Book Reviews

A Review of *Managing Uncertainties in Networks: A Network Approach to Problem Solving and Decision Making*

written by Joop Koppenjan and Erik-Hans Klijn
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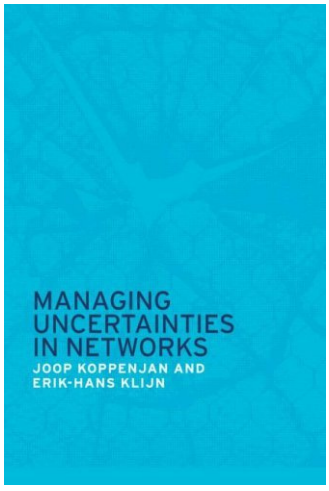

In this 2004 book (reprinted in 2006), Joop Koppenjan and Erik-Hans Klijn set out to describe the application of network theory to management. These authors have collaborated before and since. Koppenjan studied, lectured and worked as a research manager at Erasmus University of Rotterdam. He then moved to the Department of Public Administration Policy and Management of the Delft University of Technology. Klijn studied Public Administration at the University of Twente, worked at the Technical University in Delft, and then moved to the department of Public Administration at Erasmus University.

The authors divided the book into two parts. In the first, they explore analysis of uncertainties. They categorize uncertainties as relating to content, process, institutions and governments. In the second part, they address management of uncertainties and complex problems in networks. Here, they present ways of mapping uncertainties (analysis of actors, games and networks) as well as managing content, the game, networks and uncertainties.

Intent of the book

The driver for this book is familiar to anyone who studies the application of complexity theory to management. Koppenjan and Klijn acknowledge the increasing complexity and high degree of intractability or "wickedness" in current problems such as health care restructuring. They understand uncertainty as a characteristic of complex systems. They also state their case in familiar terms: "We will argue that traditional approaches [to management] are no longer adequate…" (2006: 2).

Throughout the book, the authors and publisher state and imply that the book is of value to many audiences including scholars, fellow scientists, practitioners, students, businesses, public sector workers, representatives of civil society, policy makers, advisors, managers and research shops. This makes a book review challenging. However, the book is labelled as a "text" on the back cover, and at one point the authors emphasize students over other audiences.

Koppenjan and Klijn list academic or professional objectives. They have written individually and collectively about policy networks, network management and wicked problems in networks. Over many years of engagement with these topics, they perceive increased complexity in decision making and increased interest horizontal entities such as networks. Network-related research has also deepened. Therefore, they set out to articulate a conceptual framework and tools for work in uncertain environments.

How they approached their research

The consistent voice and flow suggest the authors have developed a sound, reflective relationship. The book is conceptual. They explore the implications of complexity in a networked society, and suggest ways of moving forward using frameworks and tools. Case studies punctuate the text. However, the book leaves the reader guessing whether they used particular research methodologies to generate their conclusions, and whether the case studies are more than interpretations of past events through a chosen lens. In other words, have they used retrospective coherence to support their thesis?

Literature, assumptions and argument

As described above, the authors argue that new approaches are needed for the many wicked problems we face in complex decision-making environments. They describe how organizations cannot independently solve problems. Governments, for example, typically work with groups including citizens, experts and judicial bodies. Because of the increased emphasis on cross-boundary work, hierarchies have become less relevant. In their introductory chapter, they assert that isolated policy formation and the idea of "government at the apex of the social pyramid" are obsolete (p.3). Furthermore, they argue that the product of this fragmentation coupled with agent dependencies means that networks are replacing hierarchies.

In a somewhat circular argument, Koppenjan and Klijn write that the wickedness of social issues relate to the following network society characteristics:

- *Increasing intertwinement*, such as strategic alliances for knowledge sharing;
- *Deterritorialization and globalization* with fewer geographic limitations;
- *Turbulent environments* in which special interest groups, law suits and societal pressures force more emphasis on external factors;
- *Value pluralism*, which they describe as a landscape of different values coupled with individual choices about where individuals might place support;
- *Horizontal relations*: here the authors include a range of potentially contradictory trends such as behaviour driven by cost-benefit analyses, and transformation to a negotiating society;
- *Development of knowledge and technology: new uncertainties and risks*. This includes the creation of new risks such as genetically manipulated food crops, as well as fragmented epistemologies and ways of pursuing truth.

