Strategy Development in a Complex World: ontology not metaphor

Jean Boulton

Abstract

This paper will argue that the adoption of particular and specific concepts from complexity models, such as ‘simple rules’, ‘edge of chaos’ and ‘sensitivity to initial conditions’ can be a confusing and unhelpful practice for managers and leaders. Rather, if mangers are introduced to a more general complexity worldview, this ontological stance can lead to the fruitful selection and modification of existing approaches to strategy development. A set of practices for strategy development will be presented, building on consultancy work with organisations undertaken by the author.

Introduction

The world is increasingly interconnected, multi-faceted and unpredictable. Operations in the world are more-and-more wide-reaching. Many businesses have an almost global sweep and many not-for-profit non-governmental organisations cover vast terrains. Economic patterns pervade the entire globe as does the impact of climate change, limitations in mineral resources, social inequality and unrest. And yet the dominant scientific and professional methodologies still act as if the future is predictable and stable, as if plans and strategies can be built on past success. As if such plans, when implemented, lead to the expected outcomes. But does this indeed capture the actuality of what happens? How often are strategies implemented as intended, and, if they are, how often do they achieve the intended goals? We live in a complex, fast-changing and dynamic world. How can organisations face this complexity successfully, both in the longer-term as well as the short-term?

Complexity theory provides an ontological lens through which to consider the complex, interconnected, dynamic and unstable world. It also provides tools in the form of mathematical models. Indeed complexity science is derived primarily through abstracting from the outcomes of mathematical models. Whilst modellers themselves are in general clear as to the assumptions and simplifications of the real world on which their models are based, the implications of these assumptions, and the fact that these vary between models is not always clear to the business leader or strategist. Deriving general implications for the natural and social world is neither a straightforward nor an unambiguous process.

The dilemmas of adoption of complexity concepts

The first part of this paper will focus on the dilemmas and contradictions that can result through deriving general principles from specific mathematical models. It will critique and deconstruct a number of well-used concepts including the ‘edge of chaos’, ‘sensitivity to initial conditions’, ‘tipping points’ and ‘simple rules’. For some, these are metaphors, allowing those in the management field to use them freely to illuminate debate and provide

fresh images. For others these concepts are ‘scientific’ and are incontrovertibly ‘true’ and this lineage gives them a power which perhaps goes beyond the confidence or intentions of those modellers who first derived them. Phelan (2001) warns of the dangers of such ‘pseudo-science’.

Sensitivity to initial conditions

For example, particular types of nonlinear equations may be sensitive to initial conditions but does this really mean that real-life situations are necessarily sensitive to initial conditions? And indeed how can ‘initial’ be defined in the real social situations? Moreover how can the leader decide when this *sensitivity* may be uppermost and when, on the other hand, notions of homeostasis and equifinality (von Bertalanffy 1969) apply – that is to say when the situation moves towards a *balance* between factors and where the characteristics of this balance are largely *independent* of initial conditions.

The ‘edge of chaos’

In similar vein, is the ‘edge of chaos’ a concept of general applicability? The state space of dynamical systems in general will have complex features – more than attractor basins, some areas of chaos and the state space itself will change over time. Can there be smooth transitions between attractor basins - that is to say, can there be smooth regime shifts? And is the edge of chaos, if it exists, a fruitful place to be? The paper will deconstruct this concept from a theoretical perspective and will also refer to empirical work by Maclean and MacIntosh (2011) which explores whether organisations do indeed try to position themselves on the edge of chaos and whether there is evidence that this brings any benefit.

Tipping points

Theories of ‘tipping points’ and regime shifts will also be considered, based on the work of Scheffer (Scheffer, Bascompte et al. 2009) (Scheffer 2009). Scheffer draws on many theories of regime shifts including Bak’s (1997) work on power laws, Thom’s (1989) work on catastrophe theory, Holling’s (2002) observations on forests and, finally, perspectives from the theory of deterministic chaos. These theories convey differing understandings about the dynamics of regime shifts although these differences are not always obvious or made explicit. So the manager or leader can infer contradictory and confusing lessons about the nature of tipping points and regime shifts.

Simple rules

Some complexity theorists have adopted the idea of ‘simple rules’. A classic example of simple rules in action is of flocking birds; from three rules regarding separation, direction and cohesion in respect of the behaviour of neighbouring birds, the flock, in computer simulations on ‘boids’ (Reynolds 1987), can keep together, respond to environmental changes and keep heading forwards.

The question that arises is whether this concept is of general validity, whether it is appropriate for organisations and, if it is, what it suggest you do in managing organisations.

With respect to the first question, Hodgson, for example, points out that whilst complex phenomena can be *generated* by simple, algorithmic rules, this does not necessarily infer that the 'complexity we find in reality has an equivalent and equally simple outcome' (Hodgson 2011:590).

