisational research, as different academic fields appropriate aspects of organisations as the focus of their endeavours. However, this paper poses the question, ‘to what extent do these different ‘languages’ perhaps reflect a reality where the diversity of perspectives reflects a reality; which is truly different along more dimensions than we typically imagine?’

In the face of voluminous data and a plethora of theory about the nature of the business organisation, this paper attempts to provide a synthesis, or a rationale for a unified perspective of the phenomenon. Although the field of management seeks to theorise around the administration of processes and practice across fields, little theory exists as an underlying rationale for a transdisciplinary perspective of management as a science in itself.

In the following sections, different theoretical perspectives of the firm are considered. Each, in turn, is shown to explore the phenomenon through a different theoretical lens. After considering these different dimensions, a conceptual model is offered, that suggests a unifying perspective, albeit one that belies the very notion of unity, or unification.

This paper follows the process offered by Mayer and Sparrowe (2013:917); where a method of integration of theories is used that “maximises the chance that integration will provide novel insights that will influence future research and ultimately management practice”. For Mayer and Sparrowe (2013:917), there are four ways in which theory can be integrated to provide new insights; through (i) using different theories that relate to one phenomenon but differ in their approach; (ii) using two disparate streams of research to investigate commonalities; (iii) applying a theory to another which relates to another separate phenomenon; or (iv) using different theories to “draw on a related or common set of explanatory factors”. In this paper we use the former method, in order to provide an understanding of the forces that relationships within and around organisations and individuals are subject to in real world contexts.

Based on this conceptual model, recommendations are offered for how to apply methodological techniques to the study of organisational and individual relationships. It is therefore the core argument of this paper that a lack of balance, or an excessively uni-disciplinary perspective of the organisation can impose a cost, both theoretically and practically, on business researchers and practitioners in the field of management.

Theory and Literature

Despite much literature on the nature of the organisation, absent from this body of literature seems to be an authoritative perspective on how to reconcile the different dimensions along which organisations are studied. The problem addressed by this paper is the dearth of knowledge of how to understand the organisation as a holistic entity, theoretically situated as it is at the nexus of different literatures, or even sciences.

The objective of this paper is therefore to interrogate theory of the organisation and to derive a conceptual model of this theoretically contested space which may be of use to further researchers and managers. It is argued that a holistic perspective of the organisation is needed by managers lest they act on unidisciplinary insights and influence the performance of organisations in unanticipated ways.

The paper uses a level of abstraction as a heuristic in order to offer a holistic perspective of business-related theory and its interrelationships. At this level of abstraction, patterns are identified, with a view of relating these patterns to clear and practical implications for management. This perspective goes beyond a dialectic approach to the tensions between the dominant seminal theories that have taken management into a multi-dimensional space; to a multi-lectic space. It is argued that it is in this multi-lectic space that paradox can be better understood. By problematising the notion of interdisciplinary boundaries in management science and through trying to reconcile certain of the most influential theory that has perhaps taken the field in different directions, the case is made for the need of management as a discipline to offer a unifying 'language' for the study of business and enterprise, in all its dimensions.

This paper therefore seeks to make a modest contribution to the literature by providing insights into how the management of the organisation can take into account certain specific challenges related to its holistic nature, and derive methodological implications from these. In the following sections, different theoretical perspectives of the organisation and the firm are offered. As each is considered, a synthesis is incorporated and the framework for a conceptual model is developed. The overall logic of the paper draws from Grant's (1996) notion that a common language is necessary for the study of organisations. *In this paper we will argue that the realm of business-related theory has expanded beyond the point at which 'reductionist' research can be taken to be valid without qualification. And that caution is recommended in the knowledge claims that are made on the basis of reductionist investigations.*

For Grant (1996:109), theories "of the firm are conceptualisations and models of business enterprises which explain and predict their behaviour", and although "economists use the term 'theory of the firm' in its singular form, there is no single multipurpose theory of the firm". Indeed, according to Grant (1996:109) every "theory of the firm is an abstraction of the real-world business enterprise" that is

related to a set of characteristics and behaviours. As indicated, whereas a plethora of literature offers different 'slices' of these perspectives, what is lacking in the literature is an attempt to integrate this body of literature and to offer a 'general' theory of the firm. This paper does not claim to be able to do this, but attempts to point the way towards this, albeit in an exploratory manner. It is hoped that further research does not abandon such a project.

