Ariane Berthoin Antal · Peter Meusburger
Laura Suarsana
Editors

Klaus Tschira Symposia Knowledge and Space 6

Learning Organizations

Extending the Field

Springer

Klaus Tschira Stiftung
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KTS

Learning Organizations

Knowledge and Space

Volume 6

Knowledge and Space

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ISSN 1877-9220
ISBN 978-94-007-7219-9 ISBN 978-94-007-7220-5 (eBook)
DOI 10.1007/978-94-007-7220-5
Springer Dordrecht Heidelberg New York London

Library of Congress Control Number: 2013954708

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Acknowledgments

The editors thank the Klaus Tschira Foundation for funding our enterprise (symposia and book series on Knowledge and Space). The staff of the Klaus Tschira Stiftung, Beate Spiegel, Renate Ries, Jana Brinkmann, and Sylke Peters always contribute a great deal to the success of the symposia. Together with all the authors in this volume, we are especially grateful to David Antal for his tireless dedication to quality as technical editor of all the chapters and as translator for some of them. Volker Schniepp at the Department of Geography at Heidelberg University has been an enormous support in ensuring that the figures and maps meet the high standards of publication. We also thank the students of Heidelberg University's Department of Geography who helped to organize the 6th symposium and prepare this publication, especially Amadeus Barth, Julia Brasche, Helen Dorn, Claudia Kämper, Melanie Kudermann, Inga Labuhn, Martina Ries, and Tina Thiele.

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1 The Importance of Knowledge Environments and Spatial Relations for Organizational Learning: An Introduction

Ariane Berthoin Antal, Peter Meusburger, and Laura Suarsana

The birthplace of the field of organizational learning can be traced back to management scholars in the United States who were interested in organizational behavior. Over the years it has attracted researchers from diverse disciplines and from all around the world. This line of inquiry is particularly apt to address the way interest in the field has spread and how it has been populated so far, given that the current edited volume is appearing in the series Knowledge and Space, an intellectual venture launched by the department of geography at Heidelberg University.

The first book dedicated to organizational learning grew out of the collaborative relationship between Chris Argyris (Harvard University) and Don Schön (MIT) in Boston, Massachusetts. They published it in 1978 then revised it significantly in 1996, both times with the Massachusetts-based publisher Addison-Wesley. The year 1996 saw the appearance of two edited volumes (Cohen & Sproull, 1996; Moingeon & Edmondson, 1996), both of whose contents show that scholars from other parts of the United States as well as some Europeans had become engaged in the field. The internationalization appears to have started with visiting fellowships of U.S. scholars in Europe. In the 1970s the young Swede Bo Hedberg worked at the International Institute of Management of the Social Science Research Center Berlin (WZB) in Germany with the American scholar Bill Starbuck, who was a senior fellow there, and one outcome was the landmark chapter on organizational unlearning (Hedberg, 1981) in the first volume of the *Handbook of Organizational Design* (Nystrom & Starbuck, 1981). Later, Europeans went to work in the United

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A. Berthoin Antal et al. (eds.), *Learning Organizations: Extending the Field*, Knowledge and Space 6, DOI 10.1007/978-94-007-7220-5_1,

States. In the 1990s the French scholar Bertrand Moingeon became involved in the field while he was at Harvard with Chris Argyris and Amy Edmondson, a working relationship that grew into a coeditorship (Moingeon & Edmondson). Another landmark book in the field came from Japan. Ikujiro Nonaka and Hirotaka Takeuchi shifted the discussion both geographically and conceptually by drawing on experiences in Japanese organizations and by introducing "the SECI[1] model of knowledge creation" as a different way of framing processes of learning in organizations (Nonaka & Takeuchi, 1995). In 2006 three researchers from Israel (one of whom had studied with Argyris and Schön in the early 1980s) wrote a book to offer readers help in "demystifying organizational learning" because the field had meanwhile become highly complex and its ideas appeared too complicated to apply in organizations (Lipshitz, Friedman, & Popper, 2007).