When examining the implications of policy makers' casting nets more broadly, Koppenjan and Klijn initially emphasize problems of fragmentation rather than benefits of holism. They do not speak to the ethics of various boundary choices as some systems theorists have done (Midgley, 2000). Nor do they mention the temporary and artificial nature of boundaries in complex systems (Richardson, 2001). Their choices may be driven by pragmatism. A business student or a busy manager may feel as if they have been dropped into a pile of jigsaw puzzle pieces. A problem-orientation may be more comfortable and familiar than thinking about being proactive, optimistic or transdisciplinary. This hypothesis is supported by their comments later in the book, such as "the substance of proposed solutions [by traditional managers] is not problematized" and "substantive uncertainty cannot be tamed by initiating an intellectual design process that culminates in a solution whose solution is unclear" (2006: 242-243).

In the face of complexity and the network society characteristics shaping the wickedness of problems, the authors conclude that *desired* solutions (emphasis added) will not emerge without management effort. So, they are not denying the emergent nature of work in complex environments. However, the first part of the book raises several questions for me. In multi-party problem solving, who decides which solution is desirable? Is the manager seen as objective, and monitoring the system from outside? How does desirability shape behaviours in complex networks? And, how does this increased management effort relate to ideas from complexity or other related theories?

The authors state that the book is inspired by network theory. They contrast theorists' two schools of thought. The more theoretical school, which they label as institutional, emphasizes network formation, interdependencies and mapping. The more practical school focuses on strategic interaction, which is also termed "the policy game" (2006: 12). They emphasize they are adopting a qualitative game approach, not to be confused with quantitative game theory. They are rarely explicit about others' theories, their interpretations, or the lines between the two. Most citations are from public administration and policy literatures. They do not reference systems theorists such as Bertalanffy or Boulding; second order cybernetics such as von Foerster or Bateson; or chaos or complexity theorists such as Lorenz or Holland. Nor do they reference social network research by authors such as Borgatti, Granovetter or Rapoport.

Koppenjan and Klijn do present a consolidated list of over 25 uncited assumptions about the network approach. Some seem self-evident, such as "When actors reason from very different problem perceptions and are unwilling to reflect, this increases the likelihood that any interaction will lead to a 'dialogue of the deaf'" (116). Others are more provocative. For example, the question of the objective manager outside the system comes to mind with their assumption: "In order to improve cooperation [of mutually dependent actors] it is necessary to monitor interactions (network management)" (116). Despite their extensive efforts to contrast networks with hierarchies, the management approaches they promote sometimes resemble traditional conflict management or consensus-building techniques used to mitigate intellectual scuffles.

In the second part of the book, they contrast two ways of thinking about uncertainties. One approach involves the disentanglement of issues using tactics such as privatization. The other approach, promoted by the authors, involves entanglement using tactics such as enabling interaction. These two schools of thought overlap the Method A and Method B approaches to management often described by Dave Snowden in keynote addresses. For example, Method A managers and disentanglers both develop objectives, strive for unambiguous problem analysis and implement thorough efficient planning and control. In contrast, Method B managers and entanglers avoid premature fixation and engage in social network stimulation.

Potentially valuable ideas from systems-related literatures appeared to be missing, underplayed or introduced late in the book. The stage is set through their emphasis on fragmentation and entities rather than on relationships (as emphasized by Uhl-Bien, 2006). There are hints that the authors value diversity, as in the parallel development of competitive solutions. At other times, the authors appear to promote mutual adjustment (alignment or compromise?) over diversity. This contrasts with authors who highlight the benefits of diversity in complex systems (McKelvey, 2002; Michaels, 2002). The authors briefly mention that there could be many managers. However, in general, the "manager" appears to be an individual who works to solve problems and improve the situation, but apparently not by encouraging distributed leadership. Managers appear to guide effectiveness rather than enable it (as suggested by authors including Marion and Uhl-Bien, 2001). Benefits are framed in terms of abstract solutions to the exclusion of personal benefits. This is true even when network theories provide interesting insights. Granovetter's work with weak ties shows that individuals can benefit greatly from new insights, connections and opportunities through a network of loosely-connected acquaintances (1983).