The general approach of this paper is therefore derived from the conception that no amount of theorising can explain all the variance associated with a phenomenon as multidimensional as a firm, along all its possible dimensions. However, it is argued that it is impossible to specify correctly the specific variances associated with the behaviour of firms, and that the most prevalent relationships cannot be reliably placed in relation to others. In the following sections the phenomenon we know as the firm, as an organisation, is related to certain of these different dimensions in an attempt to develop some kind of 'three dimensional' theoretical perspective that can inform a conceptual model of the organisation; as a multidisciplinary phenomenon within the field of management. The first dimension of the firm to be considered now relates to the rationale for the existence of the firm. Starting this analysis with Coase (1937) follows the development of the organisational literature by taking cognisance of its roots in economics. Coase (1937) explored the question 'why do firms exist at all in contexts where the market can allocate resources?'

Coase's Theory of the Firm

According to Coase (1937), economic theory requires that the assumptions of a theory are made explicit. For Coase (1937:19), the economic system is "co-ordinated by the price mechanism and society becomes not an organisation but an organism", as the "economic system "works itself". The price mechanism can effectively be taken to exist as a knowledge system. This seminal perspective first introduces the notion of the organisation as an organism analogous to a biological organism, and to biological equilibria. If human systems in some way operate under similar laws as those that govern systems in natural ecologies it is possible that flows of knowledge can be seen as common to both. The organisational literature might reflect certain of these underlying laws. If certain regularities underlie the systemic existence of the firm then it is expected that over time the literature will uncover these.

Coase (1937:19) stresses that price mechanisms operate outside the firm but that inside the firm "market transactions are eliminated and in place of the complicated market structure with exchange transactions is substituted the entrepreneur co-ordinator, who directs production". For Coase (1937:11) "[o]ur task is to attempt to discover why a firm emerges at all in a specialised exchange economy", because the "price mechanism (considered purely from the side of the direction of resources) might be superseded if the relationship which replaced it was desired for its own

sake". Coase (1937) argues that organisations offer a cost advantage associated with not having to negotiate for each sale, which might be the case if organisations did not exist and all transactions were based on the price mechanism. A firm "is likely therefore to emerge in those cases where a very short-term contract would be unsatisfactory", which is "obviously more important in the case of services-labour-than it is in the case of the buying of commodities (Coase, 1937:21/22). A firm "consists of the system of relationships which comes into existence when the direction of resources is dependent on an entrepreneur" (Coase, 1937:22).

A firm, then, "becomes larger as additional transactions (which could be exchange transactions co-ordinated through the price mechanism) are organised by the entrepreneur and becomes smaller as he [or she] abandons the organisation of such transactions" (Coase, 1937:23). Therefore "a firm will tend to expand until the costs of organising an extra transaction within the firm become equal to the costs of carrying out the same transaction by means of an exchange on the open market or the costs of organising in another firm" (Coase, 1937:23/24). Inventions "which tend to bring factors of production nearer together, by lessening special distribution, tend to increase the size of the firm...All changes which improve managerial technique will tend to increase the size of the firm" (Coase, 1937:25). Coase (1937:25) acknowledges, however, that exchange transactions in the real world are heterogeneous. Organisational studies face the complexity associated with different levels of analysis, which introduce further forms of hierarchical heterogeneity (Klein and Kozlowski, 2000; Klein, Conn, Smith and Sorra, 2001). For example, relationships around performance that exist for teams can differ at the level of the organisation (Klein et al., 2001). It is argued that a common theme underlies these bodies of theory; that the dynamics of knowledge are central to an organisation's generation of value in the form of goods and services, but that different perspectives of an organisation reveal an inherent complexity, and bring to light an interplay of causal mechanisms that are inherently too interconnected to apply a reductionist logic to their operation.