At the turn of the millennium the maturation of the field was marked by the appearance of the first handbooks, both with international editorial teams and contributions from Asia, Europe, and North America (Dierkes, Berthoin Antal, Child, & Nonaka, 2001; Easterby-Smith & Lyles, 2003). The internationalization of this area of inquiry received additional impetus from the translation of the handbook by Dierkes et al. (2001) into Mandarin for publication by the Peoples' Publishing House in Shanghai (also in 2001). The field's spread into multiple disciplines was explicitly documented in that handbook, with scholars from anthropology, economics, management science, political science, psychology, and sociology reviewing the contributions that their disciplines had made. Geographers and environmental psychologists were absent in those compendia, probably more because the disciplinary networks of editors and authors did not yet overlap with them than because of a lack of geographical interest in the phenomena connected to organizational learning.

Shared Interests and Different Approaches

Organizational Learning from the Perspective of Geography

Geographers have a long-standing interest in the organization and coordination of social systems in space. Indeed, the term *region* has the same etymological root as the words *rex* (king), regulate, regime, regiment, or the German verb *regieren* (to rule, to govern). Originally, region meant a space that was organized, coordinated, controlled, and influenced by a power center or a social system's authority. In the context of this volume, the term *space* is understood as relative space, which is a product of interrelations and interactions. Relative space is never a closed system; it is always "in a process of becoming, always being made" (Massey, 1999, p. 28). The term *place* has a multidimensional meaning. First, it denotes a location characterized by specific configurations, facilities, and resources, enabling or impeding certain actions. Second, it signifies a position in a hierarchy

[1] SECI is an acronym for socialization, externalization, combination, internalization.

or network, that is, in relation to other positions. Third, it can be defined as a "discursively constructed setting" (Feld & Basso, 1996, p. 5) having a symbolic and emotional meaning, providing an identity, and communicating a complex history of events, cultural memories, and emotional attachments (Canter, 1977, 1985; Manzo, 2005; Rowles, 2008a, 2008b; Scannel & Gifford, 2010). Places can be studied from a broad variety of philosophical perspectives. They are "known, imagined, yearned for, held, remembered, voiced, lived, contested, and struggled over … and metaphorically tied to identities" (Feld & Basso, p. 11). People are rooted in and attached to places.

In the 1960s and 1970s geographers became interested in spatial disparities of educational achievement (Geipel, 1965), the exchange of knowledge within and between organizations, the spatial concentration of knowledge and power, and in central-peripheral disparities in the distribution of jobs for high- and low-skilled employees (for an overview see Meusburger, 1980, 1998, 2000, 2007a, 2007b). They studied the importance of face-to-face contacts and telecommunication for the acquisition and diffusion of various types of knowledge and inquired into the importance of office locations for the communication process. The Swedish geographers Bertil Thorngren (1970) and Gunnar Törnqvist (1970) analyzed the spatial dimension of contact systems and their impact on regional development. The American geographer John R. Borchert (1978) studied the major control points in the American economy. The British geographer John B. Goddard and his colleagues focused for many years on office communication and office location, the communications factor in office decentralization, office linkages and location, and the impact that new technologies of telecommunication have on office location (Goddard, 1971, 1973; Goddard & Gillespie, 1986; Goddard, Gillespie, Thwaites, & Robinson, 1986; Goddard & Morris, 1976; Goddard & Pye, 1977). The Oxford geographer Jean Gottmann (1979, 1980a, 1980b, 1982, 1983) wrote about the symbolic meaning of centrality, relations between centers and peripheries, the organizing and reorganizing of space, the impact of telecommunication on urban settlements, and transactions as the main function of cities. These early studies on office locations, office linkages, and spatial concentration of knowledge and power were designed to explain why the headquarters of many large companies tended to concentrate on large cities rather than take advantage of modern telecommunication technologies and incentives to move to smaller towns or rural areas.

As of the 1980s geographers of science turned their attention to the spatiality of science and research and to the places and spaces of knowledge production, the networks and spatial mobility of scholars (Jöns, 2003, 2007; Livingstone, 1995, 2002, 2003; Withers, 2002), knowledge environments and scientific milieus (Matthiesen, 2013; Meusburger, 2012), and the regional mobility of various categories of knowledge (Meusburger, 2009b).

Key research areas for economic and social geographers in recent decades have included the transfer of knowledge in and between organizations, the learning and decision-making procedures in organizations, the role of places as knowledge environments, the coordination and governance of spatially distributed system elements, the role of proximity and distance in learning processes, the spatial

concentration of knowledge and power, and the asymmetric relationships between center and periphery. However, the authors of most of these early geographical studies did not use the concept of organizational learning. They preferred other expressions, such as diffusion of knowledge in organizations or knowledge-sharing in organizations or adaptation of organizational structures to internal needs and external pressure.

