Forschungs-/ Entwicklungs-/ Innovations-Management
Hans Dietmar Bürgel (em.) · Diana Grosse (em.)
Cornelius Herstatt · Hans Koller · Christian Lüthje
Martin G. Möhrle *Hrsg.*

RESEARCH

Benjamin Schulte

The Organizational Embeddedness of Communities of Practice

Exploring the Cultural and Leadership Dynamics of Self-organized Practice

Springer Gabler

Forschungs-/Entwicklungs-/ Innovations-Management

Die Reihe stellt aus integrierter Sicht von Betriebswirtschaft und Technik Arbeitsergebnisse auf den Gebieten Forschung, Entwicklung und Innovation vor. Die einzelnen Beiträge sollen dem wissenschaftlichen Fortschritt dienen und die Forderungen der Praxis auf Umsetzbarkeit erfüllen.

More information about this series at http://www.springer.com/series/12195

Benjamin Schulte

The Organizational Embeddedness of Communities of Practice

Exploring the Cultural and Leadership Dynamics of Self-organized Practice

Springer Gabler

Benjamin Schulte
Institute for Technology and Innovation
Management
Helmut Schmidt University – University of the
German Federal Armed Forces
Hamburg, Germany

Dissertation Helmut Schmidt Universität – Universität der Bundeswehr, Hamburg 2020. Der Titel der eingereichten und begutachteten Dissertation lautet „The Embeddedness of Communities of Practice within Formal Organizational Hierarchy: Exploring the Cultural and Leadership Dynamics of Self-organized Practice“ und wurde aufgrund von Verlagsvorgaben angepasst.

Forschungs-/Entwicklungs-/Innovations-Management
ISBN 978-3-658-31953-3 ISBN 978-3-658-31954-0 (eBook)
https://doi.org/10.1007/978-3-658-31954-0

Responsible Editor: Carina Reibold
This Springer Gabler imprint is published by the registered company Springer Fachmedien Wiesbaden GmbH part of Springer Nature.
The registered company address is: Abraham-Lincoln-Str. 46, 65189 Wiesbaden, Germany

For the three woman in my life

Carmen, Mum, and my unborn baby girl.

Foreword

In today's world, many companies—as well as public administrations—are confronted with the increasing necessity to adapt to rapidly changing environmental conditions. Established and hierarchically coordinated organizations, however, tend towards inertia and stability in their processes and routines, causing difficulties and resistance in adapting fast enough to environmental changes. Prior literature has shown that one crucial element for promoting learning and adaptation could be self-organized communities of practitioners (CoPs). They meet regularly in order to discuss not only their practical experiences but also cope with new evolving challenges to their practice by developing adaptive solutions and initiating their realization. Communities of practice thus spur change and flexible adaptation through self-organized and voluntary collaboration. Importantly, they do so without any formal assignment or external control.

Despite these promises, communities of practice raise crucial questions concerning the way they interrelate with their organizational context. Although these communities emerge and work detached from the formal hierarchy and formal rules of day-to-day work, they nevertheless are situated within this organizational context that they are supposed to adapt. Furthermore, control-oriented formal leadership of the hierarchy may suppress self-organization and informality in communities of practice because of the expectations to formalize and champion change throughout the organization. Hence, both culture and leadership of the organizational context may undermine the very core idea of communities of practice, namely emergent change and innovation through practitioner's self-organized interaction in communities. The questions thus remain, how communities of practice interrelate with their organizational context and how they ensure its continuous adaptation?

Referring to these questions, the present book examines the embeddedness of communities of practice in the formal organizational hierarchy. Its contribution is at least threefold: First, it presents an in-depth empirical study that vividly illustrates communities of practice as a source of learning and adaptation within the formal hierarchy of the German Federal Armed Forces. Second, it investigates the emergence of these communities of practice and their cultural embeddedness in this organizational context. Third, this study shows how formal leadership can affect the practices of communities without commanding them in a traditional military way, and therefore, can help to reconcile the tension between communities of practice and their formal organizational context.

To do so, the author is presenting an impressive literature review on communities of practice, their different interpretations in academic literature, and their embeddedness in the formal hierarchy. Based on a citation analysis and a subsequent content analysis, the author reviews the fundamental nature of CoPs, the practices within them, as well as their outcome and their interrelation with the surrounding organization. Notably, the author shows that different theoretical perspectives on communities of practice come to different and partly contradictory explanations concerning the embeddedness of emerging, self-organized communities of practice within their formal organizational context. Referring to this research gap, he underlines his research questions addressing (1) the emergence of communities of practice, (2) their cultural embeddedness within their organizational context, and (3) the dynamics of formal leadership to affect and embed these self-organized CoPs into the hierarchy.

The empirical study offers an impressive deep dive into three communities of practice. Based on a qualitative, interpretative research approach, the author presents a rich data set that has been gathered as part of an ample research project at our institute, focusing on “Communities of Practice in the German Federal Armed Forces”. These findings are structured in three consecutive parts, uncovering the emergence of three communities of practice, their cultural embeddedness, and their interaction with formal leadership. In detail, the author shows that these communities of practice emerged because practitioners sensed changed requirements for their respective practice. They began to self-organize and to create new resources. The author reflects his findings against the background of a “resourcing in practice lens” and complexity theory, explicating how new resources emerged in each of the three communities.

Furthermore, the findings reveal a very intensive interrelation between the communities of practice and their organizational context that is driven by cultural norms and values. Practitioners learn cultural resources during their education in the FAF, experience them as partly devalued in their day-to-day business within

the hierarchical administration, but reanimate and reproduce these norms and values through their membership in the informal communities. Drawing on a practice lens and complexity theory, the author refers to this process as "cultural resourcing". Regarding the interaction between communities of practice and official leaders, the author uncovers four processes inherent in leader-member relations—enabling the emergence of a CoP, supporting its members with resources, sensegiving and sensemaking, and assistance in putting the solutions developed by a CoP into practice. The author substantiates this way of enabling leadership by referring to complexity leadership theory. Finally, he consolidates these different aspects of embedding self-organized communities of practice in a hierarchical context in a comprehensive model which is—to the best of my knowledge—the first model depicting the interrelations between self-organized communities of practice and their organizational context in a theoretical and empirically grounded manner.

In summary, this study offers remarkable contributions (1) for understanding the essential onto-epistemological nature of communities of practice as well as their potential for creating new resources, (2) for understanding the cultural embeddedness of communities of practice in their organizational context, and (3) for understanding the dynamics of influencing these self-organized CoPs via enabling leadership. These results are not only crucial for scholars but also for managers. The key takeaways are first the vast potential of communities of practice as a source of organizational adaptability, and second, the possibilities of how leadership can foster the alignment of these communities of practice with their hierarchical context. Due to these remarkable contributions, I hope that this study gets the attention and recognition in management and organization studies it deserves. Certainly, readers will have an exciting, inspiring, and enriching experience.

Prof. Dr. Hans Koller

Acknowledgements

The path towards this dissertation was by no means straightforward and a walk in the park. Instead, it was a challenging academic and personal journey that had its fair share of roadblocks and obstacles along the way, requiring me to take more than one detour. Despite or maybe because of it, this intellectual endeavor was not only an academic exercise in terms of exploring one particular area of research but simultaneously a journey towards myself as I gained a new vista on the world and developed a new and expanded understanding of myself. I not only learned how to actually do research, how to engage in scholarly discussions, and how to write papers as I slowly became absorbed into the academic practice, I also experienced a gradual shift in my identity. That is, as I began this journey, I viewed myself first and foremost as an armed forces officer. More specifically as a *Panzergrenadier* (mechanized infantry) officer. Yet, at the end of it, I became more than that and now understand myself as an academic, husband, son, friend, soldier, and soon as a dad of a little baby girl. I thus personally grew along this journey. In light of this, I am now the more grateful to have reached my goal and to be able to look back and think about those who helped me. Without their help and support this journey would have not been the same.

First of all, this dissertation would not have been possible without the research project on communities of practice in the German Federal Armed Forces (ComBw), which has been commissioned and supported by the German Ministry of Defense, department for management development. In conjunction with this, I like to thank my supervisor Professor Dr. Hans Koller, for providing me with the opportunity to work on this project. Besides, I would also like to mention the many soldiers we met during our research in the armed forces and thank them for sharing their personal stories for this study.

I am also extremely grateful to Professor Dr. Matthias Wenzel, who I sincerely appreciate for his professional expertise. He was, without any hesitation, willing

to serve as my second assessor and swiftly crafted an insightful and constructive evaluation that will help me develop my research further. Further, I like to thank both Professor Dr. Wenzel Matiaske and Professor Dr. Christina Schäfer for joining the commission and making the defense of this dissertation possible during the COVID-19 crisis.

I cannot begin to express my thanks to Ivana Milosevic, PhD, for advising me throughout the research process and reviewing many of my ideas. I am convinced that without her positive encouragement, her helpful comments, and her general advice on how to navigate academia, my research journey would have taken another turn.

Equally, I would like to thank my colleagues Dr. Dominique Groß, Dr. Michael Zeng, Dr. Daniel Ehls, Reimo Jahn, Katharina Nowak, and Kai Adams at the Institute for Technology and Innovation Management for their open discussions and for creating a supportive working atmosphere. Next to them, I am also thankful for having served with my fellow *Panzergrenadier* comrade André Kreutzmann at the Institute.

Also, I am incredibly grateful for having met Florian Andresen with whom I now have been working, learning, and traveling in close tandem for the past six years. We certainly built our own *kleine Kampfgemeinschaft* (fighting community) in the truest sense of the word as we constantly pushed each other forward, encouraged each other after failures, and in the end, shared our victories. It is our ongoing scholarly discussion that contributed immensely to this dissertation. It was and still is an honor for me serving, working, and researching by your side.

I further cannot express how deeply thankful I am to my mum Sabine Spranger for her unconditional love and support. She always had an open ear, showed a sincere interest in my work, and during our hour-long phone calls patiently listened to my professional and personal problems, offering comfort and encouragement when need be.

Most of all, I cannot express how thankful I am to my wife and best friend Carmen for her almost endless patience and for having to put up with me during this wild journey. Above all, I am grateful to her for being there by my side. It is her gentle love and caring support, as well as her profound belief in me and my abilities that gave me the strength and perseverance to work through the occasional disappointments and in the end to finish this dissertation. Our journey together will go on, and we will soon welcome our little baby girl.

Hamburg
August 2020

Benjamin Schulte

Contents

Abbreviations

CAC	Cultural Advisory Community
CAS	Complex Adaptive System
CBC	Chief Blaster Community
CEIC	Coordination element for Intercultural competence
CiPs	Collectivities of Practice
CLT	Complexity Leadership Theory
CoP	Community of Practice
COpCom	Center for Operative Communications
DoD	Department of Defense
DEU TDLMC	Deutsche TDL Management Cell
EC	Epistemic Communities
EU	European Union
FAF	German Federal Armed Forces
ICT	information and communication technology
KBV	knowledge based view
LPP	legitimate peripheral participation
MIDS	Multifunctional Information Distribution System
NATO	North Atlantic Treaty Organization
NCO	Non-commissioned officer
NetOpFü	Vernetzte Operationsführun
NoP	Network of Practice
RBV	resource based view
SSCI	Social Science Citation Index
TDL	Tactical Data Links
TDLC	Tactical Data Link Community
UN	United Nations

Illustration Directory

Table Directory

Information Box Directory

Introduction

1

Organizations (…) have counteracting forces at play. Some forces push the system toward stability and order (…). Some other forces push the system toward instability and disorder (…). The coupling of these forces can lead to a highly complex situation.

Thietart & Forgues 1995

Since the early writings in management and organization theory, it is well-established that firms need to adapt in accordance with their environment in order to survive (Schumpeter, 1949). Indeed, in an increasingly dynamic and complex world this capacity to continuously adapt structures and practices to new circumstances becomes ever more critical for contemporary organizations. However, despite ever unfolding change, organizations also require stability in their routines and practices to reliably and repetitively produce outcomes (Brown & Eisenhardt, 1997; Child & McGrath, 2001; Farjoun, 2010). These competing demands have divergent temporal orientations and rely on contradictory attributes, or as Cegarra-Navarro & Dewhurst state: *"While renewing to adapt for tomorrow requires change, flexibility and creativity, profits for today require order, control and stability"* (2007, p. 1721).

This paradoxical tension between stability and adaptability has long drawn interest from management scholars (Farjoun, 2010), and continues to spur research about how organizations should reconcile these contradictory states. Selznick (1948), for example, points out that organizations encompass formal organizational systems focused on efficiency and an adaptive social structure. Whereas, Burns

B. Schulte, *The Organizational Embeddedness of Communities of Practice*, Forschungs-/Entwicklungs-/Innovations-Management,
https://doi.org/10.1007/978-3-658-31954-0_1

& Stalker (1961), in their seminal study, argue that organic structures support flexibility while mechanistic structures support efficiency. Similarly, Thompson (1967) refers to this trade-off between efficiency and flexibility as the central "paradox of administration", stating that managers must choose between organizational designs suited for routine work and those feasible for non-routine, innovative work. Duncan (1976), in this regard, mentions that organizations require both organic structures generating innovations and mechanistic structures exploiting them.

In view of this, several authors argue that it is difficult to resolve this tension within a single organization, proposing the structural separation of organic, informal systems focused on exploration and mechanistic, formal systems focused on exploitation (Lawrence & Lorsch, 1967; March, 1991; Tushman & O'Reilly, 1996). Conversely, recent studies acknowledge the tension as a pervasive feature of organizing (Farjoun, 2010; Leana & Barry, 2000), occurring in organization members' everyday practices (Birkinshaw & Gupta, 2013; Brown & Eisenhardt, 1997; Uhl-Bien & Marion, 2009). Researchers in this perspective suggest that firms achieve adaptability by designing "semistructures" that combine organic and mechanistic features (Brown & Eisenhardt, 1997) or through creating supportive contexts that enable employees to recognize the need for adaptation but also remain sufficiently focused on current operations (Adler, Goldoftas, & Levine, 1999; Gibson & Birkinshaw, 2004). Similarly, scholars applying a complexity theory perspective on organizations, recently, note that adaptability occurs when administrative forces focused on the execution of business and adaptive forces driving organizational response become entangled with each other (Uhl-Bien & Marion, 2009; Uhl-Bien, Marion, & McKelvey, 2007).

Turning towards self-organized communities of practice (CoPs) as a source of organizational learning and adaptability (Brown & Duguid, 2001; Wenger, 1998), one can see this paradoxical tension unfolding from peoples' everyday practices.

CoPs are self-organized groups of practitioners, who collaboratively engage with each other in their work practices, learn from each other, and solve their practical problems (Brown & Duguid, 1991; Wenger, 1998). They make up local contexts for adaptive and changing practice where new knowledge and innovations in response to specific practical challenges can arise from situated social interaction (Brown & Duguid, 1991; Jarzabkowski, 2004; Pattinson, Preece, & Dawson, 2016). For example, Orr (1996) shows, in his ethnography of photocopier repair technicians, how a CoP generates novel solutions to newly occurring technical problems by means of story-telling. While Dougherty (2001) argues, based on a multiple case study, that a firm's innovative capabilities are rooted

in its different communities of practice whose members can imagine their role within the overall innovation process and autonomously solve problems.

These CoPs, however, do not emerge in a social vacuum (Heizmann, 2011; Roberts, 2006). Instead, they are situated in broader contexts of established organizations (Kerno, 2008) that, in the vast majority are still characterized by formal organizational hierarchy, involving top-down formal leadership, centrally imposed official rules, as well as preorganized tasks and practices (Leavitt, 2003). Embedding CoPs in formal organizational hierarchy thus creates tension because CoPs can drive local learning and change of practice (Brown, 2004; Brown & Duguid, 1991; Lave & Wenger, 1991), whereas formal organizational hierarchy is primarily designed to resist change and ensure repetitive practice for producing reliable outcomes (Stacey, 1995; Thietart & Forgues, 1995). Moreover, the attributes that underlie each of the two elements are typically seen to be mutually incompatible. For CoPs to emerge, organizations' members have to autonomously engage in practice (Brown & Duguid, 1991; McDermott, 1999; Thompson, 2005); in contrast, formal organizational hierarchy requires the alignment, predictability, and control of individual and collective behavior to generate results (Uhl-Bien & Arena, 2017; Uhl-Bien & Arena, 2018). Yet, too overly rigid formal structures and bureaucratic controls can stifle self-organization (Kerno, 2008; Thompson, 2005) while, on the contrary, full autonomy can lead to organizational fragmentation as adaptation remains local without some kind of integration (Brown & Duguid, 2001; Duguid, 2008; Tallman & Chacar, 2011a).

Embedding CoPs in formal organizational hierarchy thus is characterized through tension. Given this, understanding the embeddedness and how to navigate its inherent tension is critical for contemporary organizations that are looking to unlock the potential of CoPs for emergent adaptability in light of ever more dynamic and complex environments.

1.1 Research Gap

Since its introduction, the communities of practice construct has spurred vibrant research and fruitful discussions in academia. The interest of scholarship in CoPs, indeed, becomes evident by the yearly number of publications alone in management and business science journals which, according to the Social Science Citation Index (SSCI) of the ISI Web of Science database, has grown from an average of five publications over the period from 1995 to 2000 to an average of 15 in 2001 through 2010 to an average of 19 in 2011 to 2018.

Despite its growth and the impressive body of scholarly work, the CoP concept is far from being outdated and still requires further development (Pyrko, Dörfler, & Eden, 2019). Indeed, questions about how CoPs interrelate with broader, translocal features of the surrounding formal organization remain to a large extent unanswered or under contestation in the extant literature (Hotho, Saka-Helmhout, & Becker-Ritterspach, 2014).

For instance, CoP research deeply rooted in a practice-oriented lens (Corradi, Gherardi, & Verzelloni, 2010; Gherardi, 2009b; Gherardi, Nicolini, & Odella, 1998; Lave & Wenger, 1991) focuses either on learning processes within a particular community (Gherardi et al., 1998; Lave & Wenger, 1991; Pyrko, Dörfler, & Eden, 2017) or how learning unfolds across the boundaries of several intersecting CoPs (Fox, 2000; Gherardi & Nicolini, 2002a; Oborn & Dawson, 2010), whereas other studies stress the emergent and informal nature of CoPs as sites for innovation and adaptation that, however, tend to evade managerial control (Brown & Duguid, 1991; Brown & Duguid, 2001; Wenger, 1998). Thus, the tension-ridden relations between communities and broader socio-cultural structures as well as formal leadership remain relatively vague in these perspectives (Contu & Willmott, 2003; Cox, 2005; Østerlund & Carlile, 2005). More recent research originating from the knowledge management discipline promotes different ways of operationalizing CoPs as tools for organizational learning (Bolisani & Scarso, 2014; Borzillo, 2009; Probst & Borzillo, 2008; Wenger, McDermott, & Snyder, 2002). Though authors in this instrumental perspective focus on CoPs within managerial-shaped surroundings, they tend to lose sight of the central premises of the CoP construct of identity and social practice within a particular social context (Corradi et al., 2010; Duguid, 2008; Lave, 2008). Instead, they recommend simplistic management approaches that detach the CoP from actual practice and, in doing so, largely fail to explicate the links between practice, community, and organizational context (Harvey, Cohendet, Simon, & Dubois, 2013; Roberts, 2006). Thus, taken together, these different lines of research do not sufficiently problematize the embeddedness and its tensions of communities of practice in the broader socio-cultural and power structures of the formal organizational hierarchy.

As I regard learning and adapting in CoPs as processes rather than as entities that cannot be "set up" instrumentally (Pyrko et al., 2019), I tend to agree with the critiques about the naïve and instrumental understanding of CoPs (Pyrko et al., 2017). Nevertheless, when we acknowledge CoPs as a source of organizational learning and adaptation, we need to know more about how such self-organized processes in CoPs emerge and embed within the broader cultural context and interrelate with formal leadership. That is, we need to explore how the tension between stability—induced through pre-organized practice—and change—emanating

from self-organized practice—works for organizational adaptability. Thus, the following thoughts aim at furthering our scholarly knowledge of how CoPs as sites of adaptability interrelate with and embed in a managerial-shaped organizational context.

1.1.1 Approach and Contributions

To fill this gap, I employ qualitative research methods based on the in-depth inquiry of three communities of practice that we were able to investigate within the German Federal Armed Forces (FAF) as part of a larger research project.[1] In particular, we studied the three practice areas of tactical data links, military blasting, and intercultural competence. The first involves soldiers who are concerned with establishing secure data connections between numerous units via Link encryptions. The military blasting practice comprises soldiers who are trained in the use of state of the art explosives and who are capable of conducting any military or civilian blasting assignment (e.g., skyscrapers, towers, or stadiums). Lastly, the intercultural competence domain describes a network of experts that started to enhance the FAF's awareness of intercultural aspects of modern warfare scenarios along the increasing amount of missions abroad.

In these three practice areas, we were able to detect how, in light of an increasingly dynamic and complex environment for task-fulfillment, self-organizing CoPs evolve and adapt their practice to the changed situation.

Based on these observations, I utilize an interpretative research approach (Gioia, Corley, & Hamilton, 2013; Glaser & Strauss, 1967) to build a grounded, process model (Langley, 1999; Langley, Smallman, Tsoukas, & van de Ven, 2013), which explicates the embeddedness of CoPs as sites of adaptability within the formal organizational hierarchy as profoundly shaped through cultural and leadership processes.

In building this model and theorizing its internal processes, I draw on two theories; namely, a practice lens (Feldman & Orlikowski, 2011; Feldman & Worline, 2016; Nicolini, 2012), combined and expanded with a complexity leadership

[1]The findings of this research project have been part of multiple conference papers that we presented on various conferences and meetings such as AOM, EURAM, EGOS, SMS and ECKM (Andresen, Koller, Kreutzmann, & Schulte, 2016); Andresen, Schulte, and Koller (2019); Nowak, Koller, Andresen, Kreutzmann, and Schulte (2016); Kreutzmann, Koller, Andresen, and Schulte (2016); Schulte, Koller, Andresen, and Kreutzmann (2016); Schulte, Andresen, and Koller (2017).

theory (CLT) perspective (Uhl-Bien et al., 2007; Uhl-Bien & Marion, 2009). Utilizing these two theoretical accounts helps me explain how community members generate new resources in self-organized practice, produce and reproduce cultural codes, as well as how formal leadership influences and interacts with these emergent processes. Note that throughout this manuscript, I subscribe to a broader resource understanding (Feldman, 2004; Feldman & Worline, 2012) as I describe CoPs as spaces for self-organized resourcing. Self-organized resourcing consists of and explains two critical processes of the grounded model: on the one hand, it explicates the generation of new, specialized resources such as new training programs, manuals, handbooks, or whole exercises through community activities and, on the other hand, it refers to cultural resourcing, that is the creation and reproduction of cultural resources such as identities, values, and symbols in practice.

In detail, the model shows that community members shape specialized resources through their self-organized interactions and, in doing so, adapt and renew the organizations' resource base to a changing environment. This form of self-organized resourcing builds on a practice-oriented lens (Feldman & Orlikowski, 2011; Nicolini, 2012) on resources that theorizes that individuals generate and mold resources as they make use of them in practice (Feldman, 2004; Feldman & Worline, 2012; Feldman & Worline, 2016; Howard-Grenville, 2007). Resourcing theory suggests that resources are malleable and dynamic compared to traditional perspectives, because resources hold meanings (a schema about a resource's qualities and its possible use), which can be constructed, altered, and reconceptualized (Feldman, 2004; Feldman & Worline, 2012; Kannan-Narasimhan & Lawrence, 2018; Schneider, Bullinger, & Brandl, 2020). Within the studied CoPs, we can see how community members built and molded new resources as they made sense of changing environments to their practice. That is, members identified the need for new or adapted resources and collaboratively began to improvise first responses to this need (e.g., a small exercise). By doing so, they constructed meaning about the kind of resource needed (i.e., a schema about its properties and potential uses) which, afterward, was continuously adjusted as they engaged with each other and with formal leadership, thereby refining and transforming the resource in the process (e.g., the small exercise developed into a bi-annual, international exercise).

This self-organized resourcing dynamic also resonates with what complexity theorists refer to as emergent self-organization unfolding in complex adaptive systems (CAS; Chiles, Meyer, & Hench, 2004; Lichtenstein, 2014). In complex adaptive systems new, emergent order (e.g., resource configurations) arises from the self-organized actions of interdependent agents who engage with adaptive

challenges based on local knowledge and feedback from others without an outside mandate or control (Chiles et al., 2004; Stacey, 1995; Tsoukas & Chia, 2002; Uhl-Bien & Arena, 2018). One intriguing insight from the current study thus is that the observed CoPs display the dynamics of emergent self-organization known within CAS as their members build and mold new resources without an external mandate or outside control.