Grant's Theory of the Firm

According to Grant (1996), the primary role of a firm is to integrate the specialist knowledge of individuals in order to produce goods and services. Management's primary task is therefore to establish the coordination that is needed for this process of knowledge integration (Grant, 1996). Cooperation and coordination are necessary, and the importance of tacit knowledge dominates because different types of knowledge are not homogenous in the way they are transferred and aggregated (Grant, 1996). These differences have implications for the way organisations are structured and the decision-rights allocated within this organisations. In contrast to the bureaucratic and information-processing views of the firm, the knowledge-based

view of the firm offers a theoretical framework that explains the increasing role of innovations and trends such as empowerment and the use of teams (Grant, 1996). The knowledge-based view of the firm also contests certain assumptions related to the need to maximise shareholder value and shareholder power; “the theoretical foundations of the shareholder value approach are challenged” by this view (Grant, 1996:120). Knowledge is owned by individual employees, and most of this knowledge can only be applied by these individuals (Grant, 1996). The power relationships of a ‘knowledge-economy’ seem to have inverted the power relationships of a ‘capital-based’ economy. In contrast to organisational economics, the knowledge based view focuses on the contribution of knowledge to the production of goods and services (Grant, 1996). Additional layers of complexity emerge from the analysis of the firm through the lens of knowledge-based perspectives, as knowledge is not as easy to measure as capital and other resources.

Similarly, whereas sociology-based “theories of organisations tend to analyse organisation as institutions for collective social action without distinguishing economic organisations, for those which exist for social, political, and religious ends”, it is the “task of production though the transformation of inputs into outputs where the issues of creating, storing and deploying knowledge are the fundamental organisational activities” (Grant, 1996:120). According to Grant (1996:121) “the organisational problem common to all forms of social organisation is that of cooperation: reconciling the conflicting goals of organisational members”, which has been the focus of “most economic theories of organisation”, including transaction cost economics and agency theory which “regard the primary organisational problem as the incompatibility of individual goals”. The complexity of organisational dynamics seems to be the underlying theme of an increasing voluminous body of literature. This complexity seems to confound the notion that any uni-dimensional perspective of the organisation can do justice to an understanding of it. Building upon Coase’s (1937) theory of the firm, Grant’s (1996) theory offers the notion that the organisational properties of firms offer efficiency advantages not only because of the entrepreneurial ability of a firm to organise resources more efficiently than markets can but also to organise and integrate knowledge more efficiently than markets can. In developing a synthesis of the seminal literature, it is necessary to also incorporate systemic effects that relate to how well, or how successfully, organisations integrate resources and knowledge. One dimension of this success can be taken to relate to survival over time. Population ecology theory offers insights into the survival of firms over time, providing a temporal perspective. This temporal perspective is perhaps to some extent independent of life cycle conceptions of firms. This theoretical perspective also brings a focus to the interrelationships between different levels of analysis that a synthesis of firm theory requires.

Population Ecology Theory and the Firm

The way in which organisations relate to their environment can also, to some extent, be explained by population ecological theory (Hannan and Freeman, 1977). At the heart of this relationship is how the environment ‘selects’ organisations; this contrasts with the organisational literature which used to focus on ‘adaptation’ (Hannan and Freeman, 1977). For Hannan and Freedman (1977:929):

There is a subtle relationship between selection and adaptation. Adaptive learning for individuals usually consists of selection among behavioural responses. Adaption for a population involves selection among types of members...Organisations often adapt to environmental conditions in concert and this suggests a systems effect.

To some extent adaptation represents a short-term advantage but selection represents an advantage over time. The adaptation perspective is associated with processes where subunits of organisations respond to perceptions of strengths, weakness, opportunities and threats in the relationship between the firm and its environment (Hannan and Freeman, 1977). Structural inertia, however, can constrain an organisation’s ability to adapt (Hannan and Freeman, 1977). Inertia can arise from both the environment and from internal structural relationships within the organisation (Hannan and Freeman, 1977). According to Hannan and Freeman (1977:933):

a fundamental problem in academia is the way that units of analysis are treated:

The comparison of unit choice facing the organisational analysis with that facing the bioecologist is instructive. To oversimplify somewhat, ecological analysis is conducted at three levels: individual, population, and community. Events at one level almost always have consequences at other levels. Despite this interdependence, population events cannot be reduced to individual events (since individuals do not reflect the full genetic variability of the population) and community events cannot be simply reduced to population events. Both the latter employ a population perspective which is not appropriate at the individual level.

Organisations need to contend with at least five levels of analysis: (i) of members; (ii) of subunits; (iii) of individual organisations; (iv) of communities or populations of organisations and (v) of communities, or populations, of organisations (Hannan and Freeman, 1977:933). For Hannan and Freeman (1977), population biology provides a metaphor for the theory of the firm. In biology, different species are defined primarily by their genetic structure, which acts as a blueprint for the “rules of transforming energy into structure”; this blueprint summarises all the adaptive capacity of the species (Hannan and Freeman (1977:934). The organisational counterpart to this blueprint exists as “rules or procedures for obtaining and acting upon inputs in order to produce an organisational product or response”; a blueprint for the transformation of inputs into outputs (Hannan and Freeman, 1977:935).