In contrast, Eisenhardt and Piezunka (2011:511) assert that the '*strategy of simple rules'* is 'central to the complexity perspective'. They say: 'in other words, complexity theory proposes simple rules to guide autonomously-acting BUs such that each BU agent acts according to some schemata or rules. These rules guide behaviour in the absence of central coordination…'

In the paper we will critique the use of simple rules from a theory perspective and also consider the limitations of their adoption in practical situations. We will argue, in line with Allen et al (2011:19) that 'humans and their organizations are guided by imperfect schemata that are revised as a consequence of experience, leading to changed behaviours and innovations.' That is to say, even if simple rules can be defined within an organisation, do people indeed follow them, are they understood in the same way by different individuals? And how can simple rules themselves evolve to respond to changing circumstances?

The arguments will build on previous work reviewing the differing assumptions in mathematical models (Allen and Boulton 2011) (Boulton 2010) and the implications for application in the social world.

The implications of a more general interpretation of complexity for strategy

The second part of the paper proposes a more general approach to helping managers and leaders deal with a complexity world, handle the unavoidable complexity in real situations. In this approach, there is less emphasis on specific complexity concepts, derived from specific models, and more emphasis on describing and exploring a more general ontological stance to complexity, a more general statement about the nature of the complex world. The aim is to help leaders and strategists to explore and understand the implicit ontology underpinning traditional approaches to strategy development and reflect on the implications of dealing with the world as complex.

First this complexity ontology – a view that the world is systemic, emergent and path dependent - will be described and developed. This synthesis of a complexity worldview builds on previous publications (Allen and Boulton 2011) (Boulton 2010).

Second the implications for strategy of this change in mindset will be explored. This work builds on consultancy work with organisations to develop strategy undertaken by the author.

These implications include (Boulton 2012) (Boulton and Allen 2007):

- Take a portfolio approach; the future is not easily predictable and dominant cash cows can be prone to sudden death
- Experiment and then build on what works
- See intelligence-gathering as a continuous and systemic process, both inside the organisation and in the wider world.
- See strategy as live, responsive and adaptive.
- Take care of the longer-term; resist too great a focus on short-term profits at the expense of the future
- Make *judgements*, based on foresighting, (Clayton, Wehrmeyer et al. 2003) 'walking about' as well as analysis; the future in general does not follow smoothly from the present
- Allow local response rather than insist on standardisation, but inform this by 'weaving' shared principles and intentions

References

Allen, P. (2011). Editorial. Sage Handbook of Complexity and Management P. Allen, S Maguire and Bill McKelvey, Sage.

Allen, P. and J. Boulton (2011). Complexity and limits to knowledge: the importance of uncertainty. The Sage Handbook of Complexity and Management. P. Allen, S. Maquire and B. McKelvey, Sage.

Bak, P. (1997). How nature works. Oxford, Oxford University Press.

Boulton, J. (2010). "Complexity Theory and Implications for Policy Development." Emergence: Complexity and Organisation **12**(2): 31-41.

Boulton, J. (2012). Strategy for a Complex World. Innovative Perspectives on Strategy (forthcoming). J. Verity, Palgrave Macmillan.

Boulton, J. and P. Allen (2007). Complexity Perspective. Advanced Strategic Management: A Multi-perspective approach. M. Jenkins and V. Ambrosini, Palgrave Macmillan.

Boulton, J. G. (2010). "Complexity and the Social Sciences." Institute of Physics Complexity and Non-linear Physics Sub-group Newsletter.

Clayton, A., W. Wehrmeyer, et al. (2003). Foresighting for Development, Earthscan Publications.

Eisenhardt, K. and H. Piezunka (2011). Complexity Theory and Corporate Strategy. The SAGE Handbook of Complexity and Management. P. e. a. Allen, Sage.

Hodgson, G. (2011). Complexity, Habits and Evolution. The SAGE Handbook of Complexity and Management. P. e. a. Allen, Sage.

Holling, C. S. (2002). Panarchy: understanding transformations in human and natural systems. Washington DC, Island Press.

MacLean, D. and R. MacIntosh (2011). Organizing at the Edge of Chaos: Insights from Action Research. SAGE Handbook of Complexity and Management. P. e. a. Allen, Sage.

Phelan, S. (2001). "What is Complexity Science Really." Emergence **3**(1).

Reynolds, C. (1987). "Flocks, herds and schools: A distributed behavioral model." SIGGRAPH '87: 25-34.

Scheffer, M. (2009). Critical Transitions in Nature and Society. Princeton and Oxford, Princeton University Press.

Scheffer, M., J. Bascompte, et al. (2009). "Early-warning signs for critical transitions." Nature **461**(3): 53-59.

Thom, R. (1989). Structural Stability and Morphogenesis: An Outline of a General Theory of Models, Addison-Wesley.

von Bertalanffy, L. (1969). General System Theory, George Brazillier.