That said, the management tools and solutions portion of the book emphasizes benefits of a well-managed network. These include better acceptance of solutions, shared knowledge for more effective work, opportunities for beneficial delays and reflection, and progress with important social issues. As they frame and elaborate on strategies, they implicitly touch on complexity principles, such as the importance of assessing starting conditions. The chapters about management strategies provide food for thought and options for practitioners to consider. There are interesting, unstated overlaps

with work in the areas of dialogue, deliberation and public engagement. For example, Koppenjan and Klijn recommend engaging participants based on interests rather than expertise. Deliberation professionals spend considerable time with the question of how to determine, recruit and retain participants in relation to the nature of the wicked problem.

The book as a text

The authors both teach in Dutch Universities. There are significant differences in classroom cultures even within universities let alone across continents. I expect the authors have framed issues and adopted writing styles to suit their learning environments. I think this book would be well-received in some North American professional programs such as MBA classrooms. I believe students would find it difficult—without considerable extra research—to critically evaluate the theory. Without that evaluation, they would need to adopt frameworks, strategies and tactics on faith. Or they would make those adoption/rejection decisions based on their experience to-date in organizations, thus depriving themselves of new systems-oriented views of their work.

The book's contributions

Because of the above concerns, I would personally hesitate to use this book, other than to cite material. I do think it has at least two major strengths. One is the practical detail in the management-oriented chapters. There is a lot of information presented in various formats—such as narrative, tables and cases—that could help managers reframe their thinking in challenging situations. Secondly, it delves beneath the more superficial aspects of stakeholder conflicts to acknowledge and explore fundamentally different ways of understanding one's environment. This depth helps to fill an important niche.

Given the subtle and implicit links with theory, I don't think this book makes a significant contribution to complexity literature. However, the links between complexity-related theories and policy work are significant, and deserve more attention (particularly in scholarly work and in North American literature in general). This book does contribute significantly to the intersection of policy work and network theory—by whatever definition. Given the amount of work Koppenjan and Klijn have done with public policy in complex environments, it could be interesting and fruitful to include them in a learning event that explores current, scholar-practitioner work in intersecting systems disciplines.

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A Review of *Biological Emergences: Evolution by Natural Experiment*

written by Robert G.B. Reid
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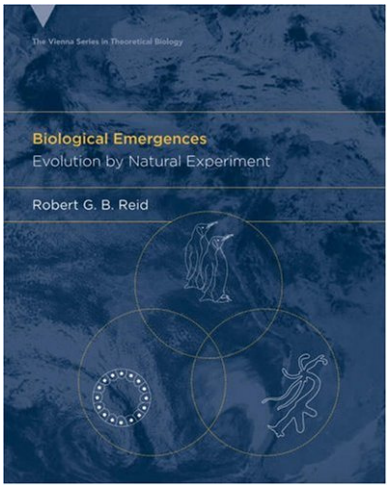

Emeritus biologist (University of Victoria, B.C.) Robert Reid's magnum opus—an impressive piece of scholarship in support of a controversial thesis—demonstrates once again that, in scientific debates as in politics, the truth often lies in the middle.

There have been many new books recently that have drawn our attention to the creative role in evolution of emergent phenomena, including symbiosis, epigenetic and developmental influences, and especially behavioral innovations (e.g., the so-called Baldwin Effect). But Reid goes a giant step beyond this in his new book with the provocative claim that emergence has been the principle shaper of "progressive" evolution (meaning greater complexity, adaptability and freedom of choice), and that natural selection has mostly been an obstacle to this trend. In fact, Reid argues that "freedom" from ecological competition and natural selection is often an important facilitator of emergence, and that the contribution of natural selection to the history of life on Earth has been confined largely to "fine-tuning" and "stabilizing" the innovations that arise from what he characterizes as an internally directed process.

In other words, emergence is where the real action is in evolution, and natural selection has been only a bit player. As Reid puts it, Darwin got it "fundamentally wrong." Once basic organismal integrity and homeostatic capabilities evolved, evolution could go forward as an "internally driven" process subject only to the "obstructionism" of natural selection, he argues. At best, natural selection is "irrelevant" to the explanation of progressive evolution.

