Steffen Blaschke

Structures and Dynamics of Autopoietic Organizations

Theory and Simulation

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Good science rests on self-proclaimed principles such as accuracy, precision, and rigor. These principles reduce error of all sorts (α, β, etc.) in the work of scientists; at the same time, they leave them with little room for passion in their work. The present work follows the principles of good science, of course. Nonetheless, it is deeply passionate about its subject of interest—organizations. On a more personal note than all the subtle and sometimes not so subtle hints of my own point of view on management science and organization theory, I want to acknowledge some of the people who in one way or another made a difference to my work.

In terms of scientific influences, I thank Prof. Niklas Luhmann (†1998) for his lifelong work on social systems which I have come to both love and hate, Prof. Richard Harrison who exposed me to computational simulation while I was at the University of Texas at Dallas, and Prof. James March as well as Prof. Kathleen Carley whose work I admire despite the critique I put on it.

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Rock & Roll.

Steffen Blaschke

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1 Introduction

O body swayed to music, O brightening glance,
How can we know the dancer from the dance?

—William Butler Yeats, *Among School Children*, 1927

The closing question from Yeats' poem *Among School Children* incites a paradoxical answer. It is possible to observe the particular positions and movements of an individual dancer and thereby identify the performance as a specific dance, while it is impossible to observe the performance of the dance devoid of the positions and movements of the dancer. Still, any other dancer may well perform the same dance, and just therefore it is possible to distinguish the particular positions and movements that constitute a specific dance from any individual performance. "Such remarks indicate that we are aware of two ontologically distinct entities within one perceptual phenomenon," Gill (1975) highlights.

Knowing the dancer from the dance is neither purpose nor objective of the following contemplation. Nonetheless, the paradox that it is both possible and impossible to know the dancer from the dance is intriguing enough to introduces this work's genuine purpose and objective.

1.1 Purpose and Objective

The primary interest of this work rests with organizational knowledge and the associated concepts of organizational learning and memory, not the least because many argue that organizational knowledge is the main source of competitive advantage (e. g., Grant, 1996; Kogut & Zander, 1992; Nahapiet & Ghoshal, 1998; Nonaka, 1991, 1994; Prahalad & Hamel, 1990). The conceptual metaphors of organizational knowledge, organizational learning, and organizational memory enjoy a long-standing tradition in both management science and organization theory. "Indeed, they have simply become part of the taken-for-granted background in conversations of these topics, and now simply provide a point of departure for researchers to address their own assumptions," Easterby-Smith, Crossan, & Nicolini (2000, p. 748 f.) assert.

In general, metaphors allow for the understanding of one conceptual domain (source) in terms of another (target) (Lakoff & Johnson, 1980, p. 5), for example, organizations in terms of machines, organisms, brains, cultures, political systems, or psychic prisons (Morgan, 1986). The basic assumption of any such conceptual transfer is that the source and the target are two ontologically distinct entities that may or may not come within one perceptual phenomenon, not unlike the dancer and the dance. Hence, a clear-cut distinction between individuals and organizations is the prerequisite of organizational knowledge, learning, and memory.

The topics of knowledge, learning, and memory spawn an increasing amount of popular scientific literature. Bestselling titles such as *The New Organizational Wealth* (Sveiby, 1997), *Intellectual Capital* (Edvinsson & Malone, 1997), *Working Knowledge* (Davenport, 1993), *The Future of Knowledge* (Allee, 2003), and *The New Knowledge Management* (McElroy, 2003) present tools for measuring creativity, practical business rules for increasing prosperity, and step-by-step guides for sustaining competitive advantages. Their back flaps alone read like easy-bake recipes for organizational success. Davenport & Prusak (1998, front flap), for instance, lay claim to be the "definite overview of knowledge management, this influential book establishes the enduring vocabulary and concepts in the field." Although scientific in nature, this literature clearly lacks in rigor and therefore widely confuses individuals and organizations.

In large part, the scientific literature likewise denies organizations knowledge, learning, and memory of their own, nevertheless drawing heavily on the conceptual metaphors thereof. Carley (1992, p. 41) then writes, "there is no repository for knowledge in the organization other than personnel," and in a later work, "knowledge resides in the minds of the individuals in the organization, and it is also captured and stored in databases, procedural routines and organizational structure" (Carley & Hill, 2001, p. 68). Hedberg (1981, p. 3) states, "it is individuals who act and who learn from acting; organizations are the stages where acting takes place", and according to Argyris (1992, p. 8), "Organizations do not perform the actions that produce the learning. It is individuals acting as agents of organizations who produce the behavior that leads to learning."

Managerial practice (more or less) follows scientific theory. On the above assumption that organizational knowledge is little more than individual knowledge in an organizational setting, other literature advises business leaders to establish knowledge management systems (Hansen, Nohria, & Tierney, 1999; Poston & Speier, 2005; Thomas, Sussman, & Henderson, 2001; Watson & Hewett, 2006), for example. The promise is to efficiently

and effectively capture, extract, and harvest individual knowledge for the benefit of the organization. Notwithstanding, information technology cannot deliver knowledge management all by itself (McDermott, 1999). An apparent trouble of managerial practice and ultimately organizational success (performance, survival, etc.) is thus the reliance on assumptions which may well be erroneous to begin with.

In remedy of these shortcomings, the genuine purpose and objective of this work is to develop a clear-cut distinction between (1) individuals and organizations, and between (2) individual and organizational knowledge, learning, and memory. Individuals and organizations lend themselves to theoretical scrutiny as two ontologically distinct entities despite being one perceptual phenomenon in practice. The distinction yields insights into knowledge, learning, and memory of both individuals and organizations as if the positions and movements that constitute a dance are observed devoid of the dancer, and vice versa. It provides the initial backdrop against which old and new questions in management science and organization theory are put, for example, "What is the effect of organizational structure on the knowledge of organizations?", "How does personnel turnover and layoff affect organizational learning?", and "Under which conditions are communities of practice beneficial to organizational memory?"

1.2 Scientific Contribution

The clear-cut distinction between individuals and organizations derives from social systems theory (Luhmann, 1984, 1995). Here, individuals and organizations are self-referential and self-producing or, in other words, autopoietic systems which recursively generate their networks of production through the interactions of previously produced components (Maturana & Varela, 1980, pp. 26–29). In case of individuals, these networks produce and reproduce consciousness; in case of organizations, they produce and reproduce communication (Luhmann, 1986). The autopoiesis of individuals and organizations furthermore separates them not only from their particular environment but from each other. Nonetheless, individuals and organizations are structurally coupled in that they incorporate observations of each other (Maturana & Varela 1980, p. 8; Orton & Weick 1990; Weick 1976) in their production and reproduction of consciousness and communication.

Autopoietic organization theory (Baecker, 1999, 2003; Bakken & Hernes, 2003; Seidl & Becker, 2006) adheres to the above definitions of individuals and organizations and already refines social systems theory (e. g., with respect to decision making, strategic management, organizational form and