Additional research areas relating to learning processes and knowledge sharing in and between organizations, particularly companies, have emerged in geography since the late 1980s. They include the geography of the firm or of enterprises (Dicken, 1990; Dicken & Thrift, 1992; Hayter, Patchell, & Rees, 1999; Hayter & Watts, 1983; Krumme, 1969; Maskell, 2001; McNee, 1960; Walker, 1989), studies on processes of knowledge work and the division of labor in organizations (Glückler, 2008a, 2008b, 2010, 2013), models of organizational structures and dynamics in geographic perspective (Hayter et al., 1999; Hayter & Watts; Taylor, 1987, 1995; Taylor & Thrift, 1982, 1983), project ecologies and projects as new models of organization (e.g., Grabher, 2001, 2002; Chap. 6 by Ibert in this volume), and organized corporate networks and network organizations (e.g., Glückler, Dehning, Janneck, & Armbrüster, 2012).

Geographers have been quite familiar with key issues of organization theory and organizational learning, and they have indisputably profited a great deal from organization theory (e.g., Argyris & Schön, 1978, 1996; Mintzberg, 1979; Nonaka & Takeuchi, 1995), systems theory (Bertalanffy, 1950, 1968, 1976), and environmental psychology (Graumann, 1978, 2002a, 2002b; Graumann & Kruse, 2003). But what can a geographical perspective offer to organization theory and to organizational learning and knowledge in particular? Learning processes and scientific research do not take place in a social, political, or economic vacuum. They are influenced by a multitude of factors whose local interaction results in a spatial context, action-setting, milieu or environment (for details see Meusburger, 2008, 2009a, 2012). Each place, milieu, or spatial context affords an organization or its parts a particular knowledge environment, a unique access to important networks and research facilities, a different degree of reputation and attractiveness, and a distinctive potential for spontaneous high-level interactions. In the field of research Meusburger (2012) described these mechanisms:

> The possibilities for discussing contested ideas and conducting expensive experiments, for becoming part of important networks, for hearing promptly of crucial developments or for receiving access to restricted data, and the likelihood of meeting with agreement or criticism upon airing new ideas or of having to grapple with controversial theoretical concepts are not equally distributed in space. The success of research projects or the intellectual development and academic careers of young scholars are thus contingent not only on the goals, talents, and creativity of the people involved, but also on existing structures. Each university location affords a scientist a different knowledge environment, which, in turn, has a bearing on whether and how soon new scientific concepts, practices, or technical innovations are accepted and acted upon or how that scientist is able to develop. (p. 12)

Geographers have a long tradition of studying the relation between structure and action (Werlen, 1993, 2010a, 2010b) and the impact that social environments

can[2] have on learning processes on various scales, of analyzing the reasons for regional economic and social disparities, and of discussing the applicability of various concepts of space and place in the social sciences.

Success in a competitive society is not based on knowledge or information per se but rather on advantage or a lead in knowledge, expertise, professional skills and competence, or early access to crucial information. The skills, experience, training, and knowledge needed by top managers and high-level experts of large and complex organizations acting in an uncertain environment will always be scarce. From a geographer's point of view, therefore, there are several crucial questions: Where does one locate the scarce knowledge, the high-level decision-making, and the key responsibilities in the architecture of a social system and in the spatial dimension? How can the internal and external formal structures of communication be organized? How is it possible to create a milieu that fosters learning processes and creativity and facilitates interactions between top managers and specialized experts of different organizations and domains? And how are the effects of new communication technologies, new external pressures (e.g., economic competition and high degree of uncertainty), new internal dynamics (e.g., acquisition of new expertise) or a change of the organization's goals translatable into new structures? Under which circumstances are steep hierarchies and centralization of expertise and decision-making more efficient than flat hierarchies and decentralized networks of expertise? In which cases is the opposite true? Which functions of an organization depend heavily on frequent and spontaneous face-to-face contacts with those in power or a certain type of knowledge environment? Which functions are more or less place-independent?