However radical it may sound to a Darwinian theorist, Reid's thesis must be taken seriously, first because he marshals a comprehensive treatment of the relevant scientific literature and, second, because he has many sympathizers among a constellation of anti-reductionist, anti-neo-Darwinian, and even anti-selectionist theorists. Indeed, as Reid acknowledges and thoroughly documents, he is resurrecting a two-century-old contrarian theoretical tradition—one that has long championed the idea of autonomous, self-directed, emergent influences in evolution. This tradition can be traced back even to Lamarck (Reid speaks approvingly of Lamarck's central idea that there is an inherent complexifying trend, or "drive" in evolution), and it includes Herbert Spencer (with his "universal law" of evolutionary complexification), as well as early emergentists like St. George Jackson Mivart, Henry Drummond, Richard Goldschmidt, D'Arcy Thompson, Lancelot Law Whyte, C.H. Waddington, Ludwig von Bertalanffy, and, more recently, Gareth Nelson, Mae-Wan Ho, Brian Goodwin, Stanley Salthe, Stuart Kauffman, John Holland, and others. (Reid also resurrects such controversial concepts as orthogenesis, saltationism, "hopeful monsters," and even the neo-Lamarckian "inheritance of acquired characters"—though he supports only Waddington's related concept of genetic assimilation.)

Some of Reid's criticisms of "classical" neo-Darwinism are certainly well justified. He attacks its reductionist, gene-centered focus, its heavy emphasis on "selfish genes" and ecological competition, its claims for the hegemony of natural selection as a causal agency in evolution, its dogmatic gradualism, and its one-dimensional definition of evolution as a

change of gene frequencies in abstract "gene pools." He is not alone in these criticisms, however, and it is a straw man to paint the diverse contemporary community of evolutionary biologists with such a narrow brush. (For a detailed review of some recent trends in evolutionary theory, see my 2005 book, *Holistic Darwinism: Synergy, Cybernetics and the Bioeconomics of Evolution*.)

Worse yet, Reid's criticisms of the neo-Darwinists have a venomous, ad hominem quality to them. He speaks of "an arrogant elite" with "serious vested interests," who "connive" to "sustain the unsustainable." He charges that they make "spurious claims" for natural selection, which is "impoverished" and is "never" the cause of evolution. "The success of the Darwinian tradition has not depended on logic or evidence, but on sophistry, polemic, authoritarianism, me-tooism, and, worst of all, indifference" (p. 421). He calls on his readers to "escape" from this "vortex" and free themselves from "genuflection to the hypostasis of natural selection" (p. 423). (And this is only a sampler.)

So where is the middle-ground to be found in this bitter dispute? In part, it can be found lurking inside a huge blind spot in Reid's paradigm—a rather surprising case of denial by such a deeply informed physiologist. In effect, Reid assumes away (or implicitly discounts) what I call the "ground-zero" premise of evolutionary biology, namely, that life on Earth is a highly contingent, often precarious ongoing experiment, and that survival and reproduction is an inescapable daily challenge. Life is quintessentially a "survival enterprise" in which an array of "basic needs" must continuously be served, and "differential survival and reproduction" as a result of functional (adaptive) variations (i.e., natural selection) is ubiquitous.

Reid's core assumption, that homeostasis and organismal "integrity" create an internal "autonomy"—a protected experimental laboratory—is fundamentally flawed. All organisms are inextricably "embedded" in, and interact with, their many diverse (and changeable) environments and, moreover, depend upon an array of external resources (and conditions) to maintain themselves. They are never "free" of these environmental influences. Reid speaks repeatedly of the need for various "generative conditions" as a pre-condition for emergent evolution, but in his formulation a conducive set of environmental conditions is simply taken for granted when in fact it's a variable. (Reid seems unaware of the fact that Darwin himself made precisely the same point about pre-conditions in *The Descent of Man*. Darwin noted that any evolutionary innovation depends on "many concurrent favorable developments" that are always "tentative". [1874 edition, p. 150]).

Reid also seems a bit obtuse about the bioeconomics of evolution—the unavoidable costs weighed against the potential (functional) benefits. Indeed, he portrays emergent evolution as a process that is often initiated by the development of non-functional "spandrels" (to borrow Gould and Lewontin's famous cathedral metaphor) that only become "visible" to natural selection when they miraculously metamorphose into arches. But even spandrels must be paid for. Evolution is never a free lunch.