These are primarily information functions, and different types of organisations (or species of organisations) can be classified according to these ‘blueprints’ (Hannan

and Freeman, 1977). This blueprint can be inferred from (i) the formal structure of the organisation; (ii) the patterns of activity in an organisation (who does what); and (iii) the normative order, or “ways of organising that are defined as right and proper by both members and relevant sectors of the environment” (Hannan and Freeman, 1977:935). Organisations that are different in their characteristics are treated differently by their environments; if the environment accepts the organisation then its structural changes “will be transmitted with near invariance” (Hannan and Freeman, 1977:937). Similar to the biologist, organisational fitness in characteristics (the result of learning and adaption) might be considered to be related to the net reproductive rate, or prevalence, of organisations with characteristics preferred by the environment (Hannan and Freeman, 1977). However, Hannan and Freeman (1977:937) argue that “organisations develop the capacity to adapt at the cost of lowered performance levels in stable environments”. In support of Hawley (1968), Hannan and Freeman stress that the principle of isomorphism suggests that in “each distinguishable environmental configuration one finds, in equilibrium, only that organisational form optimally adapted to the demands of the environment”; as each unit faces “constraints which force it to resemble other units with the same set of constraints”.

Any view of the organisation needs to consider both the forces of organisational rationality (which focus on the role of the organisation in its success) and environmental selection; where these are not aligned the forces of competitive environmental selection may dominate (Hannan and Freeman, 1977). The diversity of different forms of organisations in populations is therefore constrained by resources availability (Hannan and Freeman, 1977). Having provided a relatively holistic perspective of the rationale for a firm’s existence, framed in terms of seminal theory relating to how resources are managed more efficiently than markets, how firm activities can be framed as knowledge integration, and how organisations retain their efficiency and effectiveness over time, fundamental laws that relate to the context of firms are now introduced. Building on the previous conceptions, the nature of context itself is now considered and predictions offered by complexity science and chaos theory are discussed.

Complexity Science

New perspectives are emerging that also support the notion that organisations cannot be explained using reductionist theory. For example, complexity science studies the aggregate patterns of complex systems that “arise out of the endogenous interactions of its agents with each other and the environment, without any central controller or outside influence” (Mills, 2010:17).

For Mills, (2010), complexity science is differentiated from traditional science because it: (i) is fundamentally trans-disciplinary in that it investigates complex

systems across settings and fields; (ii) is constructive; it models complex systems ‘from the bottom up’ as the interactions of objects following behaviour rules (unlike top-down social science aggregated approaches or physical sciences reductionist approaches that deconstruct systems to their components); and (iii) is premised on the modelling of systems using computer-based simulations. For Mill (2010:18), evolution is a “mechanism of convergence”:

To understand the concept, consider an insurance company competing for survival and market dominance. The company is a complex system, made up of many agents (generally people) in a particular network of relationships, following prescribed behaviour rules (many of which are encoded in documents like the company’s mission statement and its business policies and procedures). The company’s purpose is to select from all possible combinations (its ‘design space’) the particular combination that will best enable it to survive and dominate...The design space can be thought of as a 3-dimensional landscape (a ‘fitness landscape’), where each point corresponds to one combination of behaviour rules and agent relationships. Some combinations will lead to certain failure (low fitness), and some will be winners. But the number of combinations is vast. How does the company search through all the combinations to find an optimal fitness peak? The answer is evolution. Built into the successful company’s behaviour rules is an evolutionary algorithm consisting of experimentation and random mutation.

For Mills (2010), experimentation allows for peaks or troughs to develop in this landscape, but also for ‘wild jumps’ that can produce higher peaks. The organisation will replicate these peaks and this will contribute to the ability of the organisation to thrive (Mills, 2010). complexity science also studies “‘self-organisation’, the propensity of dynamic systems to organise themselves into complex systems, on their own- without experimentation, mutation, or selection- and seemingly counter to the Second Law of thermodynamics” (Mills, 2010:19).