The grounded model of the current study, furthermore, shows that self-organized resourcing within the local context of a particular CoPs does not unfold in a vacuum but, instead, is embedded within the surrounding broader, socio-cultural context of the armed forces. More specifically, the model illustrates how community members contextually shape hybrid cultures that embody deeply ingrained norms and beliefs but also entail altered and modified cultural elements. In theorizing this mechanism, I again utilize a resourcing in practice perspective (Feldman, 2004; Howard-Grenville, Golden-Biddle, Irwin, & Mao, 2011), and explicate the cultural processes unfolding in CoPs as cultural resourcing. Viewed from this lens, members draw on once learned and internalized cultural resources such as schematic identities, norms, and values and, in doing so, reproduce parts of the organization's broader cultural repertoire in their self-organized social praxis. Given this, CoPs are inherently embedded and linked to their formal surroundings and do not make up countercultures as some prior studies would suggest (Brown & Duguid, 1991; Orr, 1990; Orr, 1996). However, the findings also illustrate that by resourcing elements from the broader repertoire, community-members adapt and mold cultural resources to fit their local circumstances. Taken together, cultural resourcing creates a space in which social praxis is neither completely determined through macro, socio-cultural structure nor is it wholly constraint-free and self-caused. This newly resourced cultural space enables members to self-organize and collaboratively work out adaptive responses to their practical problems.[2]

Finally, the grounded model outlines how the processes of self-organized resource generation within CoPs interweaves with formal leadership. Based on complexity leadership theory, leadership works to unlock the *"learning, creative and adaptive capacity of complex adaptive systems (CAS) in knowledge-producing organizations"* (Uhl-Bien et al., 2007, p. 304). Similarly, the findings of the current study illustrate that formal leadership of the armed forces helps to embed the self-organized activities from which adaptability arises. That is, leadership,

[2]These findings on cultural dynamics of self-organized practice in CoPs has been presented at multiple Academy of Management Meetings (Schulte, Andresen, & Koller, 2017).

on the one hand, enables self-organized, adaptive practice and provides much—needed assets (i.e., material and immaterial means) while, on the other hand, formal leadership helps to transform the emergent outcomes (i.e., the newly created specialized resources) into official processes and structures. Leadership, thus, is critical in embedding CoPs for adaptability into the formal organizational hierarchy without undermining its self-organized nature.[3]

In summary, the grounded model of this study introduces CoPs as spaces for resource generation and reproduction that are embedded into the structures of formal organizational hierarchy via leadership and cultural mechanisms. These mechanisms of embeddedness make sure that CoPs are neither wholly autonomous nor are they fully integrated and formalized. Instead, the paradoxical tension between informal, self-organizing system and formal system is sustained and navigated for organizational adaptability (Uhl-Bien & Arena, 2017; Uhl-Bien & Arena, 2018). More specifically, the findings of the current study illustrate that the tension mentioned above between change and adaptability inherent in the relation between CoPs and their organizational context may be better understood as a pervasive duality of change and stability occurring in local practice. CoPs reproduce but also change broader socio-cultural structures of the organization and they generate change in the organizations' resource base which in turn enables more effective practice in a changing situation.

1.1.2 Structure of Analysis

I begin the following remarks with a systematic literature review of the community of practice literature. This overview of prior work will outline the dominant perspectives on the CoP construct along its dimensions and, in doing so, will highlight that explanations of the interrelation between the CoP and its broader organizational context are contradictory and not sufficiently theorized in prior work. Therefore, I identify the embeddedness of CoPs within the formal organizational hierarchy as the current study's research gap and formulate the accompanying research questions that will guide the further reflections.

In section 3, I will outline the different theoretical and ontological groundings of the diverse CoP literature streams and illustrate how these contrasting underpinnings affect explanations of embeddedness. This shows that prior research either takes a process worldview with practice-oriented theories or has an

[3]This finding has been recently published in an article in the *Journal of Leadership & Organizational Studies* (Schulte, Andresen, & Koller, 2020).

entitative understanding accompanied by traditional management theories such as the knowledge-based view. Nevertheless, neither theoretical perspective offers a complete picture of the relation of CoPs with the organizational context. Given this, I will introduce complexity theory and in particular complexity leadership theory as an extension to a practice-oriented lens for explaining facets of CoPs' embeddedness within established formal organizations.

In section 4, I will acquaint the reader with the German Federal Armed Forces, which offer a unique research setting to explore the interrelation between the local context of a self-organized community and the broader trans-local context of the FAF. I will then logically derive the method of a grounded, interpretative research approach to build process theory that explains the processes and mechanisms of a CoP's embeddedness.

Subsequently, I will provide the reader, in section 5, with the rich narratives of three communities of practice based on our informants' quotes and experiences. This section reveals how each of the three communities emerged, how their members built and renewed resources for better accommodating environmental dynamics, how members shaped their own informal cultures, and how they interacted with the formal leadership of the organization.

Founded on these descriptions, section 6 presents the grounded, cross-level model of the embeddedness of CoPs within formal organizational hierarchy which brings together the above outlined empirical insights and makes sense of them on a theoretical level using complexity theory reasoning and practice-oriented explanations.

Within the subsequent discussion, I will elaborate in more detail how the current study's findings and its grounded model contribute and add to several research streams. In particular, the discussion outlines where and how the notion of embeddedness extends scholarly knowledge on communities of practice research, how this study adds to research on complexity leadership theory and, also, how the current findings align with recent research on organizational culture.

I will conclude with remarks on the practical implications of this study and discuss in which organizational contexts, other than the German military, the obtained findings might be useable. Finally, I will outline how future research may build from this dissertation.

Literature Review

2

Looking only at canonical groups (…) will not provide a clear picture of how work or learning is actually organized and accomplished.

Brown & Duguid, 1991

In this chapter, I provide a thorough account of the debates within the communities of practice literature. I do so systematically by generating what I will refer to as the core collection of research about CoPs, comprising the most prominent and influential work in this academic field. Based on this core collection, I will develop an explanatory framework of CoP research that is organized around the central dimensions of the CoP construct. This framework helps me in reviewing and illustrating the ongoing debates and controversies within the extant literature.

The review will reveal that scholarly work on CoPs is, at its core, divided into three different perspectives, permeating through all the construct's dimensions. On the one hand, scholars perceive CoPs as a theoretical lens to look at learning processes in practice; on the other hand, researchers understand CoPs as informal, self-organizing groups of practitioners within established organizations. With the popularization of the concept a third perspective that tries to instrumentally design, setup, and actively manage CoPs for organizational benefits has gained momentum. Depending on the respective perspective, prior work offers different and, at times, contradictory explanations of the interrelation between the local context of a given CoP with its broader, trans-local context. Early research mostly focuses on community internal learning processes that did not interrelate with broader structures beyond a local CoP. Later, other practice scholars

B. Schulte, *The Organizational Embeddedness of Communities of Practice*, Forschungs-/Entwicklungs-/Innovations-Management,
https://doi.org/10.1007/978-3-658-31954-0_2

explore organizing and learning across the boundaries of multiple communities. Meanwhile, researchers who understand CoPs as a source for adaptation and innovation study how to enable and embed these emerging dynamics. This discussion, however, recently developed towards naïve and simplistic management approaches that remove any conflictive tension between community and formal management. Taken together, embeddedness of CoPs as sites of emergent adaptability within established organizations remains undertheorized. Although this gap of a CoP's embeddedness in formal organizational hierarchy mainly covers one dimension of the CoP construct (i.e., the broader context around CoPs), I will summarize the discussion in every element of the framework not only for the sake of completeness but also because these elements are interrelated and affect each other.

2.1 Identifying the Core Literature on Communities of Practice

Since the publication of Lave & Wenger's (1991) seminal work on situated learning in communities of practice, the topic has drawn much interest from scholars and practitioners alike. Thus, there has been a vast amount of research that has employed a practice-oriented perspective to learning or inquired on informal and self-organized organizational groups. From this apparent interest on the topic, one might surmise that there exists a common understanding on communities of practice. The CoP construct, however, remains vastly open for numerous conceptualizations and interpretations concerning even its basic definition. This variation in understandings, on the one hand, has contributed to vibrant research developing in different streams and disciplines. Yet, it also causes general confusion over what CoPs basically describe which, ultimately, results in incoherent empirical findings (Lindkvist, 2005). For instance, some authors bemoan that the community of practice notion has become an "umbrella term" that scholars too often use unreflectively and in inappropriate ways, stretching the notions' core assumptions (Amin & Roberts, 2008).

Although, there have been some literature reviews on communities of practice in the past that serve as a good starting point, these are either no longer contemporary, solely focus on one particular research topic such as knowledge management (Bolisani & Scarso, 2014) or innovative capabilities (Pattinson et al., 2016), or appear somewhat fragmented (Aljuwaiber, 2016). Hence, to be able to develop a perspective on the phenomenon at hand, provide a complete picture of extant work and, more importantly, identify research gaps that still exist and are worth

pursuing, I first need to survey the relevant literature with its diverse perspectives and conflicting findings by myself.

Because the above reviews either do not report on their search method or employ unlike approaches resulting in different "data sets" of literature, the first step in gaining an overview about existing work is to identify what I refer to as the core collection of relevant research in the communities of practice field. To this end, I followed the approach outlined by Di Stefano, Peteraf, & Verona (2010) in their work on examining the intellectual core of research papers in the dynamic capabilities literature based on a citation analysis. This bibliometric analysis assumes that citation counts are valid measures for prominence and influence in a given research field.

I conducted my analysis in the THOMPSON-ISI Web of Science database based on the Social Science Citation Index. I began by retrieving all papers published between 1994 and 2018 with titles, abstracts, keywords containing either the term "community of practice" or "communities of practice". As this search yielded 2560 results, I narrowed the further exploration to the business and management categories in the database which reduced the dataset to 351 published research papers, of which 309 papers had at least one citation.[1] Based on this set I excluded every non-cited article and examined each paper in respect to its overall relevance to the field. That is, I reviewed if the community of practice notion is a central theme or issue in the paper. Intriguingly, this further reduced the set to just 138 accounts.

Moreover, by hand, I included the seminal works that have either been published earlier or in monographs such as Brown & Duguid (1991), Wenger (1998) and Wenger et al. (2002) into the collection because the database only searches research papers published in scientific journals in a timespan after 1994.[2] Also, I added work that has not been detected by the database, but I found to be central to the community of practice literature such as the articles from Bechky (2003), Boland & Tenkasi (1995), or Cook & Brown (1999). To identify the core collection, I ordered this panel of papers according to the times that they were cited by any publication in the ISI database.

[1]Note that within subfields such as education and nursing the community of practice notion has gained massive prominence in recent years. However, these streams are not relevant for my research purpose.

[2]I was only able to find citation counts for books/ monographs based on google scholar that are inflated and are hardly comparable to the SSCI which only includes cites from other publications within the database. For example, Wenger and Snyder (2000) Harvard Business Review article has 5307 citations according to google scholar compared to 950 within the ISI database.

Prior work following a similar approach suggests different criteria to define the threshold of citation counts that one includes in the core collection. For example, Di Stefano et al. (2010) use the average number of citations and only include articles that have been cited 20 times or more. The average number in the current panel, however, is 40 which would limit the core to a relatively small set of articles. Thus, in order to include as many perspectives and streams as possible, I decided to employ a lower citation count (10) to also consider newer publications into the collection. This approach generated a list of precisely 91 research papers and books that are relevant to the field with at least ten citations. I display the list in Table 2.1. From these 91 papers, 43 (≡ 47.78 %) were published in journals that can be considered A journals accumulating 77.77 % of the total citations compared to 38 (≡ 43.33 %) articles that were published in B journals with 16.21 % of the total citation count.

Within this core collection, the journals that ranked the highest in terms of articles published in conjunction with citations are: *Organization Science* (11 articles with 8951 total cites), *Journal of Management Studies* (six articles with 1025 total cites), *Management Learning* (11 articles with 859 total cites), and the *Journal of Knowledge Management* (11 articles with 300 total cites).

From the analysis of this core collection of research papers on communities of practice, I developed a framework that provides some structure and allows me to review this heterogeneous literature. I will introduce the framework and how I established it in the next chapter.

Table 2.1 Core collection of communities of practice literature

Paper	Citations	Paper	Citations
Lave & Wenger (1991)	62881*	Tallman & Chacar (2011a)	56
Wenger (1998)	48074*	Dahlander & O'Mahony (2011)	54
Wenger, McDermott, & Snyder (2002)	12017*	Jeppesen & Laursen (2009)	49
Brown & Duguid (1991)	2746	Handley, Clark, Finchman, Sturdy (2007)	49
Boland & Tenkasi (1995)	2644	Zboralski (2009)	44
Brown & Duguid (2001)	1198	Li (2010)	41
Wenger (2000)	1103	Creplet and Collegues (2001)	40
Wenger & Snyder (2000)	950	Gertner, Roberts, & Charles (2011)	37
Cook & Brown (1999)	928	Thompson (2011)	35
Wasko & Faraj (2000)	607	Contu & Willmott (2006)	34
Bechky (2003)	581	Bertels, Kleinschmidt, & Koen (2011)	32
Brown & Duguid (1998)	554	Oborn & Dawson (2010)	31

(continued)

Table 2.1 (continued)

Paper	Citations	Paper	Citations
Ferlie and Collegues (2005)	413	Collier & Esteban (1999)	30
Markus (2001)	371	Kodama (2002)	27
Contu & Willmott (2003)	314	Snell (2001)	26
Amin & Roberts (2008)	292	Kirkman and Collegues (2012)	25
Gherardi, Nicolini, & Odella (1998)	266	Iaquinto, Ison, & Faggian (2011)	25
Roberts (2006)	251	Mork and Collegues (2010)	25
Faraj & Xiao (2006)	246	Howorth, Smith, & Parkinson (2012)	23
Fox (2000)	239	Kirkman and Collegues (2011)	23
Swan, Scarbrough, & Robertson (2002)	223	Tallman & Chacar (2011b)	22
Handley and Collegues (2006)	201	Hong & O (2009)	22
Anand, Gardner, & Morris (2007)	196	Scarso, Bolisani, & Salvador (2009)	22
Lindkvist (2005)	159	Brown (2004)	21
Thompson (2005)	141	Pan and Collegues (2015)	20
Kane & Alavi (2007)	134	McLeod, O'Donohoe, & Townley (2011)	19
Pan & Leidner (2003)	123	Bolisani & Scarso (2014)	18
Gherardi & Nicolini (2002a)	121	Kietzmann and Collegues (2013)	18
Raelin (1997)	121	Styhre, Josephson, & Knauseder (2006)	18
Gherardi & Nicolini (2002b)	119	Borzillo, Aznar, & Schmitt (2011)	16
Gherardi & Nicolini (2000)	112	Borzillo (2009)	16
Fang & Neufeld (2009)	110	Hotho and Collegues (2014)	15
Sapsed & Salter (2004)	110	Retna & Tee Ng (2011)	15
Elkjaer (2004)	109	Lee, Reinicke, Sarkar, & Anderson (2015)	14
Ayas & Zeniuk (2001)	98	Contu (2014)	14
Yanow (2000)	94	Yakhlef (2010)	13
Hendry (1996)	92	Harvey and Collegues (2013)	12
Dougherty (2001)	90	Borzillo & Kaminska-Labbe (2011)	12
Liedtka (1999)	81	Nesheim, Olsen, & Tobiassen (2011)	12
Mutch (2003)	80	Corso, Giacobbe, & Martini (2009)	12
Dube, Bourhis, & Jacob (2005)	78	Pattinson & Preece (2014)	10
Bogenrieder & Nooteboom (2004)	72		
Cross, Laseter, Parker, & Velasquez (2006)	70		
Cohendet & Llerena (2003)	67		
Dunham, Freeman, & Liedtka (2006)	67		
Jeon, Kim, & Koh (2011)	63		
Levina & Vaast (2006)	61		

*citation count based on Google.Scholar

2.2 Reviewing the CoP Construct and Its Dimensions

In order to uncover the structure of the ongoing debate in the community of practice literature, illustrate the main points of contention, and identify the areas for research that can help move the debate forward, I employ an approach to qualitative data analysis similar to content analysis (Carley, 1990) and coding procedures recommended by Miles & Huberman (1994). These are techniques for examining large amounts of textual material by classifying data into a much fewer number of categories that represent a similar meaning. Content analysis mainly serves the purpose of gaining an understanding of content through systematic coding and identification of themes in the data (Weber, 1990). The content analysis starts with coding similar text passages in the data into categories. Then, the researcher explores relationships between these categories.

In my particular case of finding an explanatory framework to the CoP literature, I started with extracting the basic definitions on communities of practice in the core collection. From the 91 research papers and monographs, 29 provide an original definition of the community of practice construct. Of the remaining papers, 27 explicitly quote one of these original definitions. Namely, 11 papers cite the definition from Wenger et al. (2002), nine papers cite Lave & Wenger (1991), and four papers explicitly refer to Wenger's (1998) definition. Surprisingly, 33 research papers do not provide an actual definition, yet they often cite one of the original works.

I then went on to analyze the provided definitions. That is, I grouped similar definitions and codes extracted from them into categories, allowing me to make comparisons between them. This process yielded two fundamental perspectives on the community of practice construct (CoPs as entities versus CoPs as a theoretical lens). With this first categorization about the fundamental nature of CoPs in mind, I surveyed all 91 papers again and coded reoccurring themes from their community conceptualization and findings sections. These were, for instance, particularly salient aspects such as "meaning construction within CoPs" or "shared communal identity". After that, I categorized these themes into groups. For example, all themes that reflect something people actually do within communities of practice such as participation, meaning construction, or knowledge sharing build one category (i.e., the praxis within CoPs). Meanwhile, themes such as new knowledge, innovation, or communal repertoire of resources refer more to consequences of such community bound activities and, therefore, were grouped. Overall, this process resulted in five aggregate dimensions/categories (1) the nature of CoPs (i.e., what CoPs fundamentally are), (2) the praxis (i.e., the actual activity of people in them), (3) the local context (i.e., the practice where the praxis takes place), (4) the

outcome (what is produced through this praxis), and (5) the trans-local context (the broader structures in which practice unfolds). These five categories hence make up the explanatory framework that allows me to provide a structured review of the literature. Figure 2.1 shows the framework for the community of practice literature. Additionally, Table 2.2 provides an overview of the framework's dimensions and provides quotes from the analyzed literature.

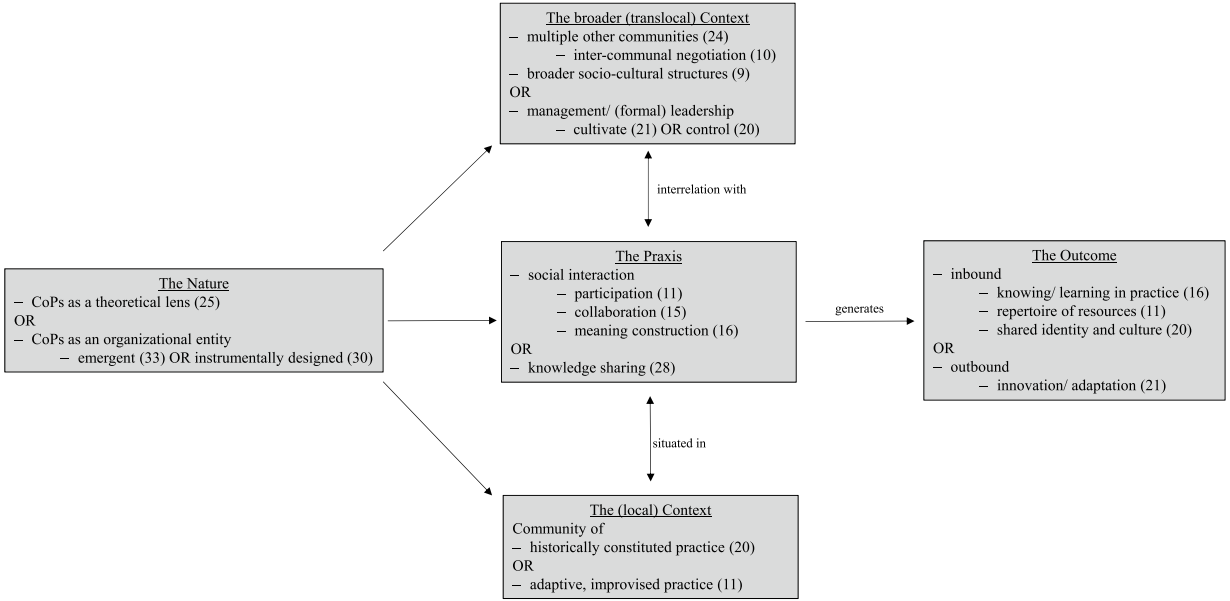
The framework uncovers the pervasive polarization within each of the five aggregate dimensions around the two main perspectives on communities of practice. This finding of a bifurcated CoP literature is not especially unique as other authors have also commented on this fact (Amin & Roberts, 2008; Lindkvist, 2005; Thompson, 2011). However, the current framework that emerged from the in-depth work with the core collection of literature is, to my knowledge, the first that systematically reveals this fundamental divide in understandings occurring in the most influential research along the key aspects of the construct. In the next sections, I will reflect this ongoing debate within each of the framework's five central dimensions. In doing so, this review will lead to the central gap in community of practice research: namely, that the interrelation between the local context of the practices of a community and the trans-local context of formal organizational hierarchy is contested and incomplete.

2.2.1 The Nature of Communities of Practice

The communities of practice concept has been around for nearly three decades and has found its way into peoples' everyday language (Pyrko et al., 2017; Wenger, 2010) despite lacking a clear definition and universal understanding. While the community of practice literature has drawn on numerous definitions, the underlying debate over the basic nature of CoPs concerns whether they are social entities that possess certain innate properties or if the CoP notion is a theoretical lens through which one observes and explains social learning processes.

As is shown in Figure 2.1 this fundamental divide over definitions is reflected in the overall literature. Thus, there are 25 research papers in the core collection that follow the CoPs as a theoretical lens approach in contrast to 63 accounts that apply a more entitative perspective.[3] Intriguingly, this divide in perspectives goes back to the first two works that mentioned communities of practice: namely, Lave & Wenger (1991) and Brown & Duguid (1991), who mutually credit each other for introducing the concept.

[3]Note, that not all of the 91 papers/monographs could be definitively categorized to one of the two perspective.



Numbers in parenthesis refer to the amount of research papers in the collection informing on the respective approach or aspect.
The numbers do not automatically add up to 91 papers in the collection because some papers focus on two or more issues.

