

that some of the findings presented in the book have already been published in journal articles, viewed as a whole, the book provides highly rewarding reading, particularly for those scholars who believe that it is time to move beyond the orthodox neoclassical conceptualization of the firm.

Joel A.C. Baum and Bill McKelvey (eds.): Variations in Organizational Science. In Honor of Donald T. Campbell

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The starting point of this brilliant and intriguing volume dedicated to Donald Campbell is the acknowledgement of Campbell's significant intellectual contributions to modern organization science. Campbell's 1965 paper 'Variation and selective retention in socio-cultural evolution' sowed the seed in what turned out to be the receptive soil of organization science. He inspired and stimulated this growing scientific field with his ideas on selectionist evolutionary explanations of emergent order and survival, his concern about co-evolutionary change and the conflation of upward (reductionist) and downward (contextualist) interpretation. There are three major components to his model: (1) the occurrence of *variations* — heterogeneous, haphazard, 'blind', 'chance', 'random' (e.g. the mutation process in organic evolution and exploratory responses in learning); (2) consistent *selection* criteria — the selective elimination, propagation, and retention of *certain types of variations* (e.g. the differential survival of certain mutants in organic evolution and the differential reinforcements of certain responses in learning); (3) a mechanism for the *preservation*, duplication, or propagation of the positively selected variants (e.g., the rigid duplication process of the chromosome/gene system in plants and animals, and memory in learning).

Campbell considered these components as preconditions for 'evolution in the direction of better fit to the selective system' (Campbell 1965: 27). In his opinion, if any of the three components was missing, there would be no fit or order. This proposition was based on his belief that (a) the likelihood of all three components occurring simultaneously was minimal, (b) changes in environmental fit were correspondingly rare. This 'rare occurrence' implies a tension between variation and retention. Campbell explained this as follows: '... maximizing either one jeopardizes the other. Some compromise of each is required' (Campbell 1974: 143).

Campbell used aspects of his selection theory on many distinct phenomena, such as how to explain vision, problem solving, creative thought, and socio-cultural evolution. Campbell's blind-variation-and-selective-retention (BVSr) dogma is centred around the following core ideas:

1. Fundamental to all inductive achievements, all genuine advances in knowledge, and all increases in the fit of systems to the environment is a process of blind variation and selective retention.

2. The many processes that shortcut a fuller blind-variation-and-selective-retention process are in themselves inductive achievements, containing wisdom about the environment achieved originally by blind variation and selective retention.

3. In addition, such shortcut processes themselves contain a blind-variation-and-selective-retention process at certain levels, substituting for overt locomotor exploration or the life-and-death winnowing of organic evolution.

The blindness of the variation process serves to explain that ‘... elaborate adaptive systems ... could have emerged, just as did termite societies, without any self-conscious planning or foresightful action. It provides a plausible model for social systems that are “wiser” than the individuals who constitute the society, or than the rational social science of the ruling elite’ (Campbell 1965: 28). For the organization-science community, this linked very closely with notions derived from March and Olsen’s garbage-can model, one of the first illustrations of bounded rationality, the unwanted and unforeseen effects of social and economic action at distinct levels of aggregation.

The book has four themes: blind variation selection and retention, multi-level co-evolution, process-level analysis and modelling, epistemology and methodology. Five chapters are devoted to the first theme. These chapters tease out the further implications of BVSR *inside* firms and reflect a shift from population-level to intrafirm-level studies. Aldrich and Kenworthy couple Campbell’s BVSR model with his writings on creativity, experimentation, playfulness, clique selfishness, and altruism. Two Campbellian antinomies arise: (a) obedience to cultural routines, norms and habits versus creativity/experimentation and play/make-believe; and (b) altruism versus egoism. Furthermore, they make a distinction between reproducer and innovator firms to label differences among entrepreneurs and the types of organizations they found. Reproducer organizations arise in established industries and only differ slightly, if at all, from existing organizations in the population. In contrast, innovator firms differ strongly from existing firms, and open up new niches. Subsequently the antinomies are used to describe where various entrepreneurs can be located on the continuum of organizational foundings and the implications for the knowledge needed. Reproducer organizations are severely constrained by the boundaries and institutional norms imposed by existing organizations. Innovator organizations not only face legitimization issues, but also the forces of rigorous selection that may be impossible to withstand. This framework clarifies why most organizational foundings are simple reproductions of existing forms, rather than innovative creations.

Miner and Raghavan challenge contemporary organization theorists’ received wisdom that interorganizational imitation produces homogeneity. This paper gives a very thorough review of the literature and asks whether distinct types of imitation (frequency, trait and outcome) should be added to competition and complexity as a selection mechanism. It is shown that imitation can indeed produce convergence to a single routine, but it can

also produce stable mixes of routines and changing routine configurations over time. An important factor is *imperfection in imitation*.