Reid fully recognizes the functional (adaptive) properties of living systems. He speaks repeatedly of "adaptation," and "adaptability" and "functionality" (physiology is all about functions, tells us), and "workability" and "does it work?" He also acknowledges that symbiosis is a relationship that enhances adaptation. More important, emergence is portrayed by him as a process that by its very nature improves adaptability. Emergent innovations facilitate survival and reproduction, he says. (He quotes *ad nauseam* the bowdlerized modern version of Aristotle's famous observation in the *Metaphysics*: the whole is greater than the sum of its parts.)

Reid also recognizes that experimentation has been a fundamental feature of the evolutionary process. "Evolution by natural experiment" is the subtitle of his book, after all. He notes, for example: "In all probability there were multiple initial experiments in emergent life forms. Some were insufficiently robust to survive environmental contingencies, and some may have pooled their resources

symbiotically" (p. 162). And again: "Given a choice among similar individuals, those whose wholes are slightly greater than the sum of their parts will out compete those whose wholes are slightly less" (p. 197). In other words, there will be differential survival, and failure is always an option. Nevertheless, Reid claims that natural selection has played no significant role in producing these remarkable biological properties. Natural selection is merely a "Looking Glass" reflection of a self-directed process. Natural selection is "redundant" because the causal dynamics are all internal, he asserts.

How can it be that natural selection was *not* a party to this trial-and-error dynamic? In fact it was, but Reid disguises its role by re-defining the term so that it refers only to (external) ecological competition and predation. In other words, natural selection was really a key player after all, but Reid hides its vital role in emergent evolution by fiat. Some of the most important members of Reid's rogues' gallery of neo-Darwinists (such as Julian Huxley, Theodosius Dobzhansky and Ernst Mayr) fully appreciated that internal selection (as Huxley characterized it) is an important subset of natural selection, insofar as it results in differential survival and reproduction as a consequence of survival-relevant functional variations. (Despite the sometimes flagrant rhetoric of evolutionary biologists, who should know better, natural selection is not a causal "mechanism". It's a metaphor—in effect a "place-holder" for the specific causes—both internal and external —of differential survival and reproduction in any given context.)

So, the question is: can the evolution of complexity be attributed to emergence or to natural selection? The answer, of course, is both. The middle-ground in this debate can perhaps be found in Ernst Mayr's characterization of evolution as a "two-step, tandem process," meaning (1) innovations from whatever source (from genes to ecosystems), coupled with (2) differential survival and reproduction based on the functional consequences of these innovations. Indeed, both the organism and its environment, and the interactions between them (their relationships), are intimately involved in determining the outcomes.

Reid asserts that his version of emergence theory is the dialectical "thesis" and natural selection theory is the "antithesis." I would argue that he got it backwards. His theory of complexity in evolution is the antithesis, whereas a Darwinian theory of complexity, such as the "Synergism Hypothesis," represents a candidate (at least) for a middle-ground synthesis. According to this theory, it is synergistic functional effects of various kinds and their consequences for differential survival and reproduction that have been the "common denominator" in the evolution of complexity over time. I characterize this theory as "Holistic Darwinism."

After spending 434 dense and frequently repetitive pages abusing Darwin's central idea and attributing its staying power to a misguided conspiracy, Reid ends his book with a quote from *The Origin of Species* in which Darwin explicitly recognized the multifarious causes of evolution within a framework of variation, contingency and differential success and failure:

A grand and almost untrodden field of inquiry will be opened, on the causes and laws of variation, on correlation, on the effects of use and disuse, on the direct action of external conditions, and so forth (Modern Library Edition, p. 372).

Reid would have been better served had he used Darwin's own broad view of evolution as his starting point. I'm reminded of Voltaire's apothegm: "It is with books as with men. A very small number are destined to play a great part; the rest are lost in the multitude." Had Reid set for himself the "mission" (as he put it) of being a synthesizer rather than a polarizer, what certainly remains an important book could have been a landmark book. Instead, it will likely be judged as just another sad chapter in what Mayr (after Darwin) called "one long argument."