Figure 2.1 An explanatory framework for the community of practice literature

Communities of practice as a theoretical lens. In Lave & Wenger's (1991) monograph that outlines their theory on situated learning in communities of practice based on ethnographic studies of craft-based workers such as midwives, butchers, Navy quartermasters, tailors, and non-drinking alcoholics, no explicit definition about the construct is given. They even note, themselves, that they leave the concept *"largely as an intuitive notion (…) which requires more rigorous treatment"* (Lave & Wenger, 1991, p. 48). For them, a community of practice is *"a system of relationships between people, activities, and the world; developing with time"* (p. 98). The use of the term community, thereby, does not *"imply necessarily co-presence, a well-defined, identifiable group or socially visible boundaries*" (p. 98); rather, it refers to the *"participation in an activity system about which participants share understandings concerning what they are doing what that means for their lives and for their community"* (p. 98). Hence, Lave & Wenger's (1991) focus is not so much on the community as an organizational grouping but, rather, on the different forms of participation in social practices. Based on their empirical observations, they develop the concept of legitimate peripheral participation (LPP) that highlights how newcomers to a craft slowly traverse through the different stages of participation in the community's practices to become competent members. Learning from this viewpoint is more than acquiring abstract knowledge, it is about a socialization process that is inextricably linked with the active involvement in practice where individuals learn the community's subjective viewpoints and how to speak its language (Lindkvist, 2005). In other words, newcomers learn to practice as a competent member by participating in the social world. As noted by Lave & Wenger:

> *"learning is recognized as a social phenomenon constituted in the experienced, lived-in world, through legitimate peripheral participation in ongoing social practice; the process of changing knowledgeable skill is subsumed in processes of changing identity in and through membership in a community of practitioners" (p. 64).*

The usage of the term community in Lave and Wenger's work is closest to the sociology from Tönnies (1887) who describes communities as counterparts to modern society (Gemeinschaft versus Gesellschaft) where social relations of intimacy, solidarity, and reciprocity based on shared norms and values endure as opposed to the alienating contractual relations in the capitalist business world (Lindkvist, 2005). In employing such a perspective on the subcultures of midwives or butchers Lave and Wenger take a critical stance towards the mainstream of

Table 2.2 The contested communities of practice literature

Dimension	Themes	Selected Papers	Example
Nature	CoPs as a theoretical lens	Lave & Wenger, 1991; Wenger, 1998; Contu & Willmott, 2003; Gherardi, Nicolini & Odella 1998; Gherardi & Nicolini, 2000,2002; Handley et al. 2006; Thompson, 2005; Mork et al. 2010	Communities of practice are: "a system of relationships between people, activities, and the world; developing with time, and in relation to other tangential and overlapping communities of practice" (Lave & Wenger, 1991, p. 98)
	CoPs as emergent entities	Brown & Duguid, 1991, 1998, 2001; Amin & Roberts, 2008; Roberts, 2006; Faraj & Xiao, 2006; Fox, 2000; Boland & Tenaksi, 1995; Lindkvist 2005; Sapsed & Salter, 2004; Hendry, 1996; Dougherty, 2001; Tallman & Chacar, 2011a; Wenger, 1998	"CoPs refer to 'tightly knit' (…) groups that have been practicing together long enough to develop into a cohesive community with relationships of mutuality and shared understandings (Lindkvist, 2005, p. 1189)
	CoPs as instrumentally designed entities	Wenger, McDermott & Snyder, 2002; Anand, Gardner & Morris, 2007; Dubé, Bourhis & Jacob, 2005; Bertels, Kleinschmidt & Koen, 2011; Kirkman et al. 2011	"Organizational communities of practice (OCoPs), however, have evolved as more formalized, purposeful, and bounded forms of CoPs and typically operate alongside more traditional team structures such as virtual and project teams" (Kirkman et al. 2012, p. 334)
Praxis	Participation	Lave & Wenger, 1991; Wenger, 1998; Brown & Duguid, 1991; Handley et al. 2006; Thompson, 2005; Wenger, McDermott & Snyder, 2002; Gherardi, Nicolini & Odella 1998;	Participation is: "not just to local events of engagement in certain activities with certain people, but to a more encompassing process of being active participants in the practices of social communities and constructing identities in relation to these communities" (Wenger, 1998, p. 4)
	Collaboration	Brown & Duguid, 1991; Wenger & Snyder 2000; Lindkvist 2005; Faraj & Xiao, 2006; Wasko & Faraj, 2000; Boland & Tenkasi, 1995;	"Collaboration refers to the fact that the reps spontaneously organized themselves as an informal team in order to collaborate with each other, trading stories and helping each other to make sense of the idiosyncrasies of different machines" (Murillo, 2011, p. 31)

(continued)

Table 2.2 (continued)

Dimension	Themes	Selected Papers	Example
	Meaning construction	Wenger 1998; Brown & Duguid, 1991, 2001; Amin & Roberts, 2008; Boland & Tenkasi, 1995, Bechky, 2003; Fang & Neufeld, 2009; Howorth, Smith & Parkinson, 2012;	"Rejection of a canonical, predetermined view and the construction through narration of an alternative view, such as Orr describes, involve, at heart, the complex, intuitive process of bringing the communicative, community schema into harmony with the environment by reformulating both" (Brown & Duguid, 1991, p. 52)
	Sharing knowledge and best practices	Wasko & Faraj 2000; Wenger & Snyder, 2000; Pan & Leidner, 2003; Scarso, Bolisani & Salvador, 2009; Borzillo 2009; Nesheim, Olsen & Tobiassen, 2011; Jeppesen & Laursen, 2009;	"A community of practice is not just a Web site or a library; it involves people who interact and who develop relationships that enable them to address problems and share knowledge" (Wenger 2004, p. 3)
Dimension	**Themes**	**Selected Papers**	**Example**
Local Context	Historically constituted practices	Lave & Wenger, 1991; Wenger 1998; Gherardi, Nicolini & Odella 1998; Gherardi & Nicolini, 2000, 2002; Handley et al. 2006; Lindkvist 2005; Contu 2013	"In emphasizing the newcomers' inbound trajectories in communities of practice, Lave and Wenger (1991) stress the reproductive and historical dimension of practice and thus leave the improvisational and unfolding aspects of practice largely unillustrated in their empirical analysis." (Osterlund & Carlile, 2005, p. 98)
	Adaptive, improvised practices	Brown & Duguid, 1991; Wenger, McDermott & Snyder, 2002; Swan, Scarbrough & Robertson, 2002; Faraj & Xiao, 2006, Anand, Gardner & Morris, 2007; Dougherty, 2001; Mork et al. 2010	"We are claiming that the actual noncanonical practices of interstitial communities are continually developing new interpretations of the world because they have a practical rather than formal connection to that world." (Brown & Duguid, 1991, 52)
Outcome	Knowing in practice	Lave & Wenger 1991, Wenger. 1998; Brown & Duguid 1991, 2001; Cook & Brown, 1999; Gherardi & Nicolini 2000, 2002a, 2002b; Contu. 2014; Amin & Roberts 2008	"Knowledge and knowing shift from an epistemology of "possession" to one of "practice" (Howorth, Smith & Parkinson, 2012, p. 374)

(continued)

Table 2.2 (continued)

Dimension	Themes	Selected Papers	Example
	Repertoire of resources	Wenger, 1998; Lindkvist, 2005; Thompson, 2005; Gertner et al., 2011	"Finally, by negotiating meaning through a process of participation and reification members produce over time a shared repertoire of communal resources, including, for example, language, routines, artefacts and stories" (Gertner et al., 2011, p. 630)
	Identity and culture	Lave & Wenger, 1991; Wenger, 1998, 2000; Wenger et al. 2002; Gherardi & Nicolini 2000, 2002; Handley et al. 2006; Hendry, 1996; McLeod, O'Donohoe & Townley 2011; Fang & Neufeld, 2009	"(…) a member's participation in a community involves the construction of his or her identity; that is, a process of understanding who one is, what one can do, and to what extent one becomes more or less legitimized and valued by the other members" (Fang & Neufeld, p. 2009 14)
	Innovation and adaptation	Brown & Duguid 1991, 2001; Wenger. 1998; Wenger & Snyder, 2000; Wasko & Faraj, 2000; Swan et al. 2002; Anand et al., 2007; Dougherty, 2001; Bertels et al., 2011;	"(…) through their constant adapting to changing membership and changing circumstances, evolving communities-of-practice are significant sites of innovating." (Brown & Duguid, 1991, 41)
Trans-local Context	Other communities	Lave & Wenger 1991, Wenger. 1998; Brown & Duguid 1991, 2001; Ferlie et al., 2005; Faraj & Xiao, 2005; Boland & Tenkasi, 1995; Bechky, 2003; Sapsed & Salter, 2004; Dougherty, 2001; Heizman, 2011; Handley et al., 2006	"Individuals can bring standards of one community to another community to refine or reinterpret the latter's standards. Membership in multiple communities can, thus, be a source of learning since individuals can benchmark standards of different communities and evaluate the process of producing knowledge in them." (Yakhlef, 2010, p. 44)
	Broader socio-cultural structures	Contu, 2014; Gherardi & Nicollini, 2002; Heizman, 2011; Hotho et al., 2014; Contu & Willmott, 2003, 2006; Thompson, 2005; Roberts, 2006	"In fact, little consideration is given to the wider conditions—historical, cultural, and social—" (Contu & Willmott, 2003, p. 290)
	Formal management cultivates	Wenger & Synder, 2000; Wenger et al. 2002; Thompson, 2005; Dubé et al., 2005; Dunham, Freeman & Lietdka, 2006; Zboralski, 2009; Kodama, 2002; Corso et al. 2009; Kirkman et al., 2011	"Communities of Practice are emerging as self-organizing entities that management can encourage and support, gaining great advantages, without owning or controlling them totally." (Corso, Giacobbe & Martini, 2009, p. 74)
	Formal management controls	Swan et al., 2002; Anand et al., 2007; Dubé et al., 2005; Nesheim, Torstein & Tobiassen, 2011; Borzillo & Kaminska-Labbé;	"(…) for top management to decide whether it is worth feeding a CoP with resources, sponsors should use proactive mechanisms that enable them to assess on an ongoing basis whether a CoP is delivering value to the organization." (Borzillo, 2009, p. 69)

organizational learning literature that concentrates on individual knowledge transmission in classrooms and workplaces (Contu & Willmott, 2003). Instead, they propose that knowledgeability can only be achieved through full participation in the community's social practices. According to Lave and Wenger, contemporary workplaces, however, tend to diminish the possibilities for such full participation.

The bottom line of Lave and Wenger's CoP notion, with its emphasis on LPP, is that it is better understood as an analytical concept to study learning as an inherently social process situated in everyday practice (Contu & Willmott, 2003; Gherardi et al., 1998; Lave, 2008; Østerlund & Carlile, 2005). As Gherardi et al. (1998) note:

> *"Referring to a community of practice is not a way to postulate the existence of a new informal grouping or social system within the organization, but is a way to emphasize that every practice is dependable on social processes through which it is sustained and perpetuated, and that learning takes place through engagement in that practice"* (p. 279).

In a similar vein, Østerlund & Carlile (2005) state that: *"Communities of practice are thus probabilistic constructs that should not necessarily be conflated with reality"* (p. 95). Research that follows Lave and Wenger's original situated learning theory, thus, closely concentrates on how learning is accomplished in practice (Gherardi et al., 1998).

For instance, based on an ethnographic study of construction site workers Gherardi et al. (1998) theorize on what they refer to as a situated curriculum as a key characteristic of communities of practice. This situated curriculum describes all the ordered and structured learning resources and practice opportunities available to novices through which they are enabled to engage in the social interaction of the specific CoP. Grounded in the same case, Gherardi & Nicolini (2002b) further elaborate on how a culture of safe work practices is learned and enacted in different communities of practice. Moreover, they examine how different perspectives across communities on safety practices are discursively negotiated (Gherardi & Nicolini, 2002a). Fang & Neufeld (2009) apply the notion of legitimate peripheral participation to open source software communities and study how members in online environments gain access to community resources and develop an understanding of the community's artifacts while becoming recognized members. Also applying CoPs as an analytical concept, Handley, Sturdy, Finchman, & Clark (2006) provide a conceptual framework that explicates how identity work is situated within the liminal spaces between multiple communities of practice. In a similar vein, Hong & K. H.O (2009) illustrate how conflicting identities

between two communities of practice resulted in an ongoing power struggle between them, hindering collective learning. Meanwhile, McLeod, O'Donohoe, & Townley (2011) study the advertising industry as constituted by several creative communities that workers pass through during their career trajectories, learning and negotiating new identities as they become newcomers again at each stage.

Wenger (1998), in his second monograph, substantially reformulates the original notion of the community of practice construct and applies it explicitly to an organizational setting. In particular, he is the first to offer a comprehensive conceptualization of CoPs that are constituted through the three interwoven dimensions of practice: a group of people that coheres through *mutual engagement* on a *joint enterprise*, thereby producing a *shared repertoire* (Wenger, 1998, p. 73).[4] Moreover, in drawing from an ethnography of insurance claims processors, Wenger (1998) provides a list of indicators of communities of practice (see Table 2.3). These indicators should signal to an observer that a CoP has formed. They refer to the actual behavior of community members (1 to 9) and structural

Table 2.3 Wenger's CoP indicators

1) Sustained mutual relationships—harmonious or conflictual
2) Shared ways of engaging in doing things together
3) The rapid flow of information and propagation of innovation
4) Absence of introductory preambles, as if conversations and interactions were merely the continuation of an ongoing process
5) Very quick setup of a problem to be discussed
6) Substantial overlap in participants' descriptions of who belongs
7) Knowing what others know, what they can do, and how they can contribute to an enterprise
8) Mutually defining identities
9) The ability to assess the appropriateness of actions and products
10) Specific tools, representations, and other artifacts
11) Local lore, shared stories, inside jokes, knowing laughter
12) Jargon and shortcuts to communication as well as the ease of producing new ones
13) Certain styles recognized as displaying membership
14) A shared discourse reflecting a certain perspective on the world Extracted from (Wenger, 1998, pp. 125–126)

[4]I will explain these dimensions in more detail in the subsections of "the praxis within communities" and "the outcome of communities of practice".

elements (10 to 14) that are generated through these actions (Thompson, 2005). Moreover, these indicators reveal the closely knit nature of such relations that Wenger had in mind (Cox, 2005).

Wenger's book depicts a shift away from the original LPP dynamic to the CoP construct itself. That is, the community as a reified form takes center stage in his notion to which the generative dynamic of LPP is underlying (Thompson, 2011). Moreover, Wenger focuses on identity in his CoP conceptualization and the identity tensions that arise through multi-membership in several communities of practice. In his outlook, Wenger exhibits how organizations can design *"learning architectures"* (Wenger, 1998, p. 230) around which LPP dynamics may occur.

Several empirical studies have applied Wenger's CoP notion to the field. As a result, task forces or project teams have been labeled communities of practice due to the detection of Wenger's (1998) three dimensions of mutual engagement, joint enterprise, and shared repertoire. For instance, Anand, Gardner, & Morris (2007), using Wenger's conceptualization, study new business areas in a consultancy firm as a CoP, whereas, Thompson (2005), employs this CoP notion and investigates a design task force in a software developing company. Similarly, Dougherty (2001) comprehends a firm consisting of four large interacting communities of practice, including functional areas such as new product development and strategic management. Moreover, in her ethnographic study of a new car development project, Bragd (2002) claims that the development team is a CoP. In a similar vein, Meeuwesen & Berends (2007) provide a case study of manufacturing teams at Rolls Royce which they discuss based on Wenger's (1998) seminal work.

Overall, these studies apply Wenger's (1998) conceptual framework as an analytical lens to focus on practices mostly located in traditional organizational units such as cross-disciplinary or project teams, yet without considering that these might be another matter (Lindkvist, 2005).

Communities of practice as emergent entities. Around the same time as Lave and Wenger published their work, Brown & Duguid (1991), in drawing on Julian Orr's (1990) ethnography of Xerox photocopier repair technicians, introduced their account on communities of practice. Even though they refer and are philosophically close to Lave & Wenger's theory, their deliberations mark a shift from viewing CoPs as analytical concepts to one that understands communities of practice as informal groups that emerge in a wider organizational setting (Brown & Duguid, 1991). Like Lave and Wenger, Brown and Duguid do not provide an explicit definition of the construct. Instead, they give a blurry description of some of the properties characterizing CoPs:

Information Box 1: Related Community Conceptualizations

Networks of Practice

In their 2001 article, Brown and Duguid extend their notion from tightly knit CoPs that spontaneously emerge in the doing of work through face to face collaboration to the concept of Networks of Practice (NoPs). The motivation behind this conceptualization is to explain how "sticky" knowledge flows in geographically dispersed groups such as "scientific communities". These networks are composed of several local CoPs from various firms or institutions that, together, constitute a network architecture. Within such a structure multiple local CoPs share the same practices and epistemic cultures which enable knowledge flows between them and beyond organizational boundaries (Brown and Duguid, 2001; Tallman and Chacar, 2011a). Some members of these NoPs may develop strong relationships. However, others may not know each member of the network and do not interact with others on a regular basis. That is to say, these networks are significantly looser than the single, locally bounded CoP.

Collectivities of Practice

Lindkvist (2005) argues that large distributed companies often organize via ad-hoc project groups and task forces in order to flexibly adapt to changing demands, making them fluid and temporary. This, however, obviously limits the chances for sustained mutual engagement and participation in an enduring context from which shared understandings may develop that constitute a CoP. Lindkvist, therefore, coins the notion of Collectivities of Practice (CiPs) that comprises such temporary groups and project teams. Moreover, he delineates this construct from the original CoP notion. Collectivities of practice have a highly dispersed and individualized knowledge base, they pursue a clearly stated collective goal, and they rely on the well-connectedness of individual knowledge to achieve collective problem solving based on objective criteria. They are thus different from CoPs which hold locally shared, often tacit knowledge that resides in practice and is accessed through active enculturation.

Epistemic Communities

Several authors introduce epistemic communities (EC) into the overall discussion (Cohendet and Llerena, 2003; Amin and Roberts, 2008; Creplet et al., 2001). Epistemic communities are defined as: "group(s) of agents sharing a common goal of knowledge creation and a common framework

allowing them to understand this trend. Hence, the goal of epistemic communities is simultaneously outside and above the community's members." (Creplet et al., 2001: 1530). As becomes clear from this definition the epistemic community construct also refers to a particular organizational grouping, rather than a specific analytical lens on learning. Moreover, it also recognizes the more dispersed and decentralized nature of project-type organization compared to the strong focus on craft-based work and face to face interaction in earlier community of practice research. Amin and Roberts (2008), for example, argue that epistemic communities evolve around project teams and problem-driven cooperation, comprising experts from diverse fields and backgrounds, are temporally limited to the achievement of a specific knowledge goal and span organizational boundaries. Cohendet and Llerena (2003) note that the cognitive goal coordinating the collective activities of the epistemic community can either emerge from former interactions or is externally imposed on the group. In the former case, the epistemic community is emergent and self-organized similar to CoPs, whereas in the later it becomes a purposefully designed and intended structure (Amin and Roberts, 2008).

> *"The communities that we discern are, by contrast, often noncanonical and not recognized by the organization. They are more fluid and interpenetrative than bounded, often crossing the restrictive boundaries of the organization (…). And significantly, communities are emergent"* (Brown & Duguid, 1991, p. 49).

This explanation, however, underlines the main tenets of Brown and Duguid's notion of CoPs as tightly knit informal groups that spontaneously emerge in the actual doing of work. A central premise of their argument is that formal (canonical) descriptions of work are inherently incomplete, flawed, and inflexible, obscuring and distorting much of the intricacies of actual (noncanonical) practice. Thus, engaging in local practice always requires improvisation and innovative "workarounds" for "getting the job done". According to Brown & Duguid (1991), this form of informally driven improvisation and innovation unfolds within communities of practice as practitioners collectively engage in practice and develop novel solutions to their practical dilemmas.

Brown and Duguid's paper is as a plea for the rediscovery of the informal organization that depicts an untapped potential for innovation and adaptation

(Hendry, 1996). In shifting the focus on CoPs as social entities in which individuals collectively generate new solutions, Brown and Duguid depart from the legitimate peripheral participation logic with its different forms and trajectories of participation. In neglecting this dynamic between novices and masters, their conceptualization of community becomes one of harmonious collaboration based on shared meanings and values (Cox, 2005; Roberts, 2006). Purists of a strictly practice-oriented view have criticized these side effects of Brown and Duguid's first steps towards a more management theory oriented understanding of CoPs (Contu & Willmott, 2000; Contu & Willmott, 2003; Contu & Willmott, 2006). Their account, however, marks the most influential and cited work on communities of practice within the management and business fields.[5]

Similarly, Wenger & Snyder (2000) define CoPs as *"groups of people informally bound together by shared expertise and passion for a joint enterprise"* (p. 139). Moreover, they construe them as organic organizational elements that are spontaneous, informal, and self-organizing, generating all sorts of organizational benefits. Their conceptualization, however, departs from earlier notions that stress the importance of co-location and mutual engagement, as, for now, CoPs can exist within single units but, also, can comprise several "*hundreds of people"* (Wenger & Snyder, 2000, p. 140) distributed across multiple divisions or even companies.

In general, the research mentioned above reveals the shift in the literature from understanding CoPs as a specific theoretical lens to studying them as social entities that hold properties such as that they are informal and self-organizing.[6] As the framework from the core collection reveals (Figure 2.1), this specific stream in the community of practice literature is the most active, measured by the number of publications. Besides the number of publications in this stream, there has also been a rise in related community definitions and conceptualizations that build on this CoP understanding as emergent entities within organizational settings (see also Information Box 1 for an overview and summary of these concepts).

Communities as instrumentally created entities. More recent research on communities of practice exhibits yet another shift in focus from emergent communities to a perspective that views them as instrumentally set up structures (Kirkman, Mathieu, Cordery, Rosen, & Kukenberger, 2011; Lesser & Storck, 2001; McDermott & Archibald, 2010; Swan, Scarbrough, & Robertson, 2002; Wenger

[5]Compare with Table 2.1 except the three monographs with Google.Scholar citation counts.

[6]See also Information Box 2 on the discussion of informality of CoPs.

& Snyder, 2000). This development sets in with the Wenger et al. (2002) management book on how to cultivate CoPs for organizational benefits. Communities of practice, in this view, are often defined as: *"groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis"* (Wenger et al., 2002, p. 4). This overly broad definition departs from the tightly knit nature of former conceptualizations; rather, people are now somehow interested in the same thing. Moreover, the purpose of getting the job done is replaced with the specific intention to learn, share, and develop knowledge (similar to the CiP and EC constructs in Information Box 1). Creating the spaces for such professional collaborations becomes an important management task, a point we shall address in a moment (chapter 2.2.5). Cox (2005) summarizes this development as:

> *"a shift from a concern to reveal and celebrate what people know, especially in seemingly routine and mechanical jobs, to a concern to design a tool for management to manage knowledge workers and experts in blue chip companies" (Cox, 2005, p. 534).*

The popularity of the outlined perspective in academia and practice, however, is steadily growing, which is evidenced by 11 research papers in the core collection that explicitly cite the above definition. Also, several other authors introduce similar notions inspired by Wenger et al.'s (2002) formulation. For instance, Kirkman et al. (2011) study so-called "organizational communities of practice" (OCoPs) with the attribute organizational referring to the created nature of the group. They note: *"Organizational communities of practice, however, have evolved as more formalized, purposeful, and bounded forms of CoPs and typically operate alongside more traditional team structures such as virtual and project teams"* (Kirkman, Cordery, Mathieu, Rosen, & Kukenberger, 2012, p. 334). According to the authors, these entities comprise and combine elements from project groups and teams with traditional characteristics of CoPs (Kirkman et al., 2011).

Information Box 2: The Informality of CoPs

From reading the core collection about CoPs one gets the impression that much of the discussion on the nature of CoPs evolves around their either formal or informal character. Many authors understand CoPs as part of the informal organization (e.g. Brown & Duguid, 1991). With the informal organization describing the emergent patterns of individual behavior and interactions among organization members, and the norms and values that underlie these behaviors and interactions. Other scholars, however, note that CoPs can also comprise formal elements (Lave & Wenger, 1991; Wenger, 1998). Formality refers to fixed rules, structures, and regulations that are aimed at coordinating and controlling behavior. This begs the question of whether informality is actually a defining criteria for communities of practice.

If one views CoPs as an independent or alternative organizational form (Wenger, 1998) they can consist of informal as well as formal elements. For example, members can formalize explicit rules for conduct within community interactions (e.g. netiquette within virtual environments) or membership criteria can be officially written down. On the other hand, if one views CoPs as social structures that emerge within traditional organizational forms such as bureaucracies their informality, understood as their unfolding character, is often used as the central characteristic that distinguishes them from predefined formal structures.

Hence, informality cannot be a distinct constitutive element of CoPs. While CoPs can comprise formal as well as informal elements, they are fundamentally self-organized (Pyrko et al., 2017), meaning that the formal elements coordinating its activities emerge from interaction, instead of being externally imposed on the CoP by a central authority. Note that informality, in this study throughout, is viewed in relation to the formal organization hierarchy.

Bolisani & Scarso (2014) similarly propose the notion of strategic CoPs while Scarso, Bolisani, & Salvador (2009) refer to internal CoPs. Others, in turn, distinguish between informal, supported, and structured communities of practice (Jeon, Kim, & Koh, 2011). Common in all these proposed terms is that they describe the structured and intended nature of such organizationally-bound groups. Along the outlined development from emergent to instrumentally designed CoPs, it also becomes apparent that research has simultaneously shifted away from studying face-to-face interactions to discuss forms of communication that are mediated

by information and communication technology (Styhre, Josephson, & Knauseder, 2006). Hence, scholars increasingly equate communities of practice with platforms, blogs, and web forums for knowledge sharing and provisioning. The question now becomes one of how to design ICT for continued participation and engagement (Pan & Leidner, 2003). For example, Dubé, Bourhis, & Jacob (2005) explore how management can create virtual communities of practice (vCoPs). Wasko & Faraj (2000) similarly refer to electronic communities of practice in investigating Usenet newsgroups, while Kirkman et al. (2012) study a global intranet forum as an OCoP.

Altogether, the above discussion reveals the different and often contradicting definitions of CoPs as either an analytical concept that focusses on the processes of learning or as entities that are situated in traditional organizational contexts.

2.2.2 The Praxis in Communities of Practice

What is it that people actually do within communities of practice ? The CoP notion with its emphasis on practice naturally implies doing and focusses centrally on human agency (Cook & Brown, 1999). The concept of practice can be equivocal and, therefore, first needs to be distinguished from other related terms such as action and behavior (see also Information Box 3 for a practical example). As Cook & Brown (1999) note, doing of any sort is called behavior, while action describes meaningful behavior.

Information Box 3: Behavior, Action, and Practice; a Practical Example
The following example that exemplifies the epistemological differences between action and practice is adopted from Cook and Brown (1999).
Consider an athlete named Vance. If Vance's knee jerks, that is called behavior. Yet, when Vance hits his knee with a physician's hammer to check his reflexes, that behavior has a specific meaning—it is meaningful—, and thus it is action. If, in turn, Vance's physical therapist hits his knee with a hammer as part of an exam, this action becomes practice. This is because the physical therapist's action comprises meaning that stems from the context of his or her training and ongoing work in physical therapy. This particular practice can draw on and contribute to the work of others in the field of physical therapy. The practice is thus imbued with meaning through its context.

Practice, in turn, can be defined following Schatzki as: *"arrays of human activity [or action] centrally organized around shared practical understanding"* (2001, p. 11). In other words, practice is action that obtains meaning from a specific organizational or social context in which people share meaning and understanding of and about their activities. Whittington (2006) provides a similar conceptualization that has become widely accepted in the strategy as practice literature (Jarzabkowski, 2005; Jarzabkowski, Balogun, & Seidl, 2007; Paroutis & Pettigrew, 2007; Vaara & Whittington, 2012) as he distinguishes between praxis, practice, and practitioners. Accordingly, practice refers to the shared routines, norms, and traditions that shape activity, whereas, praxis is about the actual activity or what people actually do in practice. Practitioners are the actors, who perform the activity and carry the practice (Whittington, 2006). As the above definitions illustrate, practice is fundamentally social and collective as its meaning is socially constructed. Thus, one can say that practices make up, constitute, and perpetuate a specific social context for praxis. Thus, practice and praxis are mutually constitutive. Practice arises through the (inter)action of individuals and, at the same time, structures these activities by furnishing them with meaning (Gherardi & Nicolini, 2002a; Lave & Wenger, 1991).