The increasing availability of telecommunication may have reduced the functional necessity of proximity in learning processes in some cases, especially within trustful relationships between administrators, communities of practice, and scientists, but the symbolic meaning of places and the importance of spatiality for representation of authority and construction of difference have not diminished in recent history (Meusburger, Koch, & Christmann, 2011). A location can still be a symbol for prestige, reliability, credit-worthiness, institutional power, repression, and social control; another may suggest untrustworthiness, low reputation, backwardness, or criminality. Place names can stand for specific and unique knowledge environments. Meusburger (2012) describes the reciprocal projection of scientific reputation between scholars and institutions (places) as follows:

> The achievements of scientists who have worked successfully for a long time in a department or at a university are transferred to the institution, places, or milieu of that period. Place names such as Berkeley, Cambridge, and Heidelberg serve as a kind of shorthand for complex and now arcane circumstances surrounding the practice and standards of science. Such projections may be unjustified, erroneous, or controversial, but they must be taken seriously because people make them in every aspect of daily life. When projecting scientific

[2] A social environment or knowledge environment is not an independent variable that has a direct effect on human agency. It is rather a potential or offer that some actors will use and others will ignore.

> prestige onto places, institutions, or even entire universities, one assumes from past experience that superb science is being practiced now and will be in the future, a supposition that, in turn, attracts top scientists. Historically less-successful universities can wind up with the stigma of being below average and of having produced or attracted few important scholars. Interestingly, this projection reflects back onto the scientists working there. The scientific prestige of an institution and that of its academics is thus reciprocal. (p. 14)

In the view of geographers, the center of a social system or a domain (e.g., chemical industry, diamond trade, or scientific discipline) is the place where its most powerful authority is located. Theoretically, each domain and each organization can have its own center. If a firm or industry in a small town grows to become an international market leader (e.g., the chemical company BASF in Ludwigshafen), then this small town represents a worldwide center of that industry. However, small towns may become the center of only one or two domains, whereas high-ranking large cities may attract the centers of dozens of different domains (politics, economics, science, media, and culture). Such places offer a multidimensional network centrality, which is much more attractive for top managers of large, multinational companies than a one-dimensional location. Nevertheless, geographers recognize that innovations are also often generated from the periphery, and they point out that it is important to distinguish between "imagined" and "real" (i.e., historically proven) centrality. Boden's differentiation between psychological creativity and historical creativity is useful in this context (Boden, 1994; see also Meusburger, 2009a). Recently, some geographers have been stepping into the breach between imagined and real centralities by exploring "diverse economies" with the intention of "putting forward a new economic ontology that could contribute to novel economic performances" (Gibson-Graham, 2008, p. 615).

Summing up, geographers have shown that the interpretation of spatial patterns, the study of knowledge environments, spatial relations, spatial diffusion processes, and positioning of functions in space allow deeper insights into organizations and their "power-geometries" (Massey, 1999) than a space-blind approach does. Since early human history, partitioning of space and positioning in space have been used to display gradations of authority and status. In all types of societies, the varying degrees of power and authority are expressed by the separation and demarcation of spaces, and by exclusion and positioning in space. Geographers have also explained why the spatial mobility (diffusion) of various categories of knowledge is not as simple as traditional communication models (sender-receiver) suggest.

From the Perspective of Organization Studies

Scholars of organizational behavior, for their part, have addressed spatial considerations for many decades without asking geographers for their input. The relevance appears self-evident: "Is not social organization a product, a function of the space it inhabits?" (Kornberger & Clegg, 2004, p. 1103). Perhaps the most attention has gone to location decisions and their implications, ranging from the global to the

very local in scale. Adler's textbook, *International Dimensions of Organizational Behavior*, which first appeared in 1986 and is now in its fifth revised edition (2008), illustrates particularly well the multiple issues that management scholars (and managers) think about when expanding operations abroad (Adler, 1986, 2008). Spatial considerations matter not only because "organizations can be understood as spatially embedded at various levels" (Taylor & Spicer, 2007, p. 326) but also because organizations themselves create spaces in which people live and work. For example, "one of the first things a newcomer to any organization has to learn is how to navigate within this new spatial environment: what are the cues which signal territorial boundaries, and whether such territories are functional or hierarchical" (Turner, 1971, p. 50).