A tension exists between the robustness of organisations and their fragility, when organisations are modelled as complex systems (Mills, 2010). This perspective offers a ‘visual’ perspective of the complexity of organisations and the attainment of organisational performance proxied by peaks in this three dimensional model. Notwithstanding the layers of understanding offered by these successive theories, what is missing from these analyses is the notion that organisational events are exposed not only to random variance but also to the variance associated with chaotic systems.

Chaos Theory

For Levy (1994:167), chaos theory “provides a useful theoretical framework for understanding the dynamic evolution of industries and the complex interactions among industry actors”, as industries “can be conceptualised and modelled as complex, dynamic systems, which exhibit both unpredictability and underlying order”. According to Levy (1994:167), “it is almost impossible to predict the impact of the advent of a new competitor or technology in an industry”, because industries

“evolve in a dynamic way over time as a result of complex interactions among firms, government, labour, consumers, financial institutions, and other elements of the environment”. The direction of causality is not unidirectional; industry structure influences firm behaviour and firm behaviour can influence industry structure and the dynamics of competition (Levy, 1994). Although much theory does predict patterns and regularities in the behaviour of organisations, oftentimes these theoretical perspectives assume linear relationships between phenomena (Levy, 1994). In contrast, chaos theory is the study of nonlinear dynamic systems; this theory holds the promise of being able to link the unpredictability of phenomena with the emergence of regularities between and within phenomena (Levy, 1994). Social, ecological and economic systems are also nonlinear in nature and are dominated by complex interactions; these systems also evolve dynamically across time (Levy, 1994).

Chaos theory was first developed by Lorenz (1963), from his work on turbulent flows in fluids. He found that, in contrast to Newtonian laws that allow relationships to be predicted, in certain instances unpredictability arose (Levy, 1994). An example of this unpredictability is what occurs when a metal ball is suspended over two or more magnets; the ball will then move in patterns that are continuously different (Levy, 1994). In other words, despite having knowledge of a range of dimensions at one point, the phenomenon can begin to behave in a way that is not predictable (Levy, 1994).

Mathematically, this relates to differential equations that are unsolvable; the state of a system at a future time ‘t’ cannot be calculated (Levy, 1994). Researchers therefore typically model systems as “discrete difference equations, which specify what the state of the system will be at time ‘t+1’ given the state of the system at time ‘t’” (Levy, 1994:168). By doing this, researchers can simulate the evolution of a system over time (Levy, 1994). Chaos theory’s contribution is that it shows how “a simple set of deterministic relationships can produce patterned yet unpredictable outcomes”, as chaotic systems “never return to the same exact state, yet the outcomes are bounded and create patterns” (Levy, 1994:168).

Chaos theory is uniquely suited to postmodernist perspectives of theory (Levy, 1994). Debate exists as to whether data can be tested in order to find out if it is chaotic or simply random in nature (Levy, 1994). Levy (1994) supports the notion that chaos theory can also be considered as an extension of systems theory.

According to Levy (1994), chaos theory can offer perspectives more helpful than those of certain other types of analysis. Game theory can be used to model the behaviours of organisations but they presume the existence of equilibria and do not typically capture the essence of industry dynamics, which can follow a path-dependent route in their development. For Levy (1994:171):

In chaotic systems, small disturbances multiply over time because of nonlinear relationships and the dynamic, repetitive nature of chaotic systems. As a result, such systems are extremely sensitive to initial conditions, which makes forecasting very difficult. This is a problem that has confronted meteorologists trying to model the weather: the fundamental problem is trying to use finite measurements in an infinite world. A related problem is that as systems evolve dynamically, they are subject to myriad small random (or perhaps chaotic) influences that cannot be incorporated into the model.

The predictions of chaos theory are therefore sobering; that there might be little marginal benefit in building more complex models of social phenomena if they are chaotic systems (Levy, 1994). Similarly, “we cannot learn too much about the future by studying the past: if history is the sum of complex and nonlinear interactions among people and nations, then history does not repeat itself” (Levy, 1994:170). Similarly, the path dependent success of a firm can also be taken to reflect the sum, at a point in time, of complex and nonlinear interactions among firm stakeholders. An understanding of complexity science and chaos theory offers important insights into the limitations of linear thinking about firms; and underscores the importance of taking into account the implications of a particular action undertaken in one area of a firm on a host of others.