Though the praxis in CoPs and their local, idiosyncratic context are fundamentally interwoven, I analytically separate these elements, here, to discuss the different perspectives in the core collection on both dimensions.

The debate over what people do in such communities is divided into two broad categories: social interaction on the one hand and knowledge sharing on the other (see also Figure 2.1). While these categories are related to one another, the respective connotations are fairly different within the literature streams. As I mentioned before, the literature on situated learning accentuates participation in practice via the LPP dynamic (Lave & Wenger, 1991). For Wenger: *"Participation here refers not just to local events of engagement in certain activities with certain people, but to a more encompassing process of being active participants in the practices of social communities and constructing identities in relation to these communities"*(1998, p. 4). Participation, in this vein, means to engage in a social activity such as conversations, reflections, and communal undertakings (Wenger, 2000). Moreover, participation can take on different forms: for newcomers, participation is limited but connected to an inbound trajectory to full participation at the core of the community, whereas marginal participants remain at the periphery (Wenger, 1998; Yakhlef, 2010). The key point of this participative dynamic is what has been called a virtuous circle of participation, where the more people participate, the more they learn, the more they identify with the community, and the more

they are motivated to participate (and thus learn) even further (Lave & Wenger, 1991).

Wenger (1998) extends this notion as he summarizes all social interaction unfolding within communities of practice under the term of "mutual engagement" that involves all the patterns and contents of interactions among community members through which they engage in a joint enterprise. For him, mutual engagement reflects all the complexities of people doing things together. Thus, the social interactions within CoPs cannot be reduced to a single principle of collaboration or information processing. Instead, mutual engagement involves a mixture of varying relations that can be both harmonious, collegial, and egalitarian or laden with conflict, tension, and struggle. The point, however, is that relationships of mutual engagement are a necessary condition for a community to evolve.

Brown & Duguid (1991), in contrast, understand social interaction in CoPs as collaboration regarding collectively working together and discussing problems in groups through narration. In particular, learning about work occurs via story-telling among community members through which they acquire, share, and elaborate context-specific knowledge (Brown & Duguid, 1991; Contu & Willmott, 2003).

Inextricably connected to participation, mutual engagement, and collaboration, and thus a central element of social interaction within communities, is the construction of meaning and sense about the communities' practices (Boland & Tenkasi, 1995; Brown & Duguid, 1991; Brown & Duguid, 2001; Gherardi & Nicolini, 2000; Wenger, 1998). As mentioned above, action is behavior that holds meaning, yet the social praxis does not achieve meaning in and of itself; rather, meaning has to be negotiated among the people involved in a specific, self-organized activity (Gherardi & Nicolini, 2002a). For instance, Brown & Duguid (1991), in drawing on the photocopier repairmen ethnography, note that the reps engage in social construction and develop shared understandings concerning their outlook on the world, the organization, and their work of repairing machines through narration and story-telling. In doing so, they constantly develop new understandings to new situations thus constantly adjusting and reformulating their community schema[7] to the environment. Brown & Duguid, therefore, propose to call CoPs "community of interpretation" (1991, p. 47) to underscore the centrality of ongoing meaning construction within such self-organized groups.

[7]A schema is a shared interpretative framework through which individuals reflect and interpret their surrounding world, it structures and organizes their experiences (Bartunek, 1984).

In a similar vein, Wenger (1998) notes that meanings and shared understandings in a CoP are constantly produced and reproduced within a process he refers to as the "negotiation of meaning":

> *"The negotiation of meaning is a productive process, but negotiating meaning is not constructing from scratch. Meaning is not pre-existing, but neither is it simply made up. Negotiated meaning is at once both historical and dynamic, contextual and unique"* (Wenger, 1998, p. 54).

Wenger thus describes a continual and recurrent process of meaning-making that constantly generates instances to negotiate meaning further.[8] Recently, Pyrko et al. (2017) have re-conceptualized the actual activity that underpins the emergence of CoPs as thinking together. Thinking together describes practitioners, who regularly indwell about their practical problems and, by doing so, interdependently draw on each other's actions and share tacit knowledge in practice.

Altogether, the literature mentioned above emphasizes various forms of social interaction in CoPs—participation, engagement, or collaboration—that not only generates dense relations of mutuality, trust, and belonging but, as well, spawns shared ways of making sense or thinking among community members. Communities of practice thus comprise a social structure but also a shared cognitive structure through which members interpret their world and share knowledge (Lindkvist, 2005).

Conversely, the literature on knowledge management tends to focus solely on knowledge sharing as the main activity unfolding within communities (Bogenrieder & Nooteboom, 2004; Styhre et al., 2006). Hence, the focus shifts away from participation and meaning construction to knowledge sharing behavior in the form of seeking and providing information in an online environment (Chiu, Hsu, & Wang, 2006; Hsu, Ju, Yen, & Chang, 2007; Jeon et al., 2011; Pan et al., 2015). The praxis within a CoP in this view thus comprise posting and replying to questions, writing creative posts, and commenting on others' posts (Pan et al., 2015). Several authors in this stream have examined various antecedents, motivators, and factors which influence, motivate, or determine knowledge sharing and creation within communities of practice (Ardichvili, Page, & Wentling, 2003; Borzillo, 2010; Markus, 2001; Neufeld, Fang, & Wan, 2013; Pan et al., 2015; Wasko & Faraj, 2000; Wasko & Faraj, 2005; Zboralski, 2009). Agency in CoPs in this perspective is downscaled from participating in the social world

[8]The notion of negotiating meaning is quite similar to Karl Weick's theory of sensemaking that explicates the social process of meaning construction through discourse and negotiation (Weick, 1988;1993; 1995).

to knowledge exchange via questions and answers between knowledge workers. Moreover, specific knowledge sharing practices become regarded as defining properties of CoPs, rather than being rooted in the social relations among members. This is because, this stream views communities of practice too often solely as a management tool to any knowledge sharing problem (Østerlund & Carlile, 2005). In other words, activity in this instrumental view on CoPs is limited to online posting and answering of questions. Such a limited praxis, however, hardly produces or reproduces a shared practice understood as a context in which practitioners interact and invest in identity and negotiate meaning about that very practice. That is, the CoP construct becomes increasingly more detached from practice in such a perspective (Duguid, 2008; Lave, 2008). In light of this development, several practice researchers plea for a translation of the CoP notion into the "practices of a community" to stress how situated and repeated social praxis creates a context in which relations among people, and between people and the material and cultural world, sustain (Corradi et al., 2010; Gherardi, 2009a).

2.2.3 The Local Context of Communities of Practice

The above-illustrated activities of participation, learning, and sensemaking arise from and are situated in the practices of a community (Contu & Willmott, 2003; Lave & Wenger, 1991). That is to say, the given practices of a CoP constitute its specific, idiosyncratic social context in which learning, meaning making, and identity construction reside. Practice thus is local and emerges from the *"moment-by-moment interactions between actors, and between actors and the environments of their action"* (Suchmann, 1987, p. 179). I refer to this as the local context of communities to differentiate it from the broader organization in which these CoPs operate.

The debate in the core collection on this domain concerns whether the local context of a community is historically constituted and stable or if communities describe the context for adaptive practice and practice change.

Lave & Wenger (1991), in their account on CoPs, emphasize newcomers' inbound trajectories to full participation and, in doing so, stress the *"reproductive and historical dimension"* (Østerlund & Carlile, 2005, p. 98) of practice. In other words, newcomers learn the masters' practices through the aforementioned virtuous cycle of participation, thereby reproducing and stabilizing the communities' practices. Such regular participation within the practices of a community thus creates a shared history of learning which simultaneously generates epistemic boundaries around that practice for others who do not have access to this

history. It also creates path-dependencies in practices as future learning builds on this history (Mørk, Aanestad, Hanseth, & Grisot, 2008; Roberts, 2006).

As a consequence, several authors argue that communities of practice are rather stable instead of improvisational. Gherardi & Nicolini (2000), for instance, note that CoPs tend to persevere in their practices even when they might seem obsolete, irrelevant, or no longer effective. Amin & Roberts (2008), in a similar vein, argue that the focus of a CoP—in particular, craft-based communities such as flute makers (Cook & Yanow, 1993)—is to preserve its skills and knowledge instead of creating new capabilities. Hence, communities of practice are only concerned with incremental innovation (Pattinson & Preece, 2014). Likewise, Roberts (2006) argues that CoPs may resist radical change because they develop preferences and predispositions that influence their ability to absorb new knowledge. On a similar note, Lindkvist (2005) reflects that communities of practice would rather benefit from periods of stability because of their relatively slow processes of enculturation.

Moreover, Ferlie, Fitzgerald, Wood, & Hawkins (2005), demonstrate how professional communities of practice can also play a significant role in the non-spread of innovations as they establish social and cognitive boundaries between professional groups that function as barriers and retard the spread of new knowledge throughout the organization. Similarly, Mørk, Hoholm, Ellingsen, Edwin, & Aanestad (2010), in their study of medical communities, illustrate how innovations can be regarded as a threat to incumbent CoPs when newly introduced practices contest the existing master-apprentice relations. Altogether, this literature leaves the improvisational and adaptive dimension of CoPs unattended and implies that practices are "recursive" (Jarzabkowski, 2004) as they build-up a stable context which is perpetuated and reproduced primarily through the dynamics of legitimate peripheral participation.

Conversely, research that understands communities of practice more as informal, organic entities located within established formal organization hierarchy emphasizes the generative nature of practice. Scholars in this stream suggest that new knowledge, and therefore new practices, arises from the local social interactions about practical problems or failures (Bertels, Kleinschmidt, & Koen, 2011; Bridwell-Mitchell, 2016; Brown & Duguid, 1991; Cook & Brown, 1999; Dougherty, 2001; Wenger, 1998). In particular, Brown & Duguid (1991) illustrate how the repairmen collectively improvise new practices in situations where extant models and understandings reach their limits or do not produce the desired outcomes. New practices thus do not come from external sources such as managerial prescriptions but emerge from participating in the social praxis of problem-solving

within a community (Jarzabkowski, 2004). In this respect, Wenger also notes that innovation emerges from the social interactions within CoPs:

> *"a well-functioning community of practice is a good context to explore radically new insights without becoming fools or stuck in some dead end (…) communities of practice are a privileged locus for the creation of knowledge"* (1998, p. 214).

Several scholars in the core collection adopt such a notion of adaptive practice (Jarzabkowski, 2004). Dougherty (2001), for example, explains how an organization's differentiated CoPs are each focused on solving problems in their practice, generating continuous innovation. Brown & Duguid (2001) similarly theorize how an organization's local CoPs are part of wider networks of practice and, therefore, can absorb relevant knowledge to their practice from the outside thus constituting a context for adaptive practice. Based on these suggestions, Swan et al. (2002) investigate how CoPs can be employed to mobilize, develop and legitimize a radical innovation. With a focus on coordination of everyday work, Faraj & Xiao (2006) explicate how new coordination practices within a hospital emerge from community activities. Anand et al. (2007) propose, based on their study of a consultancy firm, that CoPs create practice change by generating knowledge-based innovations. On a related note, Retna & Ng (2011) show that informal CoPs adapt their practices to organizational changes. Overall, the research mentioned above primarily understands communities of practice as a context for adapting and changing practice.

2.2.4 The Outcome of Communities of Practice

The outcome of communities of practice describes the consequences resulting from situated community activities. I have mentioned several outcomes already in the sections above; however, for the sake of completeness of this review I will briefly summarize the discussion on this element below.

There are primarily two perspectives in the core collection concerning the outcome of communities of practice: one that concentrates on outcomes that are inbound into the community and another that explicates outcomes from community activities as outbound affecting the surrounding organization.

Wenger (1998), for example, explains how through mutual engagement communities of practice produce a shared repertoire of communal resources. That is, through the pursuit of a joint enterprise, community members create a shared

repertoire which functions as a resource because it enables further interaction and negotiating of meaning:

> *"the repertoire of a community of practice includes routines, words, tools, ways of doing things, stories, gestures, symbols, genres, actions, or concepts that the community has produced or adopted in the course of its existence" (Wenger, 1998, p. 83).*

According to Wenger, this repertoire reflects the history of mutual engagement in the CoP but remains inherently ambiguous and, therefore, can be utilized to renegotiate new meaning. One can understand this shared repertoire of symbols, narratives, and ways of doing things as the manifestation of the specific work culture that has evolved through ongoing social praxis in a CoP. Following on from this, CoPs are often viewed as subcultures that continually engage in culture and identity formation (Bechky, 2003; Brown & Duguid, 2001; Cook & Yanow, 1993; Gherardi et al., 1998; Gherardi & Nicolini, 2002b; Hendry, 1996; Lave & Wenger, 1991).

The key notion in the practice-oriented view on learning is that participating in such a historical and cultural context of a specific community creates an increased knowledgeability (Gherardi et al., 1998; Lave, 2008; Lave & Wenger, 1991). Knowledgeability in this sense refers to the ability to meaningfully engage in the routine activities of the social life in the community (Nicolini, 2011; Orlikowski, 2002). In other words, knowing the cultural context and how to act in it. Knowledgeability or knowing in practice does not mean the production of subjectively held and easy to decode knowledge but refers to the knowledge that is highly ambiguous and contextualized as it resides in a nexus of practices. This form of knowledge not only comprises the skill of competent practicing but also involves the knowing of the community's identity, culture, and norms. The process of knowing, therefore, "*implies becoming a different person with respect to the possibilities enabled by these systems of relations (the cultural context)"* (Lave & Wenger, 1991, p. 53). Moreover, this form of knowledge is difficult to decontextualize because it is inextricably bound to and "sticks to practice", meaning it is specific to a context and a group of people engaging in that context (Yanow, 2004). Such highly contextualized knowledge, therefore, can only be obtained by practicing over lengthy periods of time in that context (Brown & Duguid, 2001; Lindkvist, 2005; Nicolini, 2011).

Overall, the outcomes mentioned above such as a shared cultural repertoire and the knowing of it are directed inwards towards the community and its members. Cohendet & Llerena highlight this self-referentiality of communities of practice

by noting: *"the community tends to send no messages towards the outer world"* (2003, p. 283).

Conversely, the literature stream that views CoPs mainly as contexts for adaptive practice within formal organizational hierarchies connects community outcomes with firm-level variables such as overall performance, innovativeness, and organizational adaptability. That is to say, communities generate organizational value. A fundamental argument in this perspective is that innovation not only occurs in planning offices and specific R&D departments but instead also emerges from the collaborations of community members who engage with each other in the doing of everyday work (Brown & Duguid, 1991; Wenger, 1998). More specifically, communities of practice provide the context in which new knowledge arises through the sharing and recombining of existent tacit knowledge (Wenger & Snyder, 2000). This is important because knowledge sharing and recombining depict the baseline for successful innovations (Kogut & Zander, 1992). Hence, communities of practice are a "ubiquitous source" of new knowledge driving continuous organizational change and adaptation (Brown & Duguid, 2001).

Brown & Duguid (2001), for instance, suggest that CoPs enhance the firms absorptive capacity of new and valuable knowledge (Cohen & Levinthal, 1990) because its members absorb knowledge from the environment (Tallman & Chacar, 2011a). Moreover, Lesser & Storck (2001) link CoPs to the production of social capital which, in turn, positively affects organizational performance regarding decreasing learning curves, increasing responsiveness to changing customer needs, preventing reinventions, and increasing the overall innovativeness of the firm. In a similar vein, Wenger and his colleagues note that CoPs develop their own practices and, in doing so, continuously improve the professional skills of their members and simultaneously change the organization's operational capabilities (Wenger et al., 2002; Wenger & Snyder, 2000). In other words, CoPs by developing and disseminating best practices change the way in which an organization operates (Cordery et al., 2014). Applying an evolutionary view on the firm, Cohendet & Llerena (2003) discuss how a firm's different communities (CoPs and ECs) differ in their learning routines (explorative learning vs. exploitative learning; March, 1991) and either generate stable operational routines or dynamic capabilities. In a similar vein, Kietzmann et al. (2013) elaborate based on a study of different mobile CoPs[9] that some CoPs can display high degrees of contextual ambidexterity in the sense that they can explore new knowledge and simultaneously exploit existing routines and procedures and can, therefore, be viewed

[9]Mobile CoPs (MCoPs) describe a community among mobile workers, who communicate with each other using mobile technologies.

as an antecedent to organizational ambidexterity (Gibson & Birkinshaw, 2004; Tushman & O'Reilly, 1996). On a related note, Liedtka in employing a capability-based view[10] theorizes that communities of practice produce both learning at the individual member level but also enhance an organization's *"meta-capabilities to think strategically, learn, collaborate, and redesign processes"* (1999, p. 14) and, in doing so, affect the organization's ability to achieve and sustain competitive advantage.[11] Turning more towards the literature on non-linear dynamics (Prigogine & Stengers, 1984) and complex adaptive systems (CAS; Gell-Mann, 1994), Collier & Esteban (1999) propose that organizational adaptability is achieved through the "participative organization" in which people participate in their CoPs generating creativity and developing human capabilities. Building on the insights of the open and user innovation literature, Koller, Schulte, Andresen, & Kreutzmann (2020) suggest that CoPs as a collective can display the characteristics of lead-users (Herstatt & von Hippel, 1992; von Hippel, 1986) and, therefore, can be viewed as a vital source of innovation.

Overall, the above literature stemming from traditional management theory fields illustrates that communities of practice within traditional hierarchies can have wide-ranging outcomes that affect firm performance. As Brown summarizes: *"these communities can help to drive strategy, transfer best practices, solve problems quickly and develop professional skills"* (2004, p. 147).

2.2.5 The Trans-local Context Around Communities of Practice

The last dimension of the explanatory framework unpacks the discussion in the core collection of how communities of practice interrelate with their surroundings. I will refer to this as the dynamic interaction between the local context of a CoP and its broader, trans-local context.

Early research depicts communities as mostly independent and unconnected (Brown & Duguid, 1991; Lave & Wenger, 1991), meaning that the immediate setting of the organization in which CoPs nest, as well as the political, legal, and cultural context surrounding these CoPs, remains mostly unconsidered (Contu & Willmott, 2003; Gherardi & Perrotta, 2011; Østerlund & Carlile, 2005; Yakhlef, 2008). For instance, Lave & Wenger (1991) only recognize one community,

[10] A capability describes the organization's capacity to perform a particular task or activity in a reliable and at least minimally satisfactory manner (Helfat and Winter, 2011).

[11] Meta-capabilities relate to learning-to-learn capabilities. That is, they describe the capabilities that renew other capabilities (Ambrosini, Bowman, and Collier, 2009).

such as midwives, without paying attention to the surrounding organization or culture in which these midwives work and learn. Specifically, the social context of a CoP involves only the local, social setting of the community in these early contributions (Yakhlef, 2008).

Given this limited perspective, several authors open up context around a CoP and begin to study social structures that go beyond the locality of one specific community of practice (Fox, 2000; Gherardi & Nicolini, 2000; Gherardi & Nicolini, 2002a; Handley et al., 2006; Hotho et al., 2014; Levina & Vaast, 2006; McLeod et al., 2011; Oborn & Dawson, 2010; Sapsed & Salter, 2004). For instance, Gherardi & Nicolini (2002a) study what they refer to as a constellation of practice describing interconnected practices that traverse the boundaries of several communities. In this perspective the context is constituted by several other communities with their own views on practice, agendas, interest, and resources. Thus, practice becomes contested between several CoPs and the focus shifts away from internal learning processes towards studying how several communities negotiate meaning. In particular, this line of research investigates the discursive practices at the boundaries between communities that often evolve around boundary objects such as artifacts, blueprints, models, or concepts that enable translation and coordination across different CoPs (Brown & Duguid, 2001; Faraj & Xiao, 2006; Oborn & Dawson, 2010; Sapsed & Salter, 2004; Wenger, 1998). For example, Boland & Tenkasi (1995) suggest that knowledge between diverse "communities of knowing" is shared through the interrelated processes of perspective-making and perspective-taking. The former describes how communities develop their unique understandings of the world, whereas the latter relates to representing, sharing, and integrating of knowledge with other communities. In a similar vein, Bechky (2003) points out that learning across occupational communities differs and that cross-communal knowledge transfer relies on more tangible objects around which individuals share knowledge. Meanwhile, Gherardi & Nicolini (2002a) illustrate the conflictive tensions that can occur in intercommunal negotiations as different communities discursively position themselves in either consent or dissonance about an interconnected practice. Also understanding the trans-local context consisting of tangential communities, Mørk et al. (2010) similarly show how different CoPs try to control a new practice by mobilizing arguments, marginalizing opponents, and building alliances. Building on these findings, Heizmann (2011) suggests that the interplay between the different CoPs of one network of practice is one of discourse and counter-discourse which will eventually hamper knowledge sharing across communities.

Altogether, several authors in the core collection recognize the broader organizational context around CoPs as constituted through multiple, intersecting

communities of practice (Brown & Duguid, 2001; Gherardi & Nicolini, 2002a; Snell, 2001)—or as Brown & Duguid suggest a *"community of communities"* (2001, p. 203)—and introduce the idea of coordination between these CoPs as intercommunal negotiation. This perspective, however, only pays little attention to how such networks of multiple CoPs are nested and integrated into the established formal organizational hierarchy and, particularly, how formal leadership functions in such settings (Kerno, 2008; Koliba & Gajda, 2009). This shortcoming stems from the tendency only to recognize communities (Lindkvist, 2005). For example, Wenger (1998) illustrates how an office manager participates in what he refers to as a "community of managers" and the actual claims processing CoP and thereby holds the role of a broker between the two communities who introduces and translates elements of one practice into the other. Although research on coordination between multiple communities of practice offers valuable insights into organizing at and across boundaries it obscures that CoPs are also embedded within structures that go beyond other communities.

In light of this, other practice-oriented scholars in the core collection provide explanations for how broader socio-cultural structures influence and constrain the social praxis within CoPs. Contu & Willmott (2003), for example, criticize the narrow perception of context and call for understanding learning in communities of practice as embedded in wider societal and cultural environments and make the plea to recognize that learning, to some extent, inevitably reproduces these wider institutional structures. Likewise, Gherardi & Nicolini (2002b) theorize that the local subculture of safety originates from the organizational and industrial culture as well as the traditions of the local community. All these elements interact in the local context of practice in which the practitioners decide which versions of safety are performed. Thus, community members in their local praxis draw on and combine other cultural materials. On a related note, Mutch (2003) applies Bourdieu's (1990) concept of habitus to the CoP concept and explores how agents' embodied and transposable dispositions, which they unconsciously acquired from other contexts (i.e., their habitus), interact with a local practice and might explain differences in the performance of the same activity. Similarly, Roberts (2006) argues that employees enter CoPs with predispositions that do not disappear within the context of a particular community. Thus the situated praxis is influenced through habitus and, therefore, by other social structures than those negotiated within the community. Roberts further points out that the practices of a CoP reflect the institutional structures of the broader context in which they are situated. Consequently, she argues that societies that have strong social structures may develop more effective communities within the business world as compared

to western societies with their strong emphasis on neo-liberalism and individualism. Building on this, Harvey et al. (2013) discovered, in their study of CoPs in a professional bureaucracy, that members carried internalized norms and behavioral expectations of the bureaucracy into community activities which ultimately led to the CoP's demise as people could not handle the newly given autonomy. Thus the socio-cultural structure of bureaucracy, to a substantial degree, determined the social praxis in the CoP. Specifically, considering the institutional environment of practice, Gherardi & Perrotta (2011) illustrate that new practices not only emerge from the situated praxis of a community of practitioners but are also initiated and influenced by broader institutional and societal forces. Based on this contribution, Hotho et al. (2014) explore how the institutional context, in combination with organizational structures, affects learning in situated practice and find that although organizational structures were in misalignment to institutional demands actors creatively used institutional rules to counter constraining structures.

Overall, the above literature recognizes that the situated activities within CoPs are not entirely self-caused and self-reflexive but also affected by the broader surrounding context. That is, cultural and institutional structures have a direct bearing on practice. In other words, CoPs cannot exist without a relation to an external world but are embedded in these broader structures (Contu & Willmott, 2003; Contu & Willmott, 2006; Cox, 2005; Yakhlef, 2008). Or as Yakhlef puts it: *"What a CoP learns cannot be self-caused, the outcome of its closed, self-reflexive processes"* (2008, p. 287). Yet, the exact mechanisms of how the broader socio-cultural context affects local CoPs, i. e., how and the degree to which members draw on these structures, remains mostly obscure from the above contributions.