Given the longstanding omnipresence of spatial issues in organization studies, it is interesting that there are both calls for and evidence of a "spatial turn" in organization studies over the past decade or so. Sydow (2002), for instance, associates the recognition of this need partly with the rise in organizational network analysis, whereas van Marrewijk and Yanow (2010) draw attention to the material experience of workspaces. Rousseau and Fried (2001) explain the growing need for researchers to attend to the context in which the organizational phenomena they are studying are set:

> Contextualization is more important in contemporary organizational behavior research than it has been in the past. Two reasons in particular motivate this editorial. First, the domain of organizational research is becoming more international, giving rise to challenges in transporting social science models from one society to another. Second, the rapidly diversifying nature of work and work settings can substantially alter the underlying causal dynamics of worker-organizational relations. (p. 1)

The communication gap between organization scholars and their peers in human geography, science studies, and environmental psychology had costs. The spatial turn came 10–20 years later in organization studies than in other disciplines, and some wheels were invented a second or third time. For the purposes of this volume, it is significant that scholars in the subfield of organization studies concerned with organizational learning and knowledge have also identified the need to address spatial dimensions. "The increasingly accepted perception that organizational learning (OL) does not only involve abstract, cognitive processes has triggered researchers' interest in the relationship between the physical settings and individuals' cognitive skills" (Edenius & Yakhlev, 2007, p. 193).

Some organizational scholars are seeking input from colleagues in disciplines that have expertise in dealing with spatial issues. The need is nicely illustrated by the title of Ford and Harding's (2004) article, "We went looking for an organization but could find only the metaphysics of its presence." The fact that the disciplines of management and architecture are positioned in professional schools in some universities may help explain why their scholars seem to have started working together to address spatiality and organizations before bringing geographers on board (especially if their universities have no geography department). For instance, MIT's School of Architecture and Planning in Boston created "The Space and

Organization Workgroup" (SPORG) to explore the interdependence of physical space and organizational behavior. However, Kornberger and Clegg (2004) observe with some concern that "the main focus is on optimizing the use of space. Critically, this could be interpreted as conventional business process re-engineering with a spatial dimension added—indeed, almost a marriage between Taylor and Le Corbusier" (p. 1097).

Organizational scholars admit that their field has problems addressing spatial phenomena because of "fragmented contributions" (Taylor & Spicer, 2007, p. 326) and the "ongoing controversy around differentiating the concepts of space and place" (p. 326). Attempts to resolve the problems of fragmentation and conceptual distinctions with help from sociologists have not been completely successful: "the discipline chops up the phenomena into incommunicado bits: urban sociology, rural sociology, suburban sociology, home, the environment, neighbourhood, workplaces, ecology" (Gieryn, 2000, p. 464).

How This Volume Enriches the Conversation

One of the objectives of our book is to advance the field by bringing the voices of geographers into conversations with those of other disciplines. It is therefore high time to join forces with geographers! This volume also seeks to expand the conversation by including learning spaces that were not addressed in the two handbooks that marked the state of the art at the turn of the millennium. The field originally focused on processes *within* organizations, then expanded to include *interorganizational* learning, not only in multinationals (Macharzina, Oesterle, & Brodel, 2001), strategic alliances (Child, 2001), and joint ventures (Lyles, 2001) but also in supplier networks (Lane, 2001) and global and local networks (Tsui-Auch, 2001). In this volume we expand the scope by addressing organizational learning in temporary organizations at the international level (Chap. 10 by Böhling, in this volume), an organizational phenomenon that appears to be becoming more prevalent than in the past and that may be particularly important for the learning processes of other kinds of organizations. At the other end of the size spectrum, we draw attention to the space of computer screens that display abstract representations of the organization (Chap. 2 by Puyou, in this volume). Indeed, a strength of organizational learning theories is the multilevel analysis that they enable—individuals, groups, units, and communities of practice in and between organizations, and whole organizations. The potential strength in the field is not always realized, because it is difficult to connect the different levels and there is the risk of mistakenly applying individual-level concepts to organizations. This volume addresses the potential and the difficulties head on in the contribution by Friedman and Sykes (Chap. 9), who offer a model that also encompasses systemic learning.