A major flaw in certain models of prediction is their need to assume that a stable equilibrium will result; these systems cannot therefore model chaotic systems because chaotic systems do not reach a stable equilibrium; they can “never pass through the same exact state more than once” (Levy, 1994:170). If chaotic systems could pass through the same exact state more than once they “would cycle endlessly through the same path because they are driven by deterministic relationships: hence industries are not typically expected to reach states of apparent stability, for example in pricing or investment patterns (Levy, 1994:170/171). Another important implication of chaos theory is that changes in industry structures can be endogenous; corporate decisions can alter industry structure and future firm behaviour (Levy, 1994:171). Chaotic systems have also been considered to be able to also “spontaneously self-organise into more complex structures” (Levy, 1994:171; Allen, 1998). The actions taken by managers of firms are, necessarily, bound by the constraints posed by these different bodies of theories. What seems to emerge is a perspective of the complexity that is common to these bodies of theories. Having explicated certain theoretical frameworks and their juxtaposition with the nature of enterprise, a synthesis of these is now provided.

Discussion and Synthesis

The theories discussed above reflect different, and perhaps incommensurate assumptions. The core argument made in this paper is that the potentially incommensurate assumptions of different fields of business studies have certain implications for management theory and practice. In an increasingly complex

landscape in which we seek to theorise about the management of organisations, individuals, processes and entities, we face an ever-increasing range of specialist areas of academic enquiry, and the proliferation of different terminologies, or languages (Caterino et al., 2000). The derivation of a conceptual model requires a deliberate focus on certain theory, and, necessarily, a delimitation of scope, that excludes other theory. The rationale for the choice of theory discussed here is based on a maximum heterogeneity approach; Coase's economic theory, Grant's knowledge theory, population ecology theory, complexity science theory and chaos theory are taken to account for a significantly large amount of the 'theoretical variance' associated with organisations within their contextual environments. On this basis, these five theoretical frameworks met our criteria for inclusion.

From Coase's (1937) theory we understand society as an organism, within which the economic system is co-ordinated by the price mechanism; a seminal perspective in the economics literature that grounds economic and social activity in biologic terminology or metaphor. The causal mechanism that underlies the size of firms is the extent to which they internalise transactions that are otherwise performed by the market (Coase, 1937); implied here is that the performance of firms, or organisations, is primarily related to how well this problem is solved. However, firms themselves comprise subordinate structures, units and levels (Klein and Kozlowski, 2000; Klein, Conn, Smith and Sorra, 2001), and Coase's (1937) logics break down at these different levels; in other words, a host of other factors interact within the organisational space. What Grant's (1996) conceptions share with Coase (1937) is the notion that knowledge is at the heart of the nexus of different forces organisations are subjected to; whereas firms provide a solution to the knowledge problem of how and when to internalise transactions for Coase (1937), for Grant (1996) a firm primarily exists in order to integrate knowledge and thereby generate goods and services. Within the organisation, the requirements of knowledge integration dictate structure, decision rights and how cooperative relationships in a context of competing goals can be enabled (Grant, 1996), and the implication here is that an organisation's performance is dependent on how well these problems are solved. The linkage between Coase's (1937) and Grant's (1996) theoretical frameworks can perhaps be reduced to levels of analysis; Coase at the boundary between the firm and the market and Grant at the boundaries between different structures within the firm, but they offer complex and competing vistas of the organisation. The organisation, and markets themselves, however, exist within a broader context, which is taken here to reflect relationships predicted by ecology theory. Evolutionary theory predicts that in any population of entities the environment will 'select' organisations for survival, while others that conform less successfully will typically not survive (Hannan and Freeman, 1977). A systems effect is present, as the interaction of different systems determines the survival of

organisations, and failure to adapt, for instance due to inertia, but at the heart of the problems organisations need to contend with is an overarching logic: events at the individual, population or community level have consequences for other levels, but “population events cannot be reduced to individual events...and community events cannot be simply reduced to population events...[and both of these] employ a population perspective which is not appropriate at the individual level” (Hannan and Friedman, 1977:933).

What seems to emerge from this analysis is that different ‘laws’ operate at different levels of organisational operation, and that the survival or performance of organisations is differently dimensioned at these different levels. Ecological theory offers at least five levels of analysis, namely members, subunits, organisations, populations of organisations, and communities of populations of organisations (Hannan and Freeman, 1977). Entities will survive at all these different levels to the extent that they display isomorphism, or have similar characteristics that match the unique environment’s selection forces (Hannan and Freeman, 1977). The analysis, thus far, suggests that different problems exist at different levels, but the interactions between these levels pose additional challenges to the survival of a firm. In order to understand the interactions between these levels, we now apply the lens of complexity science, which applies a fundamentally trans-disciplinary perspective and a focus on ‘bottom-up’ interactions (Mills, 2010).