Turning towards the literature in the core collection that construes CoPs more as organizational entities, authors understand the organizational context around such communities essentially as the managerial shaped formal organizational hierarchy. As mentioned in the nature section, however, there are two fundamental perspectives in this stream on CoPs as either emergent or instrumentally created entities. In the former, CoPs are self-organized and autonomous entities that do not need supervision. Therefore, the question of how community members interact with formal management and administrative leadership[12] remains mostly unattended in this stream. For example, Wenger notes that a CoP can never be: *"fully determined by an outside mandate, by a prescription or by any participant"* (1998, p. 80). That is to say, the self-organized nature would contradict

[12]I will use administrative leadership and formal leadership synonymously throughout this study referring to leadership that is tied to a formal position in the formal organization hierarchy.

any attempts to influence such communities externally. Other scholars note that this picture may be overly romantic because it is close to managerial utopia where employees do not need any supervision, motivate themselves, and set their own goals of working more effectively, learn, and improve (Østerlund & Carlile, 2005). Moreover, such a perspective obscures the dilemma that CoPs might solve problems locally and produce learning and innovation at the expense of overall fragmentation, drift, and incoherence as they are not embedded in a context and thus cannot affect the strategic levels of the organization (Brown & Duguid, 2001; Duguid, 2008; Tallman & Chacar, 2011a; Tallman & Chacar, 2011b). Brown & Duguid (2001) note that the main challenge for dynamic firms, therefore, is to allow for change to occur locally in dispersed CoPs but, if necessary, to integrate it for global strategic change. Yet, the mechanisms of how to do so remain vague in these contributions.

In contrast to the emergent perspective, scholars who perceive CoPs as instrumental tools argue that management can spur their emergence and integrate them to leverage their full potential for competitive advantage (Wenger et al., 2002; Wenger & Snyder, 2000). Hence, these studies explicitly focus on the relation between CoPs and management and suggest different forms of what they refer to as "community management". In particular, several scholars in this literature discuss how management can sustain a community's autonomy and simultaneously exert control over these entities (Borzillo, Probst, & Raisch, 2008; Bourhis & Dubé, 2010; Wenger & Snyder, 2000). This stream is also incoherent in his suggestions on how to cultivate and "set up" communities of practice.

Several scholars thus point out that management can and should shape the context for community emergence, albeit with indirect and loosely structured top-down initiatives than direct structural interventions (Chua, 2006; Dougherty, 2001; Thompson, 2005; Wenger, 2000; Wenger et al., 2002). For example, Dougherty (2001), on a generic level, argues that in innovative organizations management (i.e., the top management team) should define and differentiate the problem areas of the firm and then should allow its autonomous communities of practice to take charge of these problems without predetermining possible solutions. Meanwhile, Wenger et al. (2002), in their monograph, provide a handful of design principles managers should adopt to catalyze organic CoP growth within their firms. In a similar vein, Thompson (2005) reflects that CoPs need some infrastructural investment to grow but without controlling the actual activities of its members. Therefore, he coins the term *"seeding structures"* (e. g., ICT infrastructure, artifacts, office spaces, and installations) that enable future interaction from which a CoP may evolve.

Other authors underline the importance of new leadership forms or general management styles that can help to shape an organizational culture that enables community emergence and their integration (Borzillo & Kaminska-Labbé, 2011; Bourhis & Dubé, 2010; Dubé et al., 2005; Kietzmann et al., 2013; Peltonen & Lämsä, 2004; Smith & McKeen, 2003; Snell, 2001; Zboralski, 2009). Faraj & Xiao (2006), for instance, suggest that organizational leadership is responsible for providing visions and creating safe havens where several communities can negotiate new practices because they all follow the same overarching goal and have the psychological safety to admit mistakes. Likewise, Retna & Ng (2011) illustrate how a company's CEO installed a cooperative culture of distributed leadership (Brown & Gioia, 2002) comprising open communication, collaboration, interpersonal interaction, trust, and a strong company vision which, together, helped to spur informal CoP emergence, increased participation, and facilitated high knowledge sharing. Moreover, Kirkman et al. (2011) show that community-oriented leadership, consisting of encouraging collaboration, facilitating high-quality interpersonal exchange, alignment of community activities with broader goals, and provision of resources to CoPs, positively affects a CoP's effectiveness. Meanwhile, other scholars note that participatory leadership facilitates self-management among employees and helps to encourage community activities and bottom-up initiatives by shaping a culture that enhances human productivity and creativity (Collier & Esteban, 1999; Hotho et al., 2014). In a similar vein, Kodama (2002) proposes community leadership as a general management style that traverses through all organizational levels and helps to build and manage the company's diverse strategic communities.

Although this stream highlights the importance of culture in enabling community emergence and provides hints on how formal leadership may shape such a knowledge sharing context, it gives little information about how such a culture of informality interrelates with a culture of formal hierarchy. Several scholars, in this respect, note that formal organizational hierarchy, due to its pervasiveness, may impede informal CoPs as these two organizational forms are opposed to each other (Harvey et al., 2013; Kerno, 2008).

Overall, this line of research concludes that organizations cannot directly control CoPs but can facilitate the spontaneous emergence of them and support those that have evolved without limiting their autonomy (Roberts, 2006; Thompson, 2005). Indeed, several studies suggest that if an organization tries to restrain a community's autonomy through controlling mechanisms, the community is likely to vanish or continue outside formal avenues (Gongla & Rizzuto, 2001; Pastoors, 2007; Thompson, 2005).

Yet, despite these warnings, several scholars from the knowledge management discipline advocate for an explicit management of CoPs that involves their purposeful creation and a strict alignment to their organizational context via direct governance mechanisms and managerial interventions (Bolisani & Scarso, 2014; Büchel & Raub, 2002; Clegg, Scarso, & Bolisani, 2008; Meeuwesen & Berends, 2007; Probst & Borzillo, 2008). For example, Swan et al. (2002) illustrate how a group of managers established a community among recognized medical professionals in order to promote the adoption of an innovative practice. Anand et al. (2007), on a related note, narrate how communities of practice may occur bottom-up without managerial intention but are also launched through management support and purposeful interventions (e.g., sponsorship, resources, and assigned personnel).

Several other studies try to establish guidelines, success factors, and lists of governance mechanisms for the design and management of CoPs without explicating many of the nuances of the interactions between members and their managerially shaped context (Borzillo, 2009; Bourhis & Dubé, 2010; McDermott, 2000; Probst & Borzillo, 2008). For instance, Dubé et al. (2005), in their discussion of virtual CoPs, suggest a list of twenty-one structuring characteristics that can be shaped through: *"management decisions/actions that can be taken to assure the vCoPs' success in view of a particular configuration"* (Dubé, Bourhis, & Jacob, 2006, p. 88). Moreover, Borzillo (2009) suggests that top management sponsors of a firm's CoPs should assess a community's organizational value on an ongoing base via proactive measures (evaluation of "produced" best practices) and control processes (governance committees) in order to decide whether to fund the CoP with additional resources. Moreover, Probst & Borzillo (2008) point out several other governance mechanisms for the successful launch of CoPs such as aligning them to the firm's strategic objectives, install governance committees, assign "best practice control agents", or quantitatively measure the overall CoP's benefits. Similarly, McDermott & Archibald (2010) suggest that management should specify goals for its communities besides establishing formal relations between CoPs and top management and training of specific community leaders. These "how to community" recommendations and alleged success factor lists frequently have a one-size fits all character and too often remain on a generic level.

Other research examines purposefully created communities of practice in order to conclude their design processes, concentrating prominently on formalized roles of so-called CoP managers or facilitators (Bardon & Borzillo, 2016; Garavan, Carbery, & Murphy, 2007; Meeuwesen & Berends, 2007). For example, Garavan et al. (2007), based on their qualitative study of four intentionally created CoPs,

propose that explicitly trained CoP managers are responsible for providing goals and visions for the community and, in doing so, structure the internal sensemaking among community members. Likewise, Meeuwesen & Berends (2007) examine managed CoPs at Rolls Royce and underline the importance of community facilitators, who are responsible for organizing meetings and encouraging participation. These studies, unfortunately, either focus on organizational groups more similar to ad-hoc created task-forces and cross-disciplinary teams than CoPs (Amin & Roberts, 2008; Thomas, 2017) or lack longitudinal data that would explain the cross-level links between individual, community, organizational context, and outcomes (Bolisani & Scarso, 2014; Harvey et al., 2013).[13]

More recent research tries to combine the emergent and self-organized elements of CoPs with elements of control and integration into a formal organizational hierarchy (Borzillo & Kaminska-Labbé, 2011; Harvey, Cohendet, Simon, & Borzillo, 2015). Many scholars, however, note that more research is needed to understand the embeddedness of communities in traditionally established organizations without suppressing their dynamic and surprising nature (Aljuwaiber, 2016; Lindkvist, 2005; Rennstam & Kärreman, 2020; Roberts, 2006; Thomas, 2017). That is because, in its efforts to formulate recommendations on how to manage, integrate, and control an organization's CoPs, the managerialist view tends to suggest oversimplified solutions like formalized roles and top-down governance mechanisms that are aimed at increasing predictability and efficiency of creative and innovative learning processes that are, by their very nature, emergent and self-organizing and, therefore, unpredictable. Such measures that preplan and set up a community's activities cause CoPs to become static and predictable managerial tools, instead of being self-organized, improvisational, and dynamic (Contu & Willmott, 2003; Contu & Willmott, 2006; Corradi et al., 2010; Cox, 2005; Duguid, 2008; Rennstam & Kärreman, 2020). In other words, these studies reproduce traditional, mechanistic forms of control from the prevalent classical management approaches (Peltonen & Lämsä, 2004; Thomas, 2017) that emphasize structure of authority, rationally conceived goals, and managerial practice to supervise goal achievement (Barnard, 1938; Mintzberg, 1979; Weber, 1947). What follows from this is that there is no longer a dynamic interrelation between the local context of a CoP and the context of formal organizational hierarchy because communities are taken over by management and inevitably become absorbed in and part of the formal structure (Duguid, 2008). Besides these critiques of a naïve and simplified treatment of CoP studies have also shown that such initiatives to

[13]Interestingly, some studies even admit that they did not study a CoP but rather a cross-disciplinary team (Garavan, Carbery, and Murphy, 2007).

operationalize and instrumentally manage CoPs often lead to abandoned online discussion platforms and, thus, do not produce sustaining CoPs (Pyrko et al., 2017).

Overall, the literature in the core collection covers several aspects of the interrelation between a local CoP and its trans-local, broader context. First, several studies understand the context around a CoP as constituted through multiple intersecting communities and explore learning and coordination across the boundaries between them. Second, other practice-oriented researchers describe the interrelation between situated learning in CoPs and socio-cultural and institutional structures that go beyond the locality of a particular community, whereas research that explicitly focuses on CoPs within contexts of established work organizations searches for ways of cultivating and embedding CoPs without suppressing their self-organized nature. This stream, however, has recently developed more towards popularizing simplistic and naïve management approaches of CoPs.

2.3 Summary of Section and Research Questions

In the previous section, I provided an in-depth review of the ongoing discussions within the core collection of communities of practice research based on a systematic literature search. The review revealed three competing views on the CoP construct as either a theoretical lens on learning processes or as emergent respectively instrumentally designed organizational grouping. These different perspectives permeate through all the dimensions of the CoP construct beginning with its essential nature of what they are, over what people actually do within them, to the question of what it is that communities generate as an outcome, and how they interact with their surrounding context.

Research that views the CoP concept more as a theoretical lens to explain learning processes unfolding from people's participation in social practices (Gherardi et al., 1998; Handley et al., 2006; Lave & Wenger, 1991) emphasizes the historically constituted and stable nature of CoPs (Amin & Roberts, 2008; Østerlund & Carlile, 2005) where participation in its social practices generates learning, knowing, and identity, confined and directed towards that particular social context (Nicolini, 2012). Initially, scholars in this perspective did not consider broader structures that straddle beyond the locality of a situated CoP. Authors later on, however, have turned towards studying boundary processes unfolding between multiple CoPs (Bechky, 2003; Boland & Tenkasi, 1995; Mørk et al., 2010) and have theorized that broader socio-cultural, as well as institutional structures, have

a direct bearing on learning in practice (Contu & Willmott, 2006; Hotho et al., 2014).

On the other hand, researchers understand CoPs more as self-organized and often informal groups of practitioners situated within traditional organizations (Brown & Duguid, 1991; Brown & Duguid, 2001; Wenger, 1998; Wenger & Snyder, 2000) that establish the context for adaptive and changing practice and, therefore, are viewed as vital sources of organizational learning, innovation, and adaptability (Brown & Duguid, 2001; Cordery et al., 2014; Jarzabkowski, 2004; Liedtka, 1999). Originating from this perspective, authors have studied how to cultivate and seed self-organized CoPs (Thompson, 2005; Wenger et al., 2002) but, recently, have turned increasingly towards popularizing naïve and simplistic management approaches of instrumentally designed communities (Borzillo, 2009; Garavan et al., 2007; Probst & Borzillo, 2008; Scarso et al., 2009), thereby stretching the original concept (Amin & Roberts, 2008; Gherardi, 2009a; Pyrko et al., 2019).

I agree with the critiques on an instrumental perspective as I come to understand CoPs as emergent, self-organizing dynamics that cannot be set up and controlled. More specifically, I view CoPs as emergent and self-organized social webs of relations that emerge from organizational members' social praxis around a particular practice, in which participants collaborate and think together in order to resolve their practical problems without the presence of a central coordinating authority or a formalized plan and from which they develop shared identities and shared cultural understandings about their group (Brown & Duguid, 1991; Cox, 2005; Lindkvist, 2005; Pyrko et al., 2017).

As becomes evident from this definition, my understanding of CoPs follows Brown & Duguid's (1991) contribution about the Xerox repair technicians who form an emergent, mostly informal, and self-organized group of practitioners in which they solve practical problems collaboratively and, in doing so, adapt and innovate their local practice. Although purists of a practice-oriented lens to learning critize Brown and Duguid's account as too managerially-driven as it sees CoPs and learning in practice as a means to enhance employees capabilities to address environmental changes (Contu & Willmott, 2000; Contu & Willmott, 2003), we indeed come to perceive CoPs as a source of adaptation unfolding from people's deep engagement in local practice (Brown & Duguid, 2001; Jarzabkowski, 2004). If we are to understand CoPs as a source of adaptability, however, we need to "zoom-out" from internal community dynamics of learning and participation to explore how CoPs and their underlying processes emerge, interact with, and embed in the broader context of traditional hierarchical organizations. In particular, we need to know more about how the conflictive tension between

such self-organizing CoPs pushing for change and their managerially shaped formal surroundings more focused on stability works and can be sustained for organizational adaptability.

The above literature review, however, has revealed that prior work on communities of practice does not sufficiently problematize this embeddedness of CoPs within broader, managerially shaped organizational contexts. On the one hand, practice-oriented scholars either focus on explaining learning processes within CoPs (Gherardi et al., 1998; Lave & Wenger, 1991; Pyrko et al., 2017) or emphasize learning at the boundaries between multiple intersecting communities (Gherardi & Nicolini, 2002a; Heizmann, 2011; Oborn & Dawson, 2010), leaving the broader context of the surrounding organization mostly unregarded (Contu & Willmott, 2003; Hotho et al., 2014; Roberts, 2006). On the other hand, research that understands CoPs as sites of knowing, innovation, and adaptation (Brown & Duguid, 1991; Brown & Duguid, 2001; Wenger, 1998) explores how the CoP concept can be operationalized for organizational benefits (Wenger et al., 2002). To that end, authors increasingly suggest simplistic governance approaches that involve the active management of purposefully designed CoPs. Such an overly managerialist perspective on CoPs, however, eliminates the inherent tension in the interrelation between CoPs and the formal organizational hierarchy because the two blend together. That is to say, the logic of formalization and top-down, bureaucratic control prevails over self-organized communities of practice and ceases their dynamic potential (Kerno, 2008; Thomas, 2017).

In light of this unclear picture, I conclude that we need to explore the embeddedness of CoPs in the formal organizational hierarchy deeper to understand CoPs as a source of adaptability. Consequently, the current study's overall guiding research question reads as follows:

> *How are emergent and self-organized CoPs embedded in the broader trans-local context of formal organizational hierarchy?*

To study how organizations can navigate the tension between CoPs and formal organizational hierarchy for adaptability, one needs to know, first, how it unfolds and works over time. Because recent research focuses predominantly on top-down initiated communities or regards already existing CoPs, the complex processes of bottom-up, informal emergence have been rather neglected in prior research (Siedlok, Hibbert, & Sillince, 2015). To be precise, it remains unexplored how communities actually evolve within the organizational context: *"There is no way in the theory to explain why a community of practice forms"* (Cox, 2005, p. 533). Thus, research question 1 asks:

RQ1: How do communities of practice emerge within the formal organizational hierarchy?

As we know more about how communities of practice emerge, we can shift our attention to how they interrelate with their organizational environment and become eventually embedded within it. In particular, one needs to study the processes and mechanisms inherent in the cross-level relations and interactions between community members and their context (Harvey et al., 2013). More specifically, this concerns two related areas of inquiry. For one, we need to understand how CoPs interrelate with the broader socio-cultural structures of their organizational context and, second, we need to explore the tension-ridden relationship between CoPs and formal management/leadership.

Regarding the relation to broader socio-cultural structures the literature review showed that prior research offers contradictory perspectives. On the one hand, CoPs are said to generate local subcultures with idiosyncratic identities (Brown & Duguid, 1991; Lave & Wenger, 1991) and, therefore, are viewed as closed cultural systems (Gherardi & Nicolini, 2002a). Meanwhile, other scholars note that the practices of local communities reproduce and reflect the broader cultural and institutional structures in which they are situated (Contu & Willmott, 2003; Contu & Willmott, 2006; Roberts, 2006). Several other studies offer a more nuanced picture of the cultural dynamics in CoPs (Brown & Duguid, 2001; Gherardi & Nicolini, 2002b; Thompson, 2005). Though these authors contest the notion of organizations as monolithic cultural units and reject cultural determinism, they acknowledge that CoPs draw, to some extent, on broader cultural repertoires. Yet, the exact mechanisms of how they do so, and to what extent, remain vastly obscure. Given this, we need explore the cultural dynamics between communities and the broader, cultural context (Aljuwaiber, 2016). Hence, research question 2 is:

RQ2: How do emergent, self-organized CoPs culturally interrelate with the broader context of formal organizational hierarchy?

Turning towards the interrelation between CoPs and formal leadership, the above literature review has revealed that many approaches to "CoP management" detach communities from actual practice as they offer generic lists of success factors and simple governance mechanisms of how to design and set up communities. Thus, these studies do not offer sufficient enough insights into the embeddedness of CoPs in the organizational context. Although other researchers have introduced community-related ideas on leadership (Kirkman et al., 2011; Retna & Ng, 2011)

knowledge about how formal leadership interacts with CoPs without undermining their self-organized nature remains scarce (Koliba & Gajda, 2009; Thomas, 2017). In particular, the processes unfolding at the interface between CoPs and formal leadership are seldom recognized in detail. Therefore, we need to explore how formal leadership steers through the paradoxical tension between a CoP's autonomy and their control and integration into formal organizational hierarchy for organizational adaptability. Consequently, research question 3 reads as follows:

> *RQ3: How does formal leadership embed communities of practice in formal organizational hierarchy?*

Answering these questions should extend our scholarly knowledge about the embeddedness of communities of practice as sites and sources of adaptability in contemporary organizations. I like to expressively note, at this point, that my aim is not to develop yet another "CoP management" approach but, rather, understand how the tension-ridden interrelation between self-organized CoPs and its managerial-shaped context of formal organizational hierarchy works and can be sustained for organizational adaptability

Theoretical Background

3

There is nothing as practical as a good theory

Lewin 1943

In the previous section I conducted a thorough review of the CoP literature which revealed that we need to know more about how such self-organized communities emerge and embed within the context of formal organizational hierarchy. In traditional research, one would now expect a theoretical discussion from which arguments about the embeddedness would be honed. However, I choose to explore the research questions of this study using an interpretative research approach that develops theory from the ground up instead of deductively testing theorized relationships. In such a grounded theory approach the theory usually appears after qualitative data presentation (Nag, Corley, & Gioia, 2007; Suddaby, 2006). Yet, to give the reader a better understanding of how I look at the data spreading in front of me, and to advance the clarity of this manuscript, I will provide a theoretical overview first.

This overview will outline the two central theoretical perspectives—complexity and practice theory—on which I will draw in theorizing the study's findings. Note that employing these theoretical perspectives emerged from the study itself, the in-depth examination of the data, and from the consultation of the relevant literature. That is, during the analysis process the data led me towards theorizing the findings of CoPs that generate resources and interact with formal leadership, in part from a complexity theory perspective, in particular, complexity leadership theory (Uhl-Bien et al., 2007; Uhl-Bien & Arena, 2018; Uhl-Bien & Marion,

B. Schulte, *The Organizational Embeddedness of Communities of Practice*, Forschungs-/Entwicklungs-/Innovations-Management,
https://doi.org/10.1007/978-3-658-31954-0_3

2009) and from a practice-oriented lens on resources (Feldman, 2004; Feldman & Worline, 2012).

Because I situate the current study in the communities of practice literature, I need to discuss how these theoretical perspectives align and blend with prior research on CoPs. Therefore, I begin the following reflections with a discussion of the theoretical as well as ontological underpinnings of previous CoP research and how these help to theorize the embeddedness. After that I introduce the reader to complexity theory and discuss how this perspective is compatible to and expands a practice-oriented view on a CoP's embeddedness in formal organizational hierarchy.

3.1 Theoretical and Ontological Underpinnings of CoP Research

The review of the core collection in the previous section outlined three fundamentally different viewpoints on the essential nature of communities of practice that developed in three mostly isolated streams of literature. These are, on the one hand, practice-oriented studies on learning that follow Lave and Wenger's original contribution and explore learning processes in social practice (stream 1). Another strand developed from organization and management scholars who follow Brown and Duguid's perspective and understand CoPs as emergent entities located in an organizational setting (stream 2). On the basis of that view, another research strand emerged (stream 3) that increasingly applies an instrumental understanding to CoPs that treats them as designed tools for knowledge management initiatives. Equally different epistemological and theoretical groundings accompany these contrasting ontological understandings about the fundamental nature of CoPs (Thompson, 2011). While the early contributions heavily draw on practice-oriented social theories (Bourdieu, 1977; Giddens, 1984), later popular writings on CoPs are more grounded in traditional management frameworks such as the knowledge-based-view (Kogut & Zander, 1996; Spender & Grant, 1996). Given this, I introduce these contrasting theoretical foundations of CoP research and discuss their applicability for explaining the different aspects of a CoP's embeddedness. To do so, I will mostly concentrate on the theoretical backgrounds of streams 1 and 3 as they depict the end points of the continuum from a pure process understanding to an entity perspective on CoPs.

3.1.1 Practice-Oriented Theory and a Processual Understanding of Learning in CoPs

As mentioned above, research stream 1 in the core collection views CoPs not as concrete organizational groupings (Gherardi et al., 1998; Gherardi & Nicolini, 2002a; Handley et al., 2006; Lave & Wenger, 1991) but, rather, emphasizes with the community notion that all practices are fundamentally social practices as they are constructed and upheld through a particular assemblage of people (Nicolini, 2012). Thus, in this strand, the CoP construct depicts a specific theoretical or analytical lens through which researchers explicate social learning processes. More specifically, scholars such as Lave and Wenger unpack learning as a process that is inextricably linked to participating in the social practices of a local context, and that proceeds according to the trajectory of legitimate peripheral participation (LPP) from the periphery to the center, i.e., from unskilled novice to fully-fledged practitioner (Lave & Wenger, 1991). According to Thompson (2011), this logic of legitimate peripheral participation as the central social learning process in CoPs brings the underlying process ontology of situated learning theory to the fore.[1] That is, although Lave and Wenger introduce the notion of CoPs in their treatise—a term that implies an actual entity or a reified thing—the definition of that construct, essentially, is the underlying social process of LPP (Thompson, 2011). As Lave and Wenger point out, situated learning "concerns the process by which newcomers become part of a community of practice" (1991, p. 29). The process of LPP moreover, emphasizes activity and praxis in that it focusses on peoples' actual doings and sayings in an activity system (e.g., practicing, thinking, participating, collaborating) and the outcomes that are generated through that conduct (e.g., increased knowledgeability, competence, and identity). Besides these processual dynamics of situated learning, Fox (2000) notes the reciprocal relation between practice and practitioners in LPP, in the sense that the practice is under constant construction while novices proceed on their path to full participation and contribute to the practice's development. Also, Wenger (1998) expresses that a

[1] In much of contemporary social theory there is a divide between a process and an entity understanding of the world (Chia, 1997; van de Ven & Poole, 2005). Within an entity ontology, the world is composed of discrete, self-identifying, stable things that only change in their position in time and space. Thus, in this view, entities are primary to process, and stability as well as equilibrium are natural states of things. Within a process ontology, in contrast, the world is not a constellation of things but instead is constituted through ever-unfolding processes. That is, the reality is made up of fluctuating, ongoing activities, and is in a constant state of becoming (Rescher, 1996). Both viewpoints result in fundamentally different styles of theorization of organizational phenomena; namely, entity-based theorizing and process-based theorizing (Wenzel & Koch, 2018).

CoP is not a fixed or stable entity. Instead, a CoP evolves continuously, and its existence is not necessarily obvious to its members. As becomes evident, scholars in stream 1 understand CoPs from a process ontology that emphasizes the processual and fundamentally social dynamics of learning.[2]

Such a processual understanding of communities of practice aligns with a similar process-oriented theoretical foundation on which researchers in stream 1 build their accounts of learning and knowing in practice (Thompson, 2011). In particular, this strand of research is deeply grounded in practice theory, practice-based studies, practice approach, practice lens or what has recently become known under the term "practice turn" in contemporary social theory (Reckwitz, 2002; Schatzki, 2001). In the following, I provide the reader with an overview of this "practice turn" as the central theoretical background of CoP research.