Rao and Singh explore how new organizational forms are built *with* the ruins of existing ones rather than *on* the ruins of old organizational forms. In this exercise, they build on Campbell's idea that new mutations represent failed forms, and typify the variety in variation in organizational populations. The basic idea is that new organizational forms (re-)combine the addition of new organizational elements and the deletion of others. This yields four organizational forms: no deletion/addition: imitative entrepreneurship; no addition/deletion (the partial contraction of elements); addition/no deletion (partial enlargement); addition and deletion (radical recombination). The paper shows convincingly that it is useful to ask how selection pressures play out at the level of the entire organization as a unit versus the organizing elements themselves.

Romanelli discusses the blindness of copying in sociocultural evolution. The lack of pre-science and the trial-and-error nature of variation pose enormous problems to copying. This chapter largely overlaps the one on imitation and does not really add to the discussion on evolutionary organization, but, nevertheless, is illustrative of Campbell's ideas on effective variation.

Miller explores the self-reinforcing consequences of success in the BVS processes and whole-part competition. He claims that success has two faces: on the one hand it fixes beliefs, attitudes and ways of organizing, but, on the other, it pushes strategies towards extreme conservatism, inertia, and insularity. Miller's review yields eighteen propositions which elaborate the consequences of perceived success. In contrast to the previous contributions, Miller points to the managerial and behavioural consequences of, for example, inertia and routinization, whereas most papers ignore them.

Under the heading 'Multi-level Co-evolution', the contributors examine evolutionary models of organizational selection at various levels of organization. In the opening chapter, Joel Baum adopts a whole-part co-evolutionary perspective to look at competition in organizations. He argues that there is a rationale for expecting individuals and face-to-face groups to undermine the efficacy of organizational selection. By using Kauffman's NK[C] coupled fitness landscape model, he simulates some aspects of co-evolutionary competition in organizations. The aim here is to specify the particular conditions under which the agents that comprise a co-evolving system are successful adapters. The chapter ends with a description of four alternative strategies that might 'structure-tune' whole-part co-evolutionary competition in organizations.

In his chapter on venture capital dynamics and the creation of variation through entrepreneurship, Philips Anderson adopts a somewhat different approach. Following Campbell's theory on sociocultural evolution, he studies the evolution of the venture capital industry and how this evolution affects the variation among firms that receive venture capital. After a brief, but to-the-point, review of Campbell's theory on the process of sociocul-

tural evolution, he provides an in-depth description of the evolution of the US venture capital industry. The chapter concludes with an elaborate discussion of the results and convincing suggestions for a future research agenda.

Ingram and Roberts engage in a suborganizational level of analysis in their chapter on the evolution of the US pharmaceutical industry. They argue convincingly that it is justified to adopt this approach, because the evolution of identifiable components of organizations may be independent of the organization as a whole. Their empirical analysis of the US pharmaceutical industry is compelling in the sense that it provides noteworthy results on the organizational and market levels of selection.

Rosenkopf and Nerkar's chapter on the complexity of technological evolution starts with the bold statement that 'despite the best intentions of researchers, studies of technological evolution remain idiosyncratic and atheoretical'. They argue that the existing body of literature does not take into account that there are strong interdependencies between multiple components. Rosenkopf and Nerkar try to fill this void by proposing a framework that is better able to deal with the complexity of technological evolution. Their discussion of this at multiple levels of the product hierarchy clearly shows the complexity within which evolutionary processes operate. Finally, they appraise patent data as empirical indicators of variation, selection and retention processes.

Van de Ven and Grazman contribute the last chapter in this section. In a compelling study on the genealogy of twin cities' health-care organizations in the period 1853–1995, they discuss the issue of evolution in a nested hierarchy. They start with a short, but comprehensive, review on approaches for dealing with inheritance and hierarchy and arrive at a framework for studying organizational evolution in a nested hierarchy. Empirical evidence for this framework is found in a detailed analysis of the evolution of the twin cities' health-care systems. Overall, they make a convincing argument for a new approach to the study of evolution in a nested hierarchy.

The four chapters in the next part of the book are concerned with 'Process-level Analysis and Modelling'. Madsen, Mosakowski and Zaheer's chapter on static and dynamic variation and firm outcomes starts with an in-depth literature review of the co-evolution of VSR processes and issues related to intrafirm variation and firm evolution, followed by an innovative multi-level model of intrafirm variation, selection and retention processes. Empirically, they reproduce the model by using data from the foreign exchange trading industry during the period 1973–1993.