According to complexity science, an organisations ‘morphs’ over time as it selects from permutations of choices, a combination that corresponds with a ‘fitness landscape’ where experimentation and mutation allows it to evolve (this can be modelled using an evolutionary algorithm) (Mills, 2010). However, what adds to this complexity is the way these dynamic systems organise themselves into complex systems, with no central coordination- these are emergent systems that by themselves create order out of chaos (Mills, 2010). At the nexus of a business problem, therefore, are a host of different layers, representing levels of analysis and interaction. However, across these different levels the forces associated with a constant evolution play out, all the while ‘unseen’ forces act to create order from disorder. In order to conceptualise these relationships, it is necessary to include a discussion of chaos theory, in order to understand the tension between order and disorder. Chaos theory predicts that the dynamic evolution of industries and their subordinate relationships, which are a function of complex agent relationships, are inherently unpredictable (Levy, 1994). The direction of causality in such a complex system is inherently not unidimensional, and relationships, as in other social, ecological and economic systems, are typically not linear either (Levy, 1994). In mathematical terms, the true representation of these systems is found in differential equations that are unsolvable. In other words, assumptions of randomness require these systems and relationships within them to follow probabilistic laws, yet

social and industry systems with too many interactions are actually chaotic, and not random, or probabilistic (Levy, 1994). If stable equilibria cannot emerge in chaotic systems (Levy, 1994), then tools of analysis based on equilibria may be constrained, or indeed inappropriate for researching organisational relationships in these contexts.

From a synthesis of these seminal theoretical perspectives, we obtain a perspective of the organisation as a porous entity subject to myriad forces. Analysis of organisational-level relationships are at once confounded by dynamic systems both ‘horizontal’ (at one level) and ‘vertical’ (between different levels) in nature, which confound any attempts to distil linear or probabilistic relationships from this complexity. Systems engender endogeneity in relationships between components because multiple systemic effects act causally on all components. In such a context, relationships may primarily be an inextricable function of chaotic systems, and probabilistic methods of research will therefore not be appropriate. Statistical analysis under these conditions will therefore produce associations, but these associations cannot be grounded in ‘truth’; these analyses will pick up influences that confound assumptions of statistical methods. For example, multivariate models cannot hope to claim that all variables are included, and error terms that do not pick up systemic variance (which all other variables are necessarily correlated with) cannot exist under these conditions. In effect, under these conditions, the entire model of organisational relationships becomes ‘endogenous’, as causal directionality is inherently confounded.

There are certain implications that derive from this analysis. First, research methods that do not take cognisance of the multi-dimensional nature of the organisational landscape will not be able to make causal claims about organisational relationships without taking recourse to reductionist methods. Causal influences that act along all dimensions make management science an inherently problematic discipline, as methods require the management of simultaneity and endogeneity in an environment where this might simply not be possible. Second, until computing equals the human capacity to hold diametrically oppositional premises in the mind at the same time, and to operate under the blizzard of complexity and uncertainty, it is perhaps only the human mind that is an instrument capable of negotiating this problem landscape, albeit imperfectly. In short, qualitative research methods might be the only limited hope we have at capturing the interplay of causality in organisational contexts.

Conclusions

The objective of this paper was to provide a review of five different theoretical perspectives of the firm, or the business organisation, and, by using a heuristic mechanism based on maximum heterogeneity, develop a synthesis of these

perspectives. In so doing, a model was developed that served to highlight certain aspects of the nature of organisations. At the heart of these relationships were confounds in the directionality of causal flows, and the seemingly incommensurate nature of different theoretic lenses. It was concluded that organisational contexts are subject to forces that act along multiple axes, and that attempts to ascribe linear relationships and that attempts to use empirical methods will typically face problems in the form of endogenous systems. Perhaps management research will need to reinvigorate its use of qualitative methods until such a time as computational methods can deal with such contexts. We conclude that the Tower of Babel analogy as applied to academic endeavour might be capturing some element of inherent truth; that relationships really are complex and embedded in endogenous systems that are robust to reductionist logics such as attempts to forge a common lexicon across the sciences in general, and in management in particular.

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