The notion of "practice turn" describes the movement in sociology that puts practice at center stage in theorizing about the social (Schatzki, Knorr Cetina, & Savigny, 2001). This turn, which has gathered momentum since the 1980s, is not to be mistaken with one holistic, comprehensive, and self-contained practice theory but, instead, is made of a multitude of different practice-oriented approaches, which differ in their flavor and foci, yet all share the same goal to overcome the dualism of individualism and societism prevalent in social theory (Schatzki, 2005). According to Schatzki (2005) the camp of the "individualist"—including the likes of Max Weber and Frederick Hayek—overemphasizes the agency of individual human actors and neglects macro phenomena and their influence, while the opposing camp of "societists" (Durkheim, 1964; Tönnies, 1887) stresses broader societal forces in their explanations of action, disregarding the individual and the micro. Given this, practice scholars set out to bring these two camps together by recognizing both the micro (i.e., individual actors) as well as the macro (i.e., societal structures) in their theories.[3] To put it differently, practice-oriented approaches tackle one of the central issues in contemporary social theory: how to link individual agency with broader social structures in explanations of

[2]Note that several authors in practice-oriented studies argue for a practice ontology, in the sense that practice is ontologically prior to action and activity. Such a perspective assumes that "all there is, is practices", meaning that practices become the primary social thing (Nicolini, 2012). Paroutis and Pettigrew (2007), however, note that a practice view is similar to a process understanding in that they both focus on events and activities. Given this, I abstain from further distinguishing a practice from process ontology.

[3]Some practice scholars also note that the divide in levels such as micro, meso, and macro in much of contemporary theory is superficial and needs to be reconceptualized in the sense that the distinction between micro and macro is dissolved when we focus on practices that transcend beyond levels as they are always locally situated but also globally embedded (Miettinen, Samra-Fredericks, & Yanow, 2009).

action (Vaara & Whittington, 2012). Practice theorists thereby focus on activity or what we have termed earlier as praxis (Reckwitz, 2002; Whittington, 2006). In other words, practice-oriented approaches ground their theorizing in what people actually "do" when they engage in their "work" practices in the here and now (Miettinen, Samra-Fredericks, & Yanow, 2009; Nicolini, 2009). This doing, however, is always embedded in a web of practices that provide the broad commonalities for action, and practice scholars explore how this praxis produces and reproduces the features of the social world, i.e., how the contours of "social and organizational life stem from and transpire through the accomplishment of ordinary activities" (Nicolini & Monteiro, 2016, p. 110). Nicolini summarizes it as follows: "Practice-based theories use a performative perspective to offer a new vista on the social world" (2012, p. 7).

Early practice-oriented theories, for example, include the seminal works of sociologists Anthony Giddens and Pierre Bourdieu.[4,5] Giddens (1984), in his theory of structuration, explicates that structures enable and constrain people's practices, but it is also these practices that produce and reproduce social structures. Human agency and social structures thus, in this view, are not opposed but presuppose one another in a relationship of mutual constitution that is also called duality of structure. More specifically, he proposed structures or the structural properties of social systems as rules and resources that are virtual in that they exist in the form of often tacit knowledge, schemas, or memory traces about prior action. Hence, structures have no existence concretely in time and space apart from when they are put into practice, meaning that actors in their recurrent praxis draw on this knowledge and, in doing so, produce and reproduce social structures through their everyday activities (Giddens, 1984; Sewell, 1992).

The French sociologist Bourdieu (1977; 1990), similarly, in his conceptualization of habitus suggests that temporally persistent and durable social structures are constituted through the mutual reproduction of mental schemas and resources. In particular, habitus describes embodied dispositions that are often beyond the state of humans' consciousness and depict the imprint of historical, social structures into humans' bodies. It thus refers to the physical embodiment of social traditions and norms—the feel for the game—that people acquire through their socialization in the various contexts of historically constituted practices in which

[4]To be precise, authors such as Giddens, Foucault, and Bourdieu depict the second wave of practice-oriented social theory with the first wave often attributed to philosophers such as Marx (1845/ 1977), Wittgenstein (1953) and Heidegger (1929), who in their respective works provide first perspectives on social praxis in the social world.

[5]For a more comprehensive overview of these vast sociological theories see also Nicolini (2012).

they have participated throughout their life (e.g., family, religion, occupation etc.). Habitus predisposes how people think and act in accordance with these social norms and traditions. Therefore, habitus is also viewed to function as structuring structures in the sense of principles that generate and organize practice in a particular field (Bourdieu, 1990). That is, for Bourdieu, habitus is a phenomenon that is always bound to a particular social group or class, i.e., a specific social field. It is within this wider field that habitus becomes realized and generates practice; people's involvement in a field shapes their habitus that, in turn, recreates that field through guiding and structuring peoples' activities. In short, the concept of habitus highlights that the history of past socialization leaves a bodily mark on how practitioners see and interpret the world, i.e., on their "being in the world"[6].

Other influential practice theories, which regularly find their ways into organization and management studies include Foucault's (1972) discursive analysis and Latour's (2005) actor-network theory. Introducing the massive oeuvres of these authors, however, would go beyond the scope of this dissertation.

The "practice turn" in organization and management studies involves a growing number of scholars in different fields who draw on the above social theories and subscribe to their main assumptions in studying what people actually do within organizations.

Information Box 4: The Practice Turn in Organization and Management Theory

Practice theory not only informs work on communities of practice and organizational learning, but also has spurred research on various other organizational phenomena (Feldman & Orlikowski, 2011; Feldman & Worline, 2016).

Technology as Practice

For instance, scholars draw on practice theories in their study of technology (Orlikowski, 1992, 2000). This notion on technologies posits that technology does not structure human agency by virtue. Instead, Orlikowski (2000) argues that technological structures are not embodied in the technological properties or elements and thus are not external or independent to human agency, but rather technological structures are emergent because humans constitute them in their recurrent use of technologies in practice. That is, only when people routinely mobilize elements of a technology in repeated, situated action, the properties of the technology become structures in the sense that they structure human action or interaction with that technology (Orlikowski, 2000).

[6]The notion of being in the world stems form Heidegger (1929).

Routines as Practice

Other scholars offer a practice-oriented conceptualization of organizational routines (Dionysiou and Tsoukas, 2013; Feldman, 2000; Feldman and Pentland, 2003; Howard-Grenville, 2005; Parmigiani and Howard-Grenville, 2011). In this view, routines are not perceived to be enduring, stable, and a source of inertia, but also hold the potential for endogenous change. Routines in this perspective are perceived to comprise of two interdependent, recursively interrelated elements: the actual performance of the routine (performative) and the abstract understanding of the routine that both shapes and is shaped by the concrete performance (ostensive) (Feldman and Pentland, 2003; Parmigiani and Howard-Grenville, 2011). Change in organizational routines, therefore, unfolds in the dynamic between these two sides.

Strategy as Practice

A particularly active stream of practice-oriented research coalesces under the heading of strategy-as-practice (SAP) (Jarzabkowski, 2004, 2005; Jarzabkowski et al., 2007; Jarzabkowski and Spee, 2009; Vaara and Whittington, 2012; Whittington, 1996, 2006). From the SAP perspective, strategy is primarily conceived as something people actually do and not so much as something that firms have (Jarzabkowski et al., 2007). Given this, strategy-as-practice scholars conceptualize strategy "as a situated, socially accomplished activity, while strategizing comprises those actions, interactions and negotiations of multiple actors and the situated practices that they draw upon in accomplishing that activity" (Jarzabkowski et al., 2007: 8). It thus focusses our attention on the activities—the praxis—of strategy practitioners and the practices and tools utilized in the doing of strategy (Jarzabkowski et al., 2007; Whittington et al., 2003; Whittington, 2003). Moreover, strategy-as-practice opens up the strategy building process by recognizing and exploring the involvement of multiple actors beyond managerial elites in the doing of strategy (Seidl et al., 2019; Whittington, 2019).

Altogether, each of the above-mentioned practice streams shares a common focus on the way actors interact with their social or material features of the organizational world in the everyday activities that constitute practice (Jarzabkowski, 2004).

Given this, we can find practice-oriented research in multiple streams within management and organization sciences beyond CoPs and learning in practice. Practice-oriented studies, for example, evolved in the field of strategy-as-practice (Jarzabkowski et al., 2007; Jarzabkowski & Spee, 2009; Whittington, 2003a), institutional complexity and change (Smets & Jarzabkowski, 2013; Smets, Morris, & Greenwood, 2012), studies of organizations and organizational change (Miettinen et al., 2009; Orlikowski, 1996), as well as research in accounting (Ahrens & Chapman, 2007) or organizational routines (Feldman, 2000; Feldman & Pentland, 2003) (see also Information Box 4).

Another practice-oriented approach, which I will draw on in the later stages of this dissertation, is Martha Feldman's conceptualization of resources as resources in practice (Feldman, 2004). This perspective on resources brings the processes of how actors put things into use and thereby potentially generate new resources to the fore (Feldman, 2004; Feldman & Quick, 2009; Feldman & Worline, 2012; Feldman & Worline, 2016). In resourcing theory things only become resources as they are being skillfully used in practice (Feldman & Orlikowski, 2011). Thus, resourcing describes the situated creation of assets in practice that enable actors to undertake certain activities. These very activities can, in turn, create further resources that continue to foster these actions (Feldman, 2004).

As becomes evident from the above overview of the "practice turn" in contemporary management and organization science, practice-oriented research is diverse. Given this, Feldman & Orlikowski (2011) distinguish three different approaches to practice studies: the empirical, the theoretical, and the philosophical. The first empirical approach explores people's everyday activities—routinized or improvised—in the production of organizational outcomes such as learning, strategy or innovation, without explicitly drawing on practice theories. This approach is also referred to as the weak program of practice-oriented research (Nicolini, 2012). The theoretical approach, in contrast, explicitly utilizes concepts from the broad apparatus of practice theories such as those introduced above (Bourdieu, 1990; Foucault, 1972; Giddens, 1984; Latour, 2005; Wittgenstein, 1953). The third philosophical approach to practice-oriented research calls for acknowledging the ontological primacy of practice as the critical building blocks of reality, in the sense that the social world is "brought into being through practice" (Feldman & Orlikowski, 2011, p. 1241). Nicolini (2012) also refers to this approach as the strong program to practice research. Although practice scholars acknowledge the value of the empirical approach, they also argue that to unleash the full power of the practice perspective, practice-oriented research requires a deeper theoretical grounding and a strong commitment to a process, respectively a practice ontology (Gherardi, 2009a; Vaara & Whittington, 2012).

Despite the fact that there is no single unified and coherent practice theory on which researchers could draw (Schatzki, 2001) when they adopt a theoretical or philosophical approach, there are recognizable patterns that have emerged in practice-oriented research. Thus, Feldman & Orlikowski (2011) posit three principles of practice theorizing to which scholars subscribe when they employ a practice perspective. First, practice theory foregrounds human agency[7] and argues that: *"everyday actions are consequential in producing the structural contours of social life"* (Feldman & Orlikowski, 2011, p. 1241). This consequentiality pronounces that social structures, habitus, or social orders are produced, generated, or enacted through practices (Bourdieu, 1990; Giddens, 1984). In recognizing this efficacy of human conduct, practice theories break with approaches that overemphasize the role of structures in explaining action, and that hardly leave any leeway for individual agency as individuals are viewed as structural "dopes" (Jackson, 1999). Instead, practice theories all leave space for agency, individual performance, and intelligible action. This is because performing a practice always requires reacting and adapting to local circumstances. Therefore, practicing is never mindless repetition nor is it complete invention as it is performed against the backdrop of other practices (Nicolini, 2012).

The second principle is that practice scholars reject dualisms and recognize the inherent relationships between elements that would otherwise have been treated as dichotomies (Feldman & Orlikowski, 2011; Feldman & Worline, 2016). As mentioned above, practice theories aim at overcoming the dichotomies between person and world, individual and collective, or subject and object dimensions of reality salient in social sciences. The premise of duality of structure brought forward in structuration theory by Giddens (1984), for example, overcomes this dualism between agency and structure. By viewing elements as part of a duality, they become interdependent and closer to each other without losing their conceptual independence. The elements of a duality thus remain distinct although they are theoretically brought together (Farjoun, 2010; Jackson, 1999).

Closely connected to this is the third principle of relationality, which states that phenomena always exist in relation to other phenomena (Feldman & Orlikowski, 2011; Feldman & Worline, 2016). Relationality, herein, does not primarily refer to

[7]There are multiple conceptions on human agency, in particular, in the fields of sociology and philosophy. Agency describes the capacity to act purposefully. According to Emirbayer and Mische (1998) agency is influenced through the past because past patterns of thought and action become incorporated in actors' practical activities. Moreover, agency is oriented towards the future as actors imagine future possible trajectories of action and it is oriented towards the present because actors are capable of making judgements between different possibilities of action.

interpersonal relations but rather means that phenomena always exist in relation to other phenomena (Bradbury & Lichtenstein, 2000). To put it differently, relational thinking in practice-oriented theories posits that subjects, social groups, as well as objects such as artifacts, only develop their properties and meanings in relation to other subjects, social groups, or artifacts (Østerlund & Carlile, 2005). This idea, for instance, can be found as one of the central premises of actor-network-theory in which the social is conceived as a network of relations between a variety of human and non-human actors (Latour, 2005).

In light of these approaches and principles of practice-oriented theories, research stream 1 of the core collection (Fox, 2000; Gherardi et al., 1998; Gherardi & Nicolini, 2002a; Gherardi & Nicolini, 2002b; Handley et al., 2006; Lave & Wenger, 1991) can be regarded as a theoretical, and even at times a philosophical, approach to practice as this line of research draws heavily on the ideas of Giddens (1984) or Bourdieu (1990), and applies the above principles in its theorizing. In particular, authors in this stream reject the dualism that either knowledge is something that only exists in human brains or is only encoded into objects (Lave, 1988). Rather, from a practice-oriented perspective *"knowing is an ongoing social accomplishment, constituted and reconstituted in everyday practice"* (Orlikowski, 2002, p. 252). That is, knowledge is constructed within an idiosyncratic social context—the system of relationships among people, objects and activities within a community—therefore, knowing and doing in that context cannot be separated from each other (Orlikowski, 2002): One has to actively participate in practice to become competent in that activity, simultaneously, through this active engagement the social norms, values, and identities of that context are being reproduced in practice. As Lave & Wenger note: *"Agent, activity and the world mutually constitute each other"* (1991, p. 33). For example, a newcomer to a particular community of practice learns to interact with others in a way that is considered to be normal and competent by other community members through active participation in the shared practices of the community. This social structure—the social norms and identities that comprise what is normal and accepted within the community—is historically constituted by those who have been practicing for a long time in that community. In gaining this knowing how to act normal through active participation, newcomers either sustain the social structure of the CoP or challenge it.

From the above report on the ontological and theoretical grounding of research stream 1 in the core collection, it becomes evident that this line of inquiry applies a processual understanding to learning in practice and is simultaneously deeply rooted in the "practice turn" of social theory as one of the primary approaches to study organizations from a process perspective.

3.1.2 CoPs as Social Entities and the Knowledge-Based-View

The literature stream that interprets CoPs as emergent organizational entities (research stream 2) (Brown & Duguid, 1991; Brown & Duguid, 2001; Faraj & Xiao, 2006; Hendry, 1996; Thompson, 2005; Wenger, 1998) makes an ontological shift from viewing communities of practice primarily as learning processes towards a more entitative understanding (Thompson, 2011). As explained earlier, scholars, here, study CoPs as informal groupings or as a new organizational form. That is, communities of practice are social entities that exist in a more concrete form alongside traditional formal hierarchies that possess certain qualities such as capabilities for knowledge sharing, innovation, and adaptation. Several studies within this strand simultaneously point out the emergent and evolving nature of CoPs, implying a processual and dynamic dimension within the communities of practice construct. For example, Brown & Duguid (1991) explicate the practices of narration, collaboration, and construction from which CoPs informally evolve, while Wenger (1998) refers to the duality between participation and reification as the generative force that constitutes the community. Following on from this is that processes and social entities are mutually constitutive in this perspective.

Although shifting the ontological understanding of CoPs, research stream 2 mostly holds on to a practice-oriented view on communities of practice or incorporates similar process-oriented theories such as sensemaking (Daft & Weick, 1984; Weick, 1988; Weick, 1995). For instance, Brown & Duguid (1991) refer to practice theorists Bourdieu (1977), Suchmann (1987), and Orr (1990; 1996) besides drawing on Daft & Weick's (1984) account of enacting organizations. Other studies in this strand, however, bring CoPs in relation to ideas from the open innovation paradigm (Jeppesen & Laursen, 2009; Wasko & Faraj, 2000; Wasko, Faraj, & Teigland, 2004) and the capability-based view of the firm (Cohendet & Llerena, 2003; Liedtka, 1999). These theoretical perspectives are more focused on macro properties of the organization—i.e., its innovative capabilities and its overall performance—without giving much attention to the micro level individual agency in their explanations. This shift in theoretical perspectives is accompanied with a reformulation of the main research purpose that has moved away from establishing a social theory of learning towards studying CoPs as informal and self-organized organizational entities that accommodate learning and innovation, i.e., adaptability. In short, research in this stream applies a theoretical approach to practice but also begins to incorporate other theoretical perspectives in its explanations.

The literature strand that understands CoPs as intentionally created and designed structures originates from an entitative understanding of the world. As

mentioned earlier, this stream views CoPs as social entities that are controlled by management. In other words, communities become malleable tools that concretely exist in the form of intranet platforms, blogs, and online networks (Bardon & Borzillo, 2016; Bolisani & Scarso, 2014; Borzillo, 2009; Borzillo, 2010; Bourhis & Dubé, 2010; Dubé et al., 2005; Dubé et al., 2006; Nesheim, Olsen, & Tobiassen, 2011; Wenger et al., 2002; Wenger, 2004). With this ontological shift, however, this research does not account, anymore, for the underlying processual dynamics and activities of learning and participation. Even though scholars in this stream use the suffix "of practice" in their descriptions, they remove the CoP concept form the actual everyday work practices to which originally the generative processes of participation and spontaneous emergence were tied (Amin & Roberts, 2008; Cox, 2005; Duguid, 2008). Some of the concept's founders critically note in this context: *"But community of practice theory is nothing at all without practice"* (Duguid, 2008, p. 3). Given this, research in this strand, at the most, depicts an empirical approach to practice, nevertheless with a fairly limited understanding of practice.

This ontological shift in research strand 3 corresponds with a turn in the employed theoretical perspectives on CoPs. As this research stems primarily from the knowledge management discipline, which deliberately has a more practitioner-oriented approach to research, it sometimes lacks the appropriate theoretical foundations (Bolisani & Scarso, 2014). However, when knowledge management scholars apply theoretical perspectives they typically originate from a knowledge-based view (KBV) of the firm (Grant, 1996; Kogut & Zander, 1992; Kogut & Zander, 1996; Spender & Grant, 1996).

Knowledge-based approaches of the firm, on the one hand, aim at postulating an alternative theory to transaction costs deliberations (Coase, 1937; Williamson, 1979) about the existence of firms (Foss, 1996). Besides, a knowledge-based view encapsulates the argument that an organization's knowledge is the main source of firm performance and, therefore, of competitive advantage (Argote & Ingram, 2000; Grant, 1996; Kogut & Zander, 1992; Spender, 1996; Spender & Grant, 1996).

Kogut & Zander (1992) suggest that firms are more than a bundle of contracts that serve to allocate property rights. In particular, firms are said to be more efficient in coordinating knowledge than markets because they establish *higher order organizing principles* (e.g., cultures and social structures consisting of shared codes, languages, and schemas) that allow for the integration and transfer of individual and often tacit knowledge. Consequently, firms exist due to their ability to produce and reproduce knowledge instead of being solely viewed as institutions for transaction costs reductions (Kogut & Zander, 1992; Kogut & Zander, 1996).

Other theorists in this field depart more from a strategic management perspective and understand the knowledge-based view of the firm as an extension to the resource-based view (RBV) (Barney, 1991; Wernerfelt, 1984).[8] They argue that since firms receive tangible resources from their environment, these resources are also potentially accessible for competitors. Therefore, it follows that competitive advantage is more likely to arise from internal, firm-specific intangible resources such as knowledge about how to combine incoming factors in order to add value (Brown & Duguid, 1998; Spender, 1996). Thus, the knowledge-based view proposes that organizational knowledge is one of the most crucial resources (Argote & Ingram, 2000; Grant, 1996; Spender & Grant, 1996).

This theoretical perspective, in contrast to a practice lens, seldom considers micro-level interactions and individual agency. Instead, it concentrates on the firm's macro-structures and top management as the main actor, whose primary task it is to establish and design organizational structures that efficiently coordinate the various knowledge-creating entities (i.e., individuals, groups, and teams) inside the firm (Grant, 1996; Kogut & Zander, 1992; Spender, 1996).

Because much contemporary knowledge management research is implicitly rooted in a knowledge-based view, it is unsurprising that CoPs, here, are treated as one of the central knowledge-creating entities and, therefore, as a strategic asset. The central aim in this stream, consequently, is to understand how management can harness and utilize these resources in order to gain competitive advantage (Bolisani & Scarso, 2014; Cox, 2005; Lesser & Storck, 2001; Scarso et al., 2009).

3.1.3 Interim Conclusion

The above discussion revealed that CoP research shifted dramatically in its theoretical grounding and ontological perspective. Whereas practice-oriented research on learning is deeply rooted in a processual worldview and mainly draws from practice theories to explain the dynamics of learning as critical aspects of practice, knowledge management research views CoPs as designed, controllable entities and builds on more mainstream management concepts such as the knowledge-based view of the firm to explain how CoPs as entities are critical for firm performance. Figure 3.1 illustrates these different theoretical and ontological

[8]The RBV's primary goal is to explain firm performance by answering the question of why some firms are more successful than others in establishing sustained competitive advantages that yield superior returns. In this view, firms consist of idiosyncratic bundles of resources and capabilities which, when they are valuable, rare, imperfectly imitable, and non-substitutable, are the prime source of competitive advantage (Barney, 1991).

backgrounds in the literature graphically. Note that I locate research stream 2 in the middle between a pure process and wholly entitative worldview as authors in this strand, though they study CoPs as informal groupings, recognize their processual dimension. Moreover, I situated stream 2 higher on the y-axis, indicating that while this research remains grounded in practice-oriented theories it also draws on more traditional management concepts.

With regard to the embeddedness of CoPs in the formal organizational hierarchy, these contrasting ontological and theoretical perspectives offer different starting points for explaining the interrelation between CoP and organizational context. On the one hand, an entitative understanding coupled with mainstream management approaches as a theoretical base provides mostly functionalist explanations of embeddedness that, in the last consequence, lead to instrumental approaches of CoP design and management as formalized entities. Although I study CoPs as emergent, self-organized entities that depict sites of organizational adaptability, a purely entitative ontology and functionalist theorization of CoPs seems to produce unsatisfactory explanations that obscure the original focus on

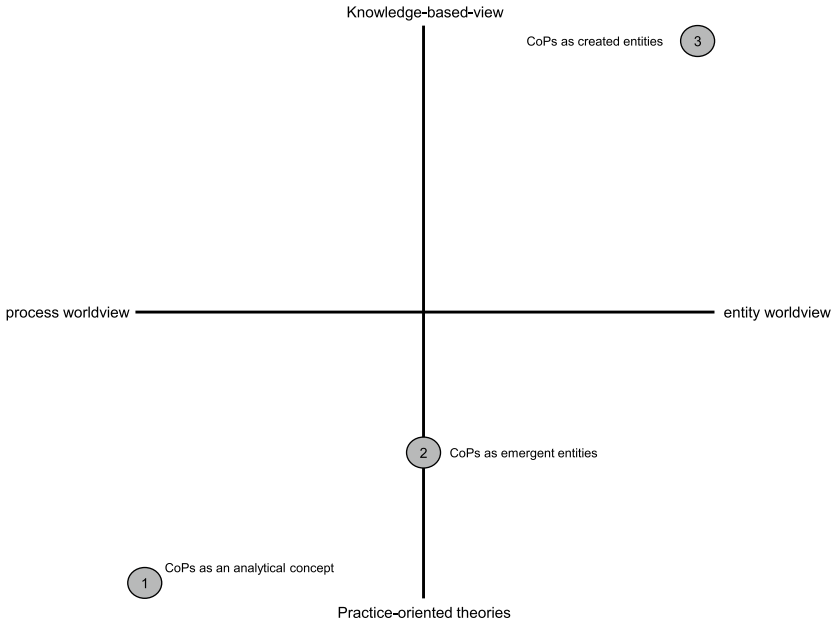


Figure 3.1 Different theoretical and ontological viewpoints on CoPs

practice and self-organized processes. Given this, I join with those authors, who suggest a reorientation of CoP research towards practice-oriented approaches that refocus our attention more on the dynamics of practice than on the properties of the reified community (Brown & Duguid, 2001; Gherardi, 2009a; Roberts, 2006). Hence, I will view the CoPs presented in the later finding section from a processual ontology and will begin my interpretation and theorization recurring to practice-oriented approaches.

