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The past and the future of business marketing theory

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ABSTRACT

A complex systems approach to understanding and modelling business marketing systems is described. The focus is on the dynamics and evolution of such systems and the processes and mechanisms driving this, rather than the more usual comparative static, variables based statistical models. Order emerges in a self-organising, bottom up way from the local or micro actions and interactions of those involved. We describe the development of our thinking regarding this approach and its main features, including the development of agent based simulation models and the identification and modelling of underlying mechanisms and processes. We conclude by discussing the implications of this approach for business marketing theory and research.

1. Introduction

Patterns in business history matter, as they provide key insights into the way business systems operate and are an important determinant of their present and future. Our research has for many years focussed on uncovering these patterns. Exploration of the evolution of ideas that guide research and of their evolutionary paths is similarly beneficial (Wilkinson, 2001). This article describes the ideas that have underpinned our theories of business marketing systems in part by considering the way they have evolved.

We believe we are now at a major transition point in the social sciences, which sees exploration and explanation of the deeper processes of evolution as central to scientific advancement. Advances in computing power and software enable us to tackle these important issues of theory in ways that were not previously possible. We can now test far more realistic theories and models of market systems that deal with the inherent complexities, dynamics and processes of social systems, including market systems.

Business markets are complex adaptive systems in which order emerges in a self-organising, bottom up way from the actions and interactions of people and firms and other types of organisations involved. Control and power are distributed through networks of interconnected, interdependent business actors. This challenges traditional notions of management and actor-centred theories of performance. A person or firm's behaviour and performance cannot be understood as simply the product of its own resources, skills, competences, orientations and motives. Actors operate in the context of other people and firms with whom they are interconnected in various ways. Behaviour and performance depends as much, if not more, on what others do, believe and want than on their own resources, skills, competences, orientations and motives. Context matters.

Context is created by the history of past interactions, interconnections, events and the like. Increasingly we recognize that the study of the history of business systems provides insight into their present state and possible future(s) (Young & Bairstow, 2011, 2012). Similarly, consideration of our evolution to a "complex systems science" framework for understanding and researching business markets provides insight into the nature of context, the value its study can provide and ways of effectively researching it.

This article is organised as follows. First, we describe what we mean by a complex adaptive systems' view of marketing, and business marketing in particular, and its relevance for advancing theory and research. Next, we briefly trace our intellectual journey towards this perspective. We describe some of the main ideas we have encountered and the way these have shaped our thinking and research within a complex systems science approach. In the final sections we consider the implications of complex systems thinking for business marketing theory and research as well as for management and policy.

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2. A complex systems view of business marketing

2.1. Complex systems thinking

Complex systems science is a way of thinking and doing science that revolutionises the way we can understand and model the behaviour of complex adaptive systems like firms, markets and business generally (Allen, Maguire, & McKelvey, 2011; Epstein, 2006; Jorg, 2011).

Complex adaptive systems (CAS) are characterised by distributed control, self-organisation and emergent behaviour. In complex systems the overall behaviour and structure of a system emerges in a bottom-up, self-organising way from the local or micro actions and interactions taking place over time among networks of interconnected actors in an environment. They are sensitive to starting conditions and are non-linear in the sense that small changes can have disproportional effects. There are also top-down feedback effects in which large scale patterns of behaviour emerging, such as price levels, industry structures and trends, affect local actions and interactions. People, households, firms, markets, supply chains, distribution systems, business relations and networks are all CAS interacting and adapting to each other. They are adaptive because the rules governing behaviour are not fixed but evolve over time in response to the experience and outcomes occurring and due to environmental effects.

Market systems have long been recognized as complex and adaptive. As Wroe Alderson and Reavis Cox, two of the founding fathers of modern marketing theory, stated in their foundation work:

> "a market changes day to day through the very fact that goods are bought and sold. While evaluation is taking place within a marketing structure, the structure itself is being rendered weaker or stronger, and the changes in organization which follow will have an impact on tomorrow's evaluations. Marketing theory will not provide an adequate approach if it ignores this interaction between the system and the processes which take place within it" (Alderson & Cox, 1948 p. 151).