Although it is not our intention to redress the imbalance in the field that has tended to underexpose barriers to organizational learning, this volume indeed provides ample evidence of unsuccessful learning and knowledge sharing in organizations. For example, Scholl finds multiple cases of information pathologies

in organizations, and Glückler and Panitz document the frequently encountered problem of top-down management models generating resistance in innovation processes. However, it is not only senior managers who are at risk of being out of touch with reality in modern organizations; new technologies, too, can filter out information provided in the lived environment of employees at all levels of the organization, leading to Mad-Hatter-like situations, as Puyou shows in Chap. 2. The distances that people need to bridge in order to share and create knowledge in organizations are multiple and entangled, as illustrated by the contributions in this volume. In addition to the gaps between top management and other employees (Glückler & Panitz), they include relational distance in professional mindsets and values, such as that between researchers and business (Ibert), between experienced workers and new recruits (Bounfour & Grefe), and between civil society and national representatives in the United Nations system (Böhling). Furthermore, there are physical distances between headquarters and sales units (Puyou) and between offices in a building complex (Sailer). The chapters offer various concepts to characterize the multidimensionality of spaces that interconnect physical, social unconscious, and mental aspects. For example, Pässilä and Oikarinen describe polyphonic spaces, Friedman and Sykes draw on the works of Lewin (1948, 1951) and Bourdieu (1985, 1989, 1998) to refer to life space and social space, Vince evokes relational space, and McNiff treats creative spaces. Sometimes these spaces are ephemeral by definition, such as the interspaces afforded by exercises in classrooms (Vince), artistic interventions in organizations (Berthoin Antal), and United Nations Global Conferences (Böhling). The temporary nature of these spaces makes it possible to suspend established rules and codes, to express the unsayable, and to try out new behaviors. The organizational learning challenge is then how to re-embed the new ways of doing things and change the organizational context—in other words, to sustain the learning.

The analyses also show how the existence of such distances and of different kinds of spaces in and between organizations can also be resources for innovation. For example, the movement between "cold" and "hot" spaces in a foundry affords different kinds of learning *ba*, as Bounfour and Grefe reveal when they apply the SECI model and enrich it with the concept of *hau* from gift theory. Building on Stark's (2009) concept of dissonance, Ibert points out how valuable for innovation processes the confrontation of different ways of seeing and doing things is. McNiff reinforces the argument for maintaining distinct mindsets and practices in organizational entities and subunits (silos) while offering suggestions for how to enhance the organization's capacity to benefit from the unavoidable tensions and conflicts that arise.

The multidisciplinarity that has characterized the field of organizational learning from its early years is expanded in this volume not only the perspectives of geographers about spatial aspects of organizational learning and knowledge but also by concepts and practices of inquiry from the world of the arts. They offer the potential to enrich the analysis of organizational learning processes by addressing the role of aesthetics and the senses, which have been neglected in the field so far because "traditional views of OL have privileged Cartesian Perspectivalism, abstract

thinking, cultural, and cognitive processes as the modalities of learning" (Edenius & Yakhlev, 2007, p. 207). By contrast, the physical bodies that human beings inhabit as they move into and out of organizational spaces with their knowledge, and the sensations they experience in situations of learning and change, receive explicit attention from the arts. There the human body is valued for its capacity to express beyond words and to integrate knowing tacitly, as well as for its role as a source of energy for action. The inclusion of art-based perspectives offers glimpses into new ways of managing and learning in organizations (in this volume see Chap. 11 by Berthoin Antal; Chap. 13 by McNiff; and Chap. 12 by Pässilä & Oikarinen). The mix of disciplines represented in the chapters of this book may have the additional advantage of shifting the tenor of the conversation. The language of management research has recently been criticized as "dehydrated" (Adler, 2010), so it may surprise readers to find that many of the contributions about the spatiality of organizational learning make use of terminology with emotional, spiritual, and sensual tones. Bounfour and Grefe refer to the spirit of the gift, *hau*, as the essential element enabling intergenerational sharing of trade secrets and co-creation of new knowledge. The theoretical physicists in Sailer's study seek out the sunny rooms for their meetings rather than limiting themselves to the practical choice of the closest office. Scholl's analysis of innovation failures reveals that the absence of sympathy was a key factor. In the Finnish forestry industry, which is beset by downsizing, Pässilä and Oikarinen describe processes designed to move toward polyphony and joy.