Practice-based approaches to CoPs, as well as practice studies in general however, tend to what Seidl & Whittington (2014) refer to as "micro isolationism", describing the tendency of overemphasizing the local empirical instance without considering larger phenomena around the local. Thus, without a few notable exceptions, there are very few practice-oriented studies that "zoom-out" (Nicolini, 2009) and empirically explore how CoPs relate to features of the broader organizational and social context (Hotho et al., 2014; Mutch, 2003; Thompson, 2005). However, when scholars do so, their descriptions are sometimes in danger of a macro determinism in that local practices must inevitably reflect and are determined by broader institutional structures (Contu & Willmott, 2003; Contu & Willmott, 2006).

Besides, there are not many studies that speak about leadership dynamics in conjunction with communities of practice within practice-oriented research. A notable exception depicts the work offered by Raelin (2005; 2011a), who explores leadership from a practice perspective and suggests leadership as "leaderful practice"—a collective, distributed, and democratic account on organizational leadership—that considers the whole firm as a community, where leadership can emerge anywhere in practice. Although this perspective provides several insights into how we have to understand leadership in adaptive organizations, it does not centrally address the problems of embeddedness.

The research aim of this study, however, is to explore the dynamics between the local context of an emergent, self-organized CoP with its broader context of the formal organizational hierarchy. More specifically, I am interested in studying how self-organized practices emerge, how they culturally interrelate to broader socio-cultural structures around them, and how leadership interacts with these practices. Given these research aims, solely grounding my explanations in a practice-oriented perspective does not seem sufficient. Instead, the process of analyzing my data led me towards employing a complexity theory perspective on parts of this study's findings. In particular, the emergence of new resources through the CoPs and the dynamic interactions between community members and formal leaders that we were able to observe, suggested taking a complexity leadership theory lens (Marion & Uhl-Bien, 2001; Marion & Uhl-Bien, 2003;

Uhl-Bien et al., 2007; Uhl-Bien & Marion, 2009). A complexity theory perspective recognizes the inherent tensions between top-down and bottom-up evolving forces within complex organizations (Uhl-Bien et al., 2007; Uhl-Bien & Arena, 2018; Uhl-Bien & Marion, 2009) and, therefore, seems especially promising for this study's research focus.

This turn towards complexity theory, however, does not render a practice-perspective obsolete. Instead, I view these two theoretical lenses as complementary as they help me to theorize different facets of the embeddedness. That is to say, I will draw on both schools of thought in theorizing the findings of this study. To be specific, I utilize a practice-oriented perspective on resources to explain how CoPs generate new specialized resources and how its members resource and shape their own informal cultures against the backdrop of the broader socio-cultural structure of the armed forces. Besides that, I will employ complexity theory reasoning to interpret and explicate the leadership dynamics between community members and formal leaders. To that end, I will introduce complexity theory with its focus on complex adaptive systems (CAS) in the following subsection and discuss how it complements a practice-oriented perspective on CoPs within the formal organizational hierarchy.

3.2 Complexity Theory: A Complementary Perspective on CoPs

In the previous chapter, I introduced the main theoretical underpinnings of community of practice research. In the current section, I will outline complexity theory—in particular, theory about complex adaptive systems and leadership—as a complementary theoretical perspective on emergent and self-organized CoPs within formal organizational hierarchies. To this end, I begin by briefly outlining the origins of complexity theory to better understand its idiosyncratic view on organizational phenomena and its contribution to management research. After that I introduce the main tenets of the research on complex adaptive systems and complexity leadership theory that seem to be critical to the study of embeddedness.

3.2.1 The Intellectual Origins of Complexity Theory

Complexity theory, in contrast to practice-oriented approaches that stem from social theory, is rooted in system notions such as cybernetics (Ashby, 1961)

and general systems theory (Bertalanffy, 1968). General system theory tries to elucidate the general principles underlying all systems, whereas, cybernetics emphasizes regulation and control of system components using feedback loops (Anderson, 1999). Viewed from these perspectives, organizations are mostly perceived as open systems constituted by positive and negative feedback loops among the system's components (Katz & Kahn, 1978). They are open because they exchange resources with their environment and they are systems because they consist of interconnected elements that work together (Anderson, 1999).

Moreover, systems in these perspectives seek a state of equilibrium in which they preserve their overall character, meaning that they move back into a stable state after periods of disturbance or internal fluctuations (Ashby, 1961; Dooley & van de Ven, 1999). In consequence, early systems research does not consider the emergence of entirely novel structures within a system (Goldstein, 2008). Besides, complexity in these system notions mostly describes the huge number of system parts that interact with one another (Simon, 1962). In other words, complexity is a function of the system's parts and the interconnectedness between them. As Phelan (1999) notes, the emphasis in early system theory is on problem-solving, in the sense that systems are studied from a reductionist perspective, meaning that researchers analyze a system's components and how they work together in order to improve some function of the system.

One precursor of complexity science, as we know it, in contemporary organization studies, is the idea of dissipative structures introduced by Ilya Prigogine and his colleagues (Nicolis & Prigogine, 1989; Prigogine, 1997; Prigogine & Stengers, 1984) that are at the heart of complexity theory (McKelvey, 1997; McKelvey, 1999).

Prigogine mainly studied thermodynamics in chemical systems and asked the question of how new order emerges in the world, knowing that all biological or even social systems consisting of molecules, cells, organisms, and humans must fall under the laws of thermodynamics. Within closed, isolated systems the second law of thermodynamics states that systems move to a fixed point, a stable thermodynamic equilibrium characterized by maximum entropy, with entropy describing a measure for the amount of irreversibility or, in the broadest sense, disorder. That is, in equilibrium states, production of entropy has come to an end. To put it differently: *"all ordered states eventually dissipate (via entropy) into disordered states"* (McKelvey, 1997, p. 369).

Consider, for example, a glass of water with ice cubes in it as a closed system. According to the second law of thermodynamics, the warmer matter (the water) produces a flow of energy to the ice cubes until the two are equilibrated, that is the ice melts until there is only homogenous water in the glass. The system is

in a stable equilibrium. This process is in itself irreversible, meaning the energy dissipates, it is consumed, and the process cannot be reversed without the injection of energy from the outside. That is to say, the energy flows in the system operate to maximize the systems' entropy (irreversibility) or disorder. In thermodynamic equilibrium, therefore, no additional entropy can be generated within the system as it has reached its maximum (Böcher, 1996; Prigogine & Allen, 1982). In other words, an isolated system cannot increase its order without external intervention.

This, however, would not explain how new order marked by increasing diversification and complexity evolves within the world (Prigogine & Allen, 1982). Therefore, Prigogine started to study systems that are far from the above-explained equilibrium, because the earth itself is not in thermodynamic equilibrium: *"in our world, we discover fluctuations, bifurcations, and instabilities at all levels"* (Prigogine, 1997, p. 55). That is, in contrast to closed systems that are rare in nature, Prigogine and colleagues study open systems that exchange matter or energy with their environment and, therefore, are in a constant state far from thermodynamic equilibrium. Thereby, Prigogine and his colleagues observed that within such systems novel structures spontaneously emerge through processes of self-organization which, counterintuitively to the second law, produce order instead of more disorder (Nicolis & Prigogine, 1989; Prigogine & Stengers, 1984). In physical terms, as energy is imported to an open system it pushes away from equilibrium, however, at a certain threshold the imported energy instead of being randomly dampened begins to dissipate through the system, thereby generating stable structures or sites of energy dissipation: *"consequently there are labeled dissipative structures because they are the sites where imported energy is dissipated"* (McKelvey, 1997, p. 369).

The critical insight of these observations is that new order evolves as small fluctuations within a system become amplified through positive feedback loops between the system's elements (Gemmill & Smith, 1985). Therefore, Nicolis & Prigogine (1989) coined the phrase *"order through fluctuation"* which means that the imported energy pushes the system thus far from equilibrium towards the threshold of stability that even small fluctuations are enough to overcome the persistence of the existing regime and generate a movement into a new, more complex order (Leifer, 1989). This movement into new order is amplified through the feedback loops among the system components (Gemmill & Smith, 1985). That is, despite the absence of a central controller the system's components can "communicate" because they are connected in a web of interconnections through which the energy flux is channeled (Prigogine & Stengers, 1984). Thus, systems self-generate structures of higher complexity rather than looking outside for an ordering mechanism. By establishing these dissipative structures, the system

moves into new configurations within which energy flows are heightened. Instead of moving into equilibrium the system can be more responsive to its environment as it adapts to best process the incoming energy flux (Smith & Gemmill, 1991). For an example see also Information Box 5.

Information Box 5: Dissipative Structures

A well-known example for dissipative structures is the Bénard convection cell. Consider a water-filled bowl that is heated from below. Since the water is continuously heated, water particles expand and start moving towards the surface where they cool down and start to sink to the bottom again. That is, in addition to the thermal flow random microscopic movements of water molecules evolve in the bowl. These two opposite movements (heated liquid upwards vs. cooled liquid downwards), however, cannot take place at the same time without some coordination between them. Therefore, at a certain threshold the movements take place within a well-ordered structure called convection cells. The liquid self-organizes into one stable pattern of movement consisting of myriad water molecules. This pattern takes the shape of hexagonal cells with an upward flow on one side of the cell and a downward flow of heat energy on the other (Böcher, 1996). In other words, the microscopic (or micro level) random movement spontaneously self-organizes into an ordered structure or pattern on the macroscopic level, that is, a dissipative structure (Prigogine, 1977).

These structures exist as long as energy is further imported into the system but tend to fade away when the influx of energy ceases (i.e., the heat source is turned off in the above example) (Kauffman, 1993).

Soon after the discovery of self-organized dissipative structures in chemical systems, scholars recognized that such phenomena of spontaneously evolving, self-organized patterns are everywhere to be found in the world (Prigogine & Lefever, 1973). Based on these fundamental insights about how new order emerges within systems, complexity science as the science of such complex, self-organized behaviors within systems gained ever more traction. In particular, with the formation of the Sante Fe Institute in the 1980s where an interdisciplinary team of biologists and computer scientists (Gell-Mann, 1994; Holland, 1995; Kauffman, 1993) started their work on complex adaptive systems (CAS) the movement started to grow (Schneider & Somers, 2006). These scholars built

on the dissipative structure model with the central premise that complex aggregate behavior of systems arises from the simple and localized interactions of the system's elements (Anderson, 1999; Cilliers, 1998; McKelvey, 1997; McKelvey, 1999). Complexity, therefore, is no longer merely the pure high number of interacting system parts as in prior system notions (Simon, 1962); rather, it describes the emergence of novel order through dynamic interactions between a system's components (Phelan, 1999) (see also Information Box 6 for an exemplified distinction between these notions).

Information Box 6: Complex vs. Complicated

To underline the key point of complexity theory of emergent order, scholars on academic conferences or in practitioner-oriented articles regularly recall the distinction between the terms complex and complicated. Thus, if a system that despite the fact that it comprises a huge number of components can be fully described by analyzing and explaining its individual constituents, it is said to be only complicated. Therefore, things like a jumbo jet although containing a myriad of different elements are complicated because when the parts interact they do not change each other and in the end one could disassemble the jet back into its single components. Admitting, this might take a while but the wheel remains a wheel and steel remains steel and so on. Complex systems, on the other hand, cannot be fully grasped by just analyzing its components because the interaction of the system parts and the dynamic between the system and its environment are not fixed, but alter and change through processes of self-organization that generate emergent system properties, behaviors, or orders. For example, someone described mayonnaise as complex as its ingredients eggs, oil, and lemon once they are mixed together fundamentally change into that sauce we put on our burgers. That is, one cannot decompose the mayonnaise back into its elements (Cilliers, 1998; Uhl-Bien & Arena, 2017).

3.2.2 Complex Adaptive Systems Dynamics and Complexity Leadership

Complexity science, similar to the practice-oriented theories introduced above, is not a coherent theoretical framework but, rather, an assemblage of approaches

which, to some degree, share the basic premise of emergent order (Goldstein, 2008). One particular vibrant research field is the examination of so-called complex adaptive systems (CAS; Gell-Mann, 1994; Holland, 1995; Kauffman, 1993; Stacey, 1995) that are said to be the basic unit of analysis in complexity science and that build the base for complexity leadership (Uhl-Bien et al., 2007).

In general, CAS describe networks of agents—e.g., individuals or groups within social systems—who interdependently interact and learn from each other, share interests and hold similar worldviews due to the history of previous interactions (Cilliers, 1998; Holland, 1995; Marion, 1999). Uhl-Bien et al. summarize: *"CAS are neural-like networks of interacting, interdependent agents who are bonded in a cooperative dynamic by common goal, outlook need, etc."* (2007, p. 299). In CAS, agents are connected to each other through feedback loops. Each agent observes and acts upon local information, received from other connected agents (Anderson, 1999). As each agent adapts to its particular local context, they—all agents of a CAS—in aggregate adjust their behavior and act in parallel without central coordination and communication (Maguire & McKelvey, 1999; Marion & Uhl-Bien, 2001; Plowman et al., 2007b). It is through this repeated, self-organized interaction that new system-level order arises and the system as a whole adapts to an altered environment (Chiles et al., 2004; Holland, 1995; Kauffman, 1993).

Such complex systems are ubiquitous. The human brain, for example, can be viewed as a CAS with neurons as its agents. Individuals who are coming together as groups or communities constitute a complex system. Moreover, organizations are complex systems in which individuals and groups are the agents. Lastly, industries make up a CAS with the multiple organizations functioning as agents of that specific system (Stacey, 1996). Consequently, CAS are everywhere and, often, they are nested as subsystems of other CAS (Gell-Mann, 1994).

Because there is no universal formula on how to describe CAS (Gell-Mann, 1994), numerous authors elaborate on the defining characteristics of complex adaptive systems and their dynamics (Anderson, 1999; Cilliers, 1998; Gell-Mann, 1994; Plowman & Duchon, 2008; Schwandt, 2008). To keep the following remarks manageable, I will concentrate on those characteristics of CAS that seem especially relevant to the current study's research aim of studying the embeddedness of CoPs within the formal organizational hierarchy. These are (1) agents with schemas, (2) emergent self-organization, (3) non-linear interactions, and (4) the edge of chaos.

In first descriptions of CAS stemming mainly from biology, agents of a complex system were perceived to interact with each other based on simple rules stored within each agent's schema (Gell-Mann, 1994; Holland, 1995; Kauffman,

1993). These schemas are conceptualized as if-then rules, according to which, each agent responses to its local environment (Griffin, Shaw, & Stacey, 1998). Swarm intelligence phenomena occurring in the natural world of ant colonies or beehives are examples of interaction based on simple rules (Plowman et al., 2007b). Within human organizations, however, the schemas of human agents might be more complicated than the simple rule systems observed in beehives (Anderson, 1999). According to Bartunek, a schema can be defined as a cognitive framework that *"map(s) our experience of the world, identifying both its relevant aspects and how we are to understand them*" (Bartunek, 1984, p. 355). That is to say, schemas are clusters of thematically related knowledge, ideas, or specific examples of a domain that, together, constitute cognitive structures or interpretative frameworks by which past events and experiences are stored and upon which action is taken (Fiske & Taylor, 1991). These schemas can be both specific to an individual agent in the form of behavioral scripts or individualized mental models that inform how one sees the world; on the other hand, they are also, to a certain degree, shared, negotiated, or contested among multiple agents (Stacey, 1996). In particular, within organizations, multiple individuals come together with different schemas containing different meanings, interpretations, and worldviews which result in struggles over interpretation (Thietart & Forgues, 1995). Following from this, CAS models consisting of human agents must comprise the collective negotiation of meanings (Anderson, 1999) from which novel overlapping schemas are constructed (Gell-Mann, 1994; Schwandt, 2008).

According to Chiles et al. (2004), one of the anchor points of complexity theory is the dynamic of emergent self-organization within CAS derived from the dissipative structure model explained above. Emergent self-organization describes the emergence of new but unpredictable order as a result of the unscripted interactions of interdependent agents at lower levels of a CAS. In other words, patterns and regularities emerge without the imposition of an overall plan by a central controller (Anderson, 1999; Chiles et al., 2004; Maguire & McKelvey, 1999; Prigogine, 1997). Thus, in the case of organizations, a CAS consisting of people or groups is not predetermined or controlled by managerial fiat; instead, it generates a novel macro-level order by itself through micro-level processes that involve interconnected individuals who exchange information, learn from each other, and continuously adapt their schemas to the feedback about each other's actions without central coordination (Chiles et al., 2004; Lichtenstein & Plowman, 2009; Plowman et al., 2007a). Notably, in a CAS, not every agent is connected to all other agents within the system. Thus, agents respond only to other agents with whom they share a connection, that is, they only learn locally (Anderson, 1999).

Moreover, complex adaptive systems are characterized as nonlinear, meaning that a linear causal logic of cause and effect does not apply to a CAS (Lichtenstein, 2000; Stacey, 1996). More specifically, the elements of a CAS (i.e., the agents) are not independent of one another but, rather, stand in mutually interdependent relations (Lichtenstein & Plowman, 2009; Plowman & Duchon, 2008). That is, the system's components function in reciprocal interactions and, thereby, mutually influence each other in unexpected and irreversible ways (Plowman et al., 2007b; Stacey, 1995; Uhl-Bien & Arena, 2017). Due to this great interrelatedness of system parts, small changes, mutations, or fluctuations in one component may cascade quickly through the whole system resulting in large, disproportionate, and unpredictable change on the collective, macro level (Holland, 1995; Kauffman, 1993). Complexity theorists describe this characteristic of nonlinear change with the metaphor of the butterfly effect: a butterfly flapping its wings over the Pacific can cause a hurricane in Texas.

Applying these ideas to organizations, complexity scholars view organizations as systems comprising of nonlinear interactions between individuals with diverse schemas who try to coordinate their activities and thereby mutually influence each other (Stacey, 1995; Stacey, 1996). Within such nonlinear feedback systems, small changes can lead to dramatic effects (Anderson, 1999; Thietart & Forgues, 1995). For example, within informal network structures, new ideas tend to escalate quickly in unexpected ways as they move through the system and become amplified (Lichtenstein & Plowman, 2009).

The fourth characteristic of complex adaptive systems is the far from equilibrium condition adapted from Nicolis & Prigogine (1989). According to complexity theorists organizations are seldom in states of perfect equilibrium and stability (Tsoukas & Chia, 2002). Instead, multiple internal, as well as external adaptive challenges, pressures, and disturbances, continually impact them. These adaptive tensions push the organization away from equilibrium into the "region of complexity" or the "edge of chaos" (i.e., the far from equilibrium states in thermodynamics) (Kauffman, 1993; Maguire & McKelvey, 1999). That is, they push the organization out of its planned and programmed course. In these states of instability, pressure, and tension, organizations are capable of highly complex behavior, meaning that order and disorder are simultaneous occurrences (Kauffman, 1995), with each force pulling the organization in different directions (Stacey, 1995; Thietart & Forgues, 1995). Many scholars argue that it is this region between stability and chaos—the edge of chaos—that gives rise to emergent self-organization in CAS as individuals start to interact without a predetermined plan and strive to adapt to such pressures as they are given freedom to experiment (Stacey, 1995;

Uhl-Bien et al., 2007). Such innovations lead to disorder and instability which is capable of moving throughout the organization (Plowman et al., 2007a).

Overall, complex adaptive systems are networks that comprise of individuals with different schemas, who in nonlinear interactions learn from and adapt to each other, giving rise to perpetual novelty and change on the global system level under the right conditions (Stacey, 1996; Uhl-Bien et al., 2007; Uhl-Bien & Marion, 2009).

Based on these properties and dynamics of CAS, several scholars explore how we have to understand organizational leadership that operates within such systems and tries to enable and guide the CAS dynamic of emergent self-organization for organizational adaptability (Lichtenstein et al., 2006; Lichtenstein & Plowman, 2009; Marion & Uhl-Bien, 2001; Uhl-Bien et al., 2007; Uhl-Bien & Marion, 2009). To put it in simpler words, this perspective on leadership explores *"how leaders affect and are affected by the informal networks in which they take part, and how they use networks to advance innovation"* (Uhl-Bien & Arena, 2018, p. 96). Complexity leadership theory (CLT) at its core distinguishes between three leadership forms that are at work in complex organizations: adaptive (or entrepreneurial), administrative (or operational), and enabling leadership (Uhl-Bien et al., 2007; Uhl-Bien & Arena, 2018). Adaptive leadership in this "meta framework" is an emergent, interactive process that produces adaptive responses, innovations, change, and adaptability in social systems (Hazy, 2008; Lichtenstein & Plowman, 2009; Plowman et al., 2007b; Uhl-Bien et al., 2007). It basically describes a process in which adaptive leaders interact with and engage the CAS dynamics of emergent self-organization. For Uhl-Bien & Marion (2009) this is leadership as it involves intentional, local acts of influence to generate change in a social system. However, adaptive leadership is not attributed to a single individual or formal position that influences the behavior of subordinates but, rather, involves the change that spontaneously emerges in the space between different agents (Bradbury & Lichtenstein, 2000; Lichtenstein et al., 2006). According to Uhl-Bien & Marion (2009) adaptive leadership can be understood as informal leadership that occurs as informally networked human agents generate and advance adaptive responses to environmental pressures and adaptive challenges. It is thus adaptive leadership that drives the organization away from equilibrium and stability towards the "region of complexity". In other words, it represents the adaptive function in organizations that generates bottom-up emergence (Lichtenstein, 2014; Lichtenstein & Plowman, 2009; Uhl-Bien & Marion, 2009).

In contrast, administrative leadership refers to the leadership processes and actions occurring at the operational core of the organization usually top-down

executed by individuals in formal managerial roles who have the power to make decisions and to allocate resources to achieve organizationally prescribed outcomes (Uhl-Bien et al., 2007). Administrative leadership is typically based on authority and position and focusses primarily on alignment and control of subordinates or follower behaviors and actions. It resides within the bureaucratic and hierarchical functions of the organization that ensure the stable, effective, and efficient execution of pre-organized tasks and, thus, are oriented towards stability and exploitation (Uhl-Bien et al., 2007; Uhl-Bien & Arena, 2017; Uhl-Bien & Arena, 2018).

The central premise of CLT is that adaptability occurs when the two forms of adaptive and administrative leadership are "entangled" with each other and work in tandem (Uhl-Bien et al., 2007; Uhl-Bien & Marion, 2009). Entanglement in essence means that adaptive leadership engages the CAS dynamics and generates adaptive responses that administrative leadership subsequently exploit and transform into organizational outcomes: *"Entanglement describes a dynamic relationship between formal top-down, administrative forces (i.e., bureaucracy) and the informal, complexly adaptive emergent forces (i.e. CAS) (…)"* (Uhl-Bien et al., 2007, p. 305). To entangle these two opposing forms of leadership, CLT introduces a third leadership function; namely, enabling leadership that works between the two and manages the entanglement. Enabling leadership thus operates at the interface between the informal (i.e., the adaptive) and formal system (i.e., the administrative) of the organization (Uhl-Bien & Arena, 2017). Uhl-Bien et al. (2007) outline two essential roles of enabling leadership: first, it helps to create the conditions for emergence to enable adaptive leadership and CAS dynamics to unfold where adaptation is needed and, second, it facilitates the flow of adaptive responses from the informal system back into the formal managerial systems.

Overall, complex adaptive system theory with its emphasis on emergent self-organization and leadership for enabling these CAS dynamics seems particularly appropriate to understand the adaptation outgoing from self-organized CoPs and theorize the leadership aspects of the embeddedness of communities of practice and formal organizational hierarchy. In light of this, I will draw and build on these insights from complexity theory in theorizing the current study's findings within the later stages of this dissertation.

3.2.3 Extending Practice-Oriented Approaches with Complexity Theory

As it becomes evident through the above descriptions of practice-oriented approaches and theory on complex adaptive systems, respectively, complexity leadership theory, these concepts stem from quite different intellectual backgrounds. While practice theories are rooted in social theory, complexity derives more from a systems tradition. Despite these different origins, I believe that both theoretical perspectives can be of value in theorizing different facets of the embeddedness of CoPs under study here. Given this, I will provide the reader, in the following, with the rationale of why I believe it is appropriate to utilize both theories in tandem and where these perspectives exactly complement each other in explicating a CoP's embeddedness.