Pentland takes on another process-level approach. He argues that most major methodological frameworks omit one of the most essential features of organization — patterns of action. One of the most interesting issues in this chapter is related to the interpretation of well-known concepts from the social-network theory, such as density, centrality and cliques, as applied to patterns of action in organizations and the discussion of possibilities for applying these concepts in theories on organizational learning, organizational ecology and institutional theory.

The next chapter, by Lomi and Larsen, takes on a computational perspective on evolutionary models of local interaction. By using advanced computational models, they illustrate how different levels of action are connected in organizational systems.

McKelvey adopts a self-organization and complexity catastrophe approach to explain the difficulties that major firms, such as General Motors, experience in adapting to their environments. First, he develops four propositions from Prigogine's self-organization theory, and then extends Kauffman's complexity catastrophe theory to firms. In addition, McKelvey models four major organizational forces: adaptive tension, self-organization, interdependency effects and co-evolution.

Under the heading of 'Methodology and Epistemology', Evans, Hendrickx and McKelvey examine Campbell's realist organization science. Evans traces Campbell's influence on methodologies in organization science by exploring two well-known bodies of work — construct validity and quasi-experimentation — and one less familiar set of ideas — the analysis of case studies. For the first two bodies of work, a citation analysis is included showing Campbell's importance in the methodology. There is an excellent overview of the development of the multi-trait–multi-method approach since the first publication of Campbell and Fiske (1959). To assess how well a measure taps a construct, they introduced a method showing that measures of the same construct should be highly correlated (convergent), measures of different constructs should be less highly correlated (discriminant), and these differences should hold whether constructs are measured with similar or dissimilar measures. Campbell had a rather deviant view on the function of case studies. In contrast to many researchers, he views them as a means for theory testing. He is, however, unapologetic in emphasizing that comparative analysis is required when causality is inferred. Only by anticipating *a priori* a pattern of results and matching that pattern *a posteriori*, can we be reasonably sure that we are not observing 'accidental regularities'.

Hendrickx keys in on Campbell's eventual addition of hermeneutics to his development of selectionist evolutionary epistemology. Her analysis suggests that Campbell's use of BVSR necessarily implies the selection and retention of selfish individuals at the expense of sociocultural (group) solidarity and altruism.

In examining Campbell's ideas, McKelvey argues strongly against the most cited epistemological and methodological controversies of social constructionists and objectivist organization scientists in organization studies. He claims that the current paradigm war is uninformed, archaic and dysfunctional. Campbell-style realism provides a way out of this downward spiral. For those who are curious as to how this might be realized, the first premise is that one should maintain a goal of objectivity without excluding subjectivist terms and entities such as 'perceived success'. The second premise is that one should try to winnow out the less probable theories and terms in search of greater verisimilitude.

This is an influential book on an important and timely issue. Written by

some of the most influential writers in the field of organizational science, it provides a significant step forward in our thinking on variations in organization science. It is perhaps one of the few occasions when one is witness to the search processes in a research programme undertaken by a relatively small clique with a common intellectual root.

A general feature of the three parts of this book is that the contributors try to escape from broad, often metaphorical evolutionary language, in search of theoretical frameworks that offer the mechanisms or means of specifying the processes of organizational founding, selection, variation, etc.

An interesting aspect of the first set of papers is that one can see how a group of researchers have made a collective effort to develop and refine the BCSR framework. The second part of the book can be seen as a significant step towards theory building and the empirical testing of multi-level co-evolution at the organizational level; it advances the current state-of-the-art in co-evolution theory and provides some compelling theoretical and empirical studies. The third part aims to fill the void in the literature on the co-evolutionary micro-state analysis of evolutionary processes. The contributors devise innovative models on diverse, but related issues such as intrafirm BCSR processes, action networks, and recombinant hierarchical social systems. The final part of the book guides organization science towards a realist future in which paradigm wars are solved and theory formation and sound methodology, retaining the best of many worlds, are rendered possible.

This compelling volume is probably one of those few books that can be considered essential reading for all scholars in the field of organization science.

Peter Karnøe, Peer Hall Kristensen and Poul Houman Andersen (eds.): Mobilizing Resources and Generating Competencies. The Remarkable Success of Small and Medium-Sized Enterprises in the Danish Business System.

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Since the mid-80s, strategic management theory, research, and practice have been dominated by the resource-based (Wernerfelt 1984) and the competence-based views (Hamel-Prahalad 1994; Sanchez and Heene 1997) on matters of competitiveness. Though tremendous progress has been made in developing these views on strategy and management in recent years, theoretical and empirical efforts to gain a (better) understanding of the very basic processes of mobilizing resources, building and leveraging the resulting competencies, and managing the associated processes of strategic learning and knowledge development (that together allow firms to gain and sustain competitiveness) have remained largely underdeveloped.

The challenge undertaken in this edited book (consisting of a collection of research papers, theoretical in nature and based on the analysis of seven