The Structure of This Volume

There are many ways to organize knowledge, and as editors we had to choose how to structure the knowledge offered by the contributors. One option would have been to take a disciplinary approach, but we wanted the readers to enter into a space in which the voices of the different disciplines come together on equal footing rather than fencing them off and implying a hierarchy of importance. We are all-too aware of the risk in academia of the "aggrandizement effect" that leads members of departments and disciplines to overrate the importance of their work (Caplow & McGee, 1958, p. 45).[3] An alphabetical ordering of authors would have been an option free of all interpretation, but we felt that this route would have meant an abdication of editorial responsibility for providing some guidance through the multivocal, multiperspectival space that this book offers. Organizing the chapters according to the research methods used by the authors was not an option because almost all the studies in this volume are based on mixed methods (i.e., different combinations of methods such as individual interviews, focus groups, participant observation, action learning, and surveys). In keeping with the theme of the book, we opted for a spatial organization and started by clustering together the chapters that treat similar settings.

[3] Studies found that raters overestimated the prestige of their own organization eight times more frequently than they underestimated it (Caplow & McGee, 1958, p. 105).

Chapters 2 and 3 explore examples of organizational learning processes and barriers in companies. Francois-Régis Puyou conducted his research in the Paris headquarters of a retail chain and its airport shops. He zoomed in on the representation of reality created on computer screens by a software package for ERP (enterprise resource planning). The next chapter, by Ahmed Bounfour and Gwénaëlle Grefe, stays in France but shifts to an organization with a completely different kind of work setting, namely, a foundry. The researchers follow workers as they move between "cold" zones and "hot" zones of production at the furnace and show how the way they share and create knowledge changes in the different places and over time. Chapters 4 and 5 are set in Germany. The case study at the heart of the chapter by Johannes Glückler and Robert Panitz is a medium-sized ophthalmological engineering firm. The authors examine the introduction of an organizational innovation and highlight the barriers encountered by top-down approaches to knowledge communication. Wolfgang Scholl's contribution expands the scope of analysis by shifting from a single-case approach to drawing on 16 firms, where he and his team analyzed 21 successful and 21 unsuccessful cases of innovation.

Chapters 6 and 7 are located in publicly funded research labs in Germany. Oliver Ibert traces the dynamics of knowledge creation in the development of a technological innovation (a sensor system for the detection of biological molecules in small quantities) across several dimensions: relational and physical space and time. Kerstin Sailer measures the distances that scientists from around the world cross within a building in order to share knowledge when they are temporarily colocated in an institute.

The final three contributions shift to different countries and domains. Chapters 8 and 9 relate to learning in educational contexts; Chap. 10, to organizational learning in the international system. Russ Vince describes action learning experiments in the use of space in an executive education classroom in the United Kingdom, bringing out the unconscious in the process. Victor Friedman and Israel Sykes develop a model of social space in which learning is understood as patterns of change in the structure of the field. They specify five learning patterns, which they then illustrate by applying them to possible ways of changing how learning is conceived and organized in the Israeli education system. Chapter 10, by Kathrin Böhling, extends the perspective up a level by addressing how Global Conferences, which she treats as temporary organizations, can serve as a space for organizational learning in the United Nations system.

The organizing principle for the last three chapters in this volume is not based on a type of organization or a particular location but rather on the movement between worlds. They are clustered around art-based innovations in organizational learning. The contribution by Ariane Berthoin Antal (Chap. 11) offers a panoramic view of how the world of the arts can contribute to organizational learning. She outlines different kinds of artistic interventions into the spaces, routines, and mindsets of public and private organizations of all sizes and industries. Her chapter is followed by the experimental research-based theater intervention that Anne Pässilä and Tuja Oikarinen conducted in a Finnish forestry company to help employees make sense of the significant changes they were experiencing (Chap. 12).

Shaun McNiff (Chap. 13) invites the reader to follow him back and forth between his practice in the art studio and his leadership roles in a university in the United States, showing how the movement between the two very different worlds can open creative spaces for organizational learning.

We hope that this book will contribute to intensifying communication and the creation of knowledge between the disciplines interested in organizational learning and organization theory. The whole "Knowledge and Space" series is intended to bring together scholars from various disciplines, schools of thought, and cultures and to provide a platform for creative discussions. Concepts of place and space or the spatial dimension of human agency can serve as a common denominator connecting the research interests of various disciplines.

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