However, sixty-five years ago there was not the capability to meaningfully research the interacting processes of complex business systems. Reflecting the research capabilities of the time, linear, comparative static, variables based, statistical models of market systems in which time and process are largely absent came to dominate research in marketing and system–process interactions were studied using heroic assumptions or were ignored. Complex systems models and theories call for an additional type of explanation to extend the variables based models (which seek to explain variance and co-variance) that we are used to. This form of explanation is described by Herbert Simon (1968): "To 'explain' an empirical regularity is to discover a set of simple mechanisms that would produce the former in any system governed by the latter." (p.445).

The term "mechanism" is often used informally to suggest a causal explanation, a reason for something happening. Campbell (2005) describes them as the processes that explain the causal relationships among variables. Hedström (2005) offers a more complete definition: "mechanisms consist of entities with their properties and the activities that these entities engage in, either by themselves or in concert with other entities…a constellation of entities and activities that are organized such that they regularly bring about a particular type of outcome." (p. 25).

Mechanisms are not variables but they can help explain why patterns of covariance occur among variables measuring different aspects of a system and the results of experiments. Researchers constructing variable-based models or designing experiments refer to underlying mechanisms and process in order to formulate their theories and hypotheses and design their experiments. But a variables-based statistical model or an experiment, no matter how well measured and designed, does not deal directly with the underlying driving mechanisms and processes. Variables are only the manifestations and reflections of their workings.

Managers operate in a world of mechanisms and processes. They do not manage variables; they manage people and processes, resources and money. They do this using various mechanisms of control, influence and communication and they assess their own and others' behaviour by taking measures of the behaviour and outcomes occurring. Measuring is another type of mechanism. In a later section of this paper we will describe the main types of mechanisms driving the behaviour and evolution of business relations and networks.

There are signs of growing interest in marketing in complex systems thinking and methods. More articles are appearing using such concepts and describing their relevance and use (e.g. Easton, Brooks, Georgieva, & Wilkinson, 2008; Rand & Rust, 2011; Watts & Dodds, 2007; Wilkinson & Young, 2002).

2.2. Researching complex adaptive systems

Complex systems science is not only a different way of thinking about the way socio-economic systems behave, it also involves a different type of methodology. There are two approaches to doing science: "Collect observational, survey or other forms of data and analyze them, possibly by estimating a model; or begin from a theoretical understanding of certain social behavior, build a model of it, and then simulate its dynamics to gain a better understanding of the complexity of a seemingly simple social system" (Liao, 2008, p. ix). The kinds of simulation models built to study complex adaptive systems are known as "agent-based models" (ABM) because they start with the behaviour of individual agents or actors in the system and the way they act and interact and these "grow" evolving systems. These types of models increasingly surround us in social media, games, and other areas of science.

Such quasi-ecological models are necessary because the behaviour of a complex system cannot be reduced to the behaviour of its parts in any additive way. The parts are interconnected and interdependent and time and order effects matter. Sometimes this type of research is referred to as "computational social science" or "computational economics" because complex system models are not amenable to traditional closed form mathematical solutions. The underlying equations of motion of such systems, which do exist, are far too complex and nonlinear to solve (Borrill & Tesfatsion, 2010; Leombruni & Richiardi, 2005). The only way to solve such equations is to count them out using a computer and examine what happens under different conditions. The mathematical equations defining the rules of behaviour of the systems have to be programmed into the computer in the form of if-then conditions.

ABM of complex systems are not models of the behaviour of variables but of actors acting. Computer simulation models are models of the mechanisms and processes underlying the behaviour of all the actors involved, including animate and inanimate or passive actors, like geographic space, resources and material things. Variables do not exist in the real world, only in the minds and models of researchers. Variables result from our measuring behaviour and can be used as an ancillary to ABM. Just as we measure the behaviour of real business markets, we can also use the same methods to measure the behaviour of our computer simulation models. We use variables based models of our complex system simulations to analyse, test and understand what is going on, as we do in real world models.

ABM enable us to study the behaviour of complex systems in ways that we cannot do in the real world. In effect, the real world is a sample size of one; there is one history — life as it has been. But computer models allow us to build models of life as it could be, including types of business and marketing life. One of the founders of complex systems research, Chris Langton, explains it this way: "We trust implicitly that there are lawful regularities at work in the determination of this set [of realized entities], but it is unlikely that we will discover many of