Although practice and complexity theories each developed their distinctive terminology and language, employing these theories together is possible as they subscribe to similar assumptions and share some central premises. For instance, both theoretical perspectives emphasize the process of emergence. Complexity theory, as outlined above, argues that new order on the macro-level of a system, that is its overall structure or properties, emerges from the self-organized interaction of the micro-level elements of the system (Lichtenstein, 2000; Prigogine & Stengers, 1984). Applied to social systems, the notion of emergence or emergent self-organization describes that innovation, new social order or social structure arises from the interaction of human agents who pursue change locally based on other agents' feedback (Chiles et al., 2004; Stacey, 1995; Tsoukas & Chia, 2002). With a slightly different focus, practice theorists argue that broader macro phenomena such as social order (e.g., structures, institutions, routines, etc.) emerge in and from situated practice (Gherardi, 2009b). This logic is grounded in practice-oriented approaches that view practices as constitutive for the social world (Schatzki, 2001). From the vantage point of structuration theory (Giddens, 1984), for example, social structure is always "in the making", meaning that social regularities are ongoing accomplishments in that they are continuously (re)produced and possibly changed through everyday activities (Reckwitz, 2002). Building on these insights, practice scholars in the field of management and organization studies have shown how micro-level activities bring macro phenomena such as an organizations' strategy (Kaplan, 2011; Rouleau, 2005), knowledge (Tsoukas, 1996), or distributed capabilities (Orlikowski, 2002) into being. Thus, in practice-oriented approaches broader, macro phenomena emerge from or are performed through local, micro-level activity. Several practice authors describe this process, also, as "becoming" in which practices reproduce the organization and its

macro features on a recurrent basis so that the organization exists in a continuous ever-unfolding state of becoming (Feldman, 2000; Jarzabkowski, 2004; Tsoukas, 1996; Tsoukas & Chia, 2002).

Related to the above is another similarity between practice and complexity perspectives in that they both fundamentally involve multiple levels in their theorizing. Complexity theory, on the one hand, recognizes the multiple level nature of complex systems with macro-levels regarding overall system processes or properties (e.g., contextual or organizational processes) and micro-level concerned with the system components and agents (e.g., individual human processes). In complexity theory, models are therefore inevitably *meso*, meaning that they comprise multiple levels with interdependencies between them (Lichtenstein & Plowman, 2009). More specifically, complexity theory describes the interrelationship between these levels as a dynamic of emergence and entrainment. Emergence, as mentioned above, describes how micro-level interactions—also referred to as fine-grained interactions—create the regularities of daily life in the sense of macro-level order (or coarse-grained properties), this macro-level order (e.g., traditions, norms, values, routines), in turn, influences and guides micro-level activities: a process called entrainment in complexity reasoning (Hazy & Uhl-Bien, 2015). This "circular causality" bears a resemblance to the "duality of structure" within practice-oriented approaches, introduced above (Hazy & Uhl-Bien, 2012; Hazy & Uhl-Bien, 2015). Indeed, one of the central concerns of practice theorists is to overcome the dichotomies between analytical levels and conceptual oppositions such as agency and structure, body and mind, or action and cognition, by bringing them closer together in practice (Feldman & Orlikowski, 2011). Although practice research is, therefore, inherently interested in studying the micro-level activities of practitioners, it is by design rather a macroscopic lens that concentrates on the wider context around that activity (Vaara & Whittington, 2012). Keep in mind that Gidden's structuration theory and the Bourdieu's concept of habitus, as introduced above, are macro theories as they are concerned with wider societal fields or social systems. Given this, taking a theoretical approach to the study of practice also involves linking micro-level activities to macro-level phenomena (Kouamé & Langley, 2018; Seidl & Whittington, 2014).

Another similarity between practice-oriented approaches and complexity theory is that they both emphasize human agency. As mentioned before, one of the central tenets of practice theories is the efficacy of human conduct in producing and performing the structural features of the social world (Feldman & Orlikowski, 2011). This strong argument for agency in practice theories also introduces the ever-present potential for change and deviation: peoples' activities

are performed against the backdrop of rules, traditions, and norms (i.e., structures), yet people can always modify these rules, traditions, and norms locally and, in doing so, change the structure in their recurrent practices (Giddens, 1984; Orlikowski, 2000). In other words, people can always choose to do otherwise as human agency is not fully structurally determined. Likewise, complexity scholars in management and organization science note that human agents are simultaneously products but also producers of social systems. Stacey, for instance, argues that although organizations are nonlinear feedback systems consisting of decision laws and scripted relationships, agents in these systems are "free to vary, ignore, or alter the institutional arrangements" (1995, p. 482) each time they go through its feedback loops. Similarly, Uhl-Bien & Marion (2009) recognize the adaptive function in organizations as based on agentic behavior, in the sense that adaptive leaders make free choices as they intentionally seek to produce desired futures or outcomes. These agentic acts fuel the CAS dynamic of emergence and occur when people recognize adaptive challenges or issues that require new learning or innovation and engage in interactive behavior to respond to these challenges (Heifetz & Laurie, 2001; Uhl-Bien & Marion, 2009).

A fourth and final shared assumption of complexity and practice theories is that they are fundamentally processual, in the sense that they each depict theoretical lenses that emphasize the unfolding, progressing, or moving nature of the phenomena—systems or practices—under study. On the one hand, complexity theory, with its emphasis on emergence and self-organization is said to be a theory more about: *"becoming rather than being"* (Gleick, 1987, p. 5). That is, it takes a strong process perspective as it focusses our attention away from fixed system states towards the generative processes of emergence underlying those systems (Chiles et al., 2004). On the other hand, practice-oriented approaches are, as mentioned before, one of the primary ways to study organizations processually because they acknowledge social and organizational phenomena as always dynamic, unfolding, and locally situated (Nicolini, 2012; Nicolini & Monteiro, 2016). Practice scholars, indeed, do not study reified entities but instead attend to "the dynamic and relational practices that constitute such entities" (Feldman & Orlikowski, 2011, p. 1249) in their theorizing. That is, practice-oriented theories focus more on the arrows in the box-and-arrows models prevalent in organization and management theory and, in doing so, emphasize the relationships and performances that produce outcomes (Feldman & Orlikowski, 2011).

Taken together, we see that although complexity theory and practice-oriented approaches depict fairly different schools of thought with vastly unlike intellectual origins in system traditions, respectively, social theory, they nevertheless

share many basic premises. In light of this, I conclude that it is appropriate to extend a practice-based perspective on CoPs with insights from complexity theory, especially complexity leadership theory.

Moreover, practice-oriented approaches and complexity theory are not only similar in their main assumptions about the world but, I would also argue, complement each other's perspectives. While complexity, and in particular CLT, emphasizes the role of leadership in explaining how the adaptive and administrative function in organizations entangles (Uhl-Bien et al., 2007; Uhl-Bien & Marion, 2009), practice-oriented approaches are more suitable for explaining how local practice embeds in, reproduces, and potentially changes larger phenomena such as socio-cultural structures (Kouamé & Langley, 2018; Seidl & Whittington, 2014). Given this, I will use explanations from both theoretical viewpoints in conceiving how the self-organized practices of communities embed in the cultural setting of the broader organizational context and how they interrelate with the organization's leadership. Doing so enables me to theorize the embeddedness of CoPs in formal organizational hierarchy.

3.3 Summary of Section

In this section, I discussed the theoretical background of the current dissertation. Unlike as in traditional, positivist approaches that usually begin with theoretically derived arguments and then proceed to theory testing, I follow a more interpretative research approach that aims at building theory from empirical data. Thus, connections to existing theoretical frameworks usually appear in the later stages in grounded theory development. Accordingly, the turn towards complexity theory, as well as practice-oriented approaches in theorizing the study's findings, occurred through the data analysis. However, to give the reader an early understanding of these theoretical lenses and to discuss how they relate to existing CoP research, I presented them at this point in the argumentation. To do so, I outlined the different theoretical and ontological underpinnings of the CoP concept within the literature streams identified in the review section. This discussion revealed that the work on CoPs initially followed a process ontology and was based on the "practice turn" to social theory. With its popularization, however, research on CoPs departed from this theoretical foundation and developed more and more a grounding in traditional management concepts such as the knowledge-based view. Such a theoretical base regularly leads to simplified and overly functionalist descriptions of embedding CoPs as designed entities into formal structures. In contrast, the findings of the current study have led me to expand a practice-perspective with

complexity theory insights to uncover the processes that underlie CoP emergence and embeddedness. Given this, I introduced complexity theory and, in particular, complexity leadership theory and discussed how these frameworks are complementary to a practice-based approach on the embeddedness of CoPs in the formal organizational hierarchy.

Research Setting and Methods

4

Not everything that can be counted counts, and not everything that counts can be counted.

Cameron 1963

The overall purpose of this study is to explore the embeddedness of communities of practice within contexts of formal organizational hierarchy. More specifically, this study will inquire on how CoPs emerge, how they culturally interrelate with broader structures, and how formal leadership navigates this tension between emergent, self-organized CoPs and formal hierarchy. That is, the aim of this research involves theorizing about the cross-level dynamics and processes between the local context of a CoP and the broader trans-local context in which it evolves. To this end, I will employ inductive qualitative research methods to build data-grounded process theory on a CoP's embeddedness.

In the following section, I will introduce the research setting of the German Federal Armed Forces (FAF). After that, I will outline this study's research approach and the rationale behind it. This will comprise a detailed description of how I carried out the data collection and data analysis for this specific research mainly following the recommendations for inductive qualitative research and data analysis from the increasingly popular "Gioia Methodology" (Gioia et al., 2013).

B. Schulte, *The Organizational Embeddedness of Communities of Practice*, Forschungs-/Entwicklungs-/Innovations-Management,
https://doi.org/10.1007/978-3-658-31954-0_4

4.1 Research Setting

The presented findings in this study are essentially part of a larger research project conducted over a period of over nearly four years from 2013 to 2017 within the German Federal Armed Forces.[1] This project basically aimed at investigating communities of practice within the FAF as a component of the organization's knowledge management efforts with the working assumption that there may be many informal, self-organized groups within the FAF on the frontlines that contribute to the organization's adaptability and innovativeness from the bottom-up without the strategic levels being aware of it. Exploring how these self-organized CoPs emerge and embed in the managerially shaped context of formal organizational hierarchy is critical if we are to understand them as a potential for adaptability. In light of this, the FAF, with its pervasive features of hierarchy and bureaucracy, offers us an extreme case perspective to explore these dynamics between self-organized CoPs and organizational context (Eisenhardt, 1989; Pettigrew, 1990).

The FAF, such as any military organization, is characterized by its pervasive nature, in the sense that military organizations, in general, strive to affect nearly every aspect of the life of their members. Scholars, therefore, consider them as "total institutions" (Goffman, 1957) referring to the clear and impermeable organizational boundaries, the organization under one central authority, and the administration via comprehensive plans and fixed rules. More specifically, the two remarkable properties of bureaucracy and hierarchy together constitute the formal organizational hierarchy of the FAF (Kark, Karazi-Presler, & Tubi, 2016).

Bureaucratic structure, on the one hand, can be defined as *"a formal, rationally organized social structure … in which, ideally, every series of actions is functionally related to the purposes of the organization"* (Feld, 1959, p. 17). Likewise, military organizations emphasize the alignment of individual and collective activities under the central organizational purpose of the armed forces (Keller, 2012). This alignment is ensured via rational rules and role expectations that are fixated and formalized within a plethora of official handbooks, manuals, orders, and instructions. In consequence, nearly all procedures, responsibilities, and behaviors are formally prescribed and, therefore, become controllable as they are simultaneously enforceable via sanctioning mechanisms (Gareis, Haltiner, & Klein, 2006). Bureaucratic structures within military organizations thus

[1]The research team that conducted the project within the armed forces consisted of three PhD students (including myself) as well as our doctoral adviser. Therefore, I will employ the plural in the manuscript whenever I refer to activities and decisions that involved all of us.

predominantly focus on rule and role conformity without the consideration of the individuals involved (Hagen & Tomforde, 2012). The rationale behind this strong formalization and rule conformity is to reduce uncertainty within organizational procedures. In particular, within the military where uncertainty, ambiguity, and stress of combat situations are naturally high, formalization and standardization of member behavior should compensate for these destabilizing tendencies (Apelt, 2012; Gareis et al., 2006). Overall, military organizations are said to come near to the ideal type of bureaucratic organizations postulated by Max Weber (1947) in which the bureaucracy excecutes legal authority. That is, we can clearly see the essential characteristics of bureaucracy in the FAF. These are, according to Weber: task specialization, hierarchy of authority, formal selection, rules and requirements, impersonality, and a strong career orientation.

Moreover, the FAF consists of a steep hierarchy that pervades throughout all organizational areas. Within organization studies the word hierarchy is almost used synonymously with organization: *"organization means hierarchy, and hierarchy means organization"* (Diefenbach & Sillince, 2011, p. 1518). According to Weber (1947), hierarchy, more specifically, describes the formal vertical integration of official positions, departments, and units often displayed in organizational charts. Simon, similarly, describes hierarchy within formal organizations: *"in a hierarchic formal organization, each system consists of a "boss" and a set of subordinate subsystems. Each of the subsystems has a "boss" who is the immediate subordinate of the boss of the system"* (1962, p. 468).

This form of hierarchical organizational design in conjunction with the principle of order and obedience is a hallmark of the FAF. For example, the Army comprises multiple hierarchical levels of divisions, brigades, battalions, companies, platoons, and groups, which always receive their orders exclusively from the direct superior level making up the chain of command. Unity of command, meaning that soldiers or units only receive orders from one superior, is a common military design principle also referred to as straight line organization (Fayol, 1916). Along these linear lines, situational information flows upwards, and orders are given downwards, ensuring quick decision making without slow consensus-building processes in combat situations. Moreover, the hierarchy is reflected within the visible rank structure and the boundaries between different status groups of officers, non-commissioned officers, and enlisted men typical for the military (Apelt, 2012; Gareis et al., 2006; Hagen & Tomforde, 2012).

Overall, the dominant logic of bureaucratic rules and ubiquitous hierarchies of positions, ranks, and organizational units characterize the formal organization of the FAF. These constitutive elements of formal organizational hierarchy, also in large part, shape and permeate the culture of uniformity, coherence, discipline,

comradery, and loyalty within the FAF (Hagen & Tomforde, 2012; Seiffert, 2012; Tomforde, 2010).

Long and slowly reacting chains of command and formally ingrained organizational behavior, however, traditionally cause structural as well as cultural inertia within military organizations (Soeters, Winslow, & Weibull, 2006) and often impede independent, self-reliant, innovative work behavior (Haltiner, 2006). In other words, the formal organizational hierarchy is designed to keep the variety of behavior at a minimum in order to increase predictability. Moreover, a military culture that is predominantly shaped by conservatism regularly hinders effective innovation and adaptation (Gareis et al., 2006).[2]

This propensity to stability, predictability, and inertia, however, becomes increasingly problematic. In recent years, the shift in military warfare scenarios towards asymmetrical and hybrid warfare scenarios, shortened technological development cycles, and also socio-cultural changes at large have caused various adaptive challenges for the armed forces (Morath, Leonard, & Zaccaro, 2011). In particular, the armed forces are compelled to become more flexible and responsive to an increasingly uncertain and dynamic environment, which requires fast decision-making, adaptation, innovation, and continuous learning in missions abroad as well as in regular duty at home. For example, new forms of military conflict within highly complex and dynamic missions require self-sufficiency, flexibility, and quick situational awareness from military leaders also at lower hierarchical levels to adequately react within extreme situations (Seiffert, 2012). Such new military tasks not only necessitate new, more flexible organizational structures but also require novel and adapted soldierly identities that are no longer solely rooted within archaic warrior images but must include the self-images of professional armed diplomats and humanitarian aid workers to cope with the cultural complexities of modern-day military assignments (Hagen, 2006; Haltiner, 2006; Tomforde, 2010).

On the other hand, present-day threats such as cyber warfare require unique organizational capabilities resulting in constant top-down initiated reorganizations of branches and departments within the FAF that, indeed, quickly change the chains of command and responsibilities but only slow, if any, build up new capacities. Moreover, due to the political nature of armed forces as part of the state's executive branch, the FAF, especially the strategic levels, are often under adaptive

[2]Historical examples of this innovation impeding tendencies can be found in the introduction of tanks within WW I which, at first, caused defensiveness among many generals due to their traditionally founded pictures of warfare with cavalries and infantry.

pressures stemming from new secretaries or altering power constellations within the government.

Taken together, while discipline, bureaucratic order, and hierarchy are pervasive elements within the FAF, the armed forces are now, more than ever, compelled to become more responsive and adaptive to an ever more dynamic environment. This inherent tension between the perseverance of bureaucratic structures and formal hierarchy on the one hand and the constant need to flexibly adapt and reorganize on the other describes what military sociologists also call the Janus character of military organizations (Soeters et al., 2006).[3] Within this organizational context of competing necessities and fundamental tensions, the interrelation between informally emerging, self-organizing communities of practice pushing for change and adaptation with the formal organizational hierarchy of the military should become *"transparently observable"* (Pettigrew, 1990, p. 275). Hence, the FAF offers us an extreme case perspective from which to build theory (Eisenhardt, 1989).

Within this organizational setting of the FAF, we were able to investigate several communities of practice in all main branches (Army, Navy, and Airforce). In this study, however, I will focus my descriptions and explanations on three particular practices that exemplarily show the dynamic interaction between evolving CoPs and their formal organizational context, allowing me to provide a detailed narration of their self-organized emergence.

4.2 Research Approach and Procedures

In this subsection, I give a thorough description of the research method I employ to answer this study's research questions. Note, however, that this is not a full report on available research methods and their associated epistemologies; rather, I provide a rationale behind the specific methodological path I choose to follow. After that, I will give a detailed account of the specific procedures taken for collecting and analyzing the qualitative data.

[3]The Janus character of military organizations originally refers to the different functional requirements of armed forces within "cold" and "hot" conditions. Cold phases refer to the bureaucratic rational administration of armed forces during peace time at home. Whereas hot conditions describe combat situations and war that in general require the quick and flexible reacting to altered situations (Elbe and Richter, 2012);. Janus was a Roman god who was portrayed as two-faced symbolizing numerous dualities of creation and destruction, light and darkness, future and past.

4.2.1 Utilizing an Inductive, Interpretative Research Approach to Build Process Theory

As noted earlier, the general research aim of this study originates from the observation that we need to know more about the cross-level processes and dynamics inherent in the relation between the local context of an evolving community of practice and the broader organizational context. In particular, we need to develop a theory that explicates how and why communities of practice evolve and how, through cultural as well as leadership mechanisms, they eventually become embedded within the organizational context over time.

From this stated research purpose the current study's research design can be logically derived. First, the above research aim implies an inductive theory-building approach to answer the study's research questions. Induction means to build new or extend existing theory from the bottom-up. In contrast, deductive research methods usually start with theory; one begins with defining concepts and variables, moves over to proposing the relations between them and, finally, tests those hypothesized causal relations through empirical investigations preferably using quantitative methods (Locke, 2001). In inductive approaches, however, this logic is reversed as the research process starts with an empirical observation from which one can derive theoretical explanations. That is, the theory is generated from empirical investigations compared to hypothetic-deductive models in which theory is usually tested (Eisenhardt, 1989; Lee, Mitchell, & Sablynski, 1999; Locke, 2001). Consequently, scholars utilize inductive research approaches when no existing theory adequately explains the how, what, and why of a specific real-world phenomenon as well as in cases where extant theory is contradictory or reveals fundamental gaps (Pratt, 2009).

Undeniably, there exists much theory on communities of practice but, so far, the interrelation between such self-organized, emergent groups with their organizational surroundings is under-theorized and contradictory, as the review of prior research has shown. Thus, an ex-ante deduction of causal relations with later empirical verification seems not practicable. In this study I will, therefore, aim at elaborating a theoretical account that extends work on CoPs rather than superseding it. Note, that the term theory herein is mainly understood as mid-range theory: a theoretical model or framework falling in between the continuum from minor working assumptions to grand theories such as structuration, contingency, or transaction cost theories (Burgelman, 2011; Eisenhardt & Graebner, 2007).

Although, equalization of deductive research with quantitative and, on the other hand, inductive with qualitative methods is superficial and incorrect (Suddaby, 2006), theory generating approaches in general favor qualitative over

quantitative techniques (Lee et al., 1999). Moreover, as this study is exploratory in nature, meaning it tries to uncover the underlying mechanisms of community emergence and embeddedness within the specific social context of formal organizational hierarchy, qualitative methods seem most promising because they are best suited to explicate complex social processes (Eisenhardt & Graebner, 2007; Yin, 2009).

Second, the research purpose of this study also implies a specific kind of theoretical account; namely, a process theory that explicates the dynamics of CoP emergence and embeddedness. According to Mohr (1982), there are two types of theories: variance and process theory. Variance theory, on the one hand, provides explanations in the form of causal relationships between dependent and independent variables, whereas process theory offers explanations in the form of sequences of events, activities, or choices (Langley, 1999; Langley, 2009; Langley et al., 2013). In more general words, process research investigates *"temporally evolving phenomena"* (Langley, 2009, p. 409). The two types of theories are fundamentally distinct, while the former studies if and the degree to which change (i.e., variance) in one variable affects change within another, dependent variable; process theories uncover how things evolve, emerge, and change over a specific time span and why they evolve in this particular way (Langley, 1999; van de Ven & Huber, 1990; Wenzel & Koch, 2018).

Moreover, variance theories usually take the form of causal, variable-based frameworks that are being tested via quantitative methods such as structural equation modeling, ANOVA, regression, or factor analysis. Meanwhile, process theories mostly consist of rich stories or statements that narrate the sequence of events, the succession of activities of who did and said what and when (Langley, 2009; van de Ven & Poole, 2005; Wenzel & Koch, 2018). van de Ven & Poole (2005) mention further distinctions between variance and process theory; variance theories usually strive for decontextualized generalization of causal law-like relations, whereas process theories focus more on explaining how context-specific patterns or sequences emerge. That is not to say that generalization does not matter within process research but, rather, it is more understood in terms of versatility, in the sense that versatile process explanations can be easily adapted to fit other cases that may differ (Poole, van de Ven, Dooley, & Holmes, 2000). Methodologically, variance theory predominantly follows hypothesis testing and deductive approaches, while process research mostly derives process theory from empirical observation and, in doing so, leans more towards inductive theory building (van de Ven & Poole, 2005). Although process research utilizes a mixture of methodologies, a majority of process studies employ qualitative and ethnographic approaches to unravel the nuances of processes as they happen in reality (Langley, 1999; Langley et al., 2013; Locke, 2001).

Central to process research, thus, is that it aims at developing models and theories that capture the dynamic, patterned sequence of events and activities of organizational behavior in organizational subsystems. In particular, the discovery of generative mechanisms that underlay organizational change and adaptation is at the heart of process research (Dooley & van de Ven, 1999).

Developing process theory is deeply grounded in an ontology that privileges process over entities. That is, process studies see organizations as constituted through processes of organizing which are emergent and always in flux (van de Ven & Poole, 2005; Weick, 1974; Weick, 1979). Such a processual view corresponds well with practice-oriented approaches and complexity theory. A complexity theory perspective on organizing brings the processes of emergent self-organization to the fore and, in doing so, explicitly focuses on unplanned, emergent, and unfolding activities of individuals within organizational settings (Stacey, 1995; Uhl-Bien & Marion, 2009). Likewise, practice theories foreground the ever unfolding nature of organizational phenomena through recurrent practice (Nicolini & Monteiro, 2016).

Moreover, complexity researchers note that in order to explore the temporal, interactive, and causally complex mechanisms of emergence, one requires methodologies that uncover rich, dynamic, contextualized data that explains processes rather than static, decontextualized variables (Uhl-Bien & Marion, 2009). Further, Marion & Uhl-Bien (2001) point out that complexity theory as a metalens can be used to guide the researcher's exploration of social processes within organizations.

Taken together, an inductive, qualitative research methodology that aims at uncovering the processual dynamics of CoP emergence and embeddedness is in harmony with the epistemologies of a practice lens and complexity theory, employed in the current study.

Thus far, I have established that the specific research purpose of this study hints at an inductive approach from which to build process theory about the mechanisms inherent within the embeddedness of CoPs within the formal organizational hierarchy. As has been pointed out above, such a form of inquiry also favors qualitative research methods that allow for the generation and interpretation of rich, contextualized data sets obtained from real-world settings. Yet, there are a plethora of different qualitative methods such as ethnography, naturalistic inquiry, phenomenology, or case studies in addition to an abundance of diverse recipes and instructions for qualitative case-based research that stem from different paradigms (Burawoy, 1991; Eisenhardt, 1989; Gioia et al., 2013; Glaser & Strauss, 1967; Miles & Huberman, 1994; Yin, 2009).

For instance, Locke (2001) distinguishes between modernist and interpretative paradigms, each associated with different qualitative methodologies. The modernist or positivist worldview assumes an objective world that exists as a knowable observable reality which is driven by universal laws of cause and effect (Guba & Lincoln, 1994). This world is investigated mainly via conceptual frameworks consisting of *a priori derived* hypotheses that are tested against the observed reality (Locke, 2001). Qualitative methods following a modernist stance, for example, are techniques such as content analysis (Carley, 1990) in which qualitative data (e.g., text) gathered via fieldwork is analyzed by developing frequency counts of conceptual categories occurring in the data (i.e., word counting) which, in turn, enables quantitative testing of ex-ante propositions (similar to variance theory mentioned above) (Locke, 2001; Suddaby, 2006).

The interpretative paradigm (which is similar to a constructivist understanding), in contrast, assumes a subjective reality and, therefore, proponents of this worldview are mainly interested in: *"understanding the complex world of lived experience from the point of view of those who live it"* (Schwandt, 1994, p. 221). That is to say, reality is not an observable given but, rather, a mental construction among social actors that share history, experience, and communication within a specific local context (Guba & Lincoln, 1994; Locke, 2001). Interpretative research, therefore, is interested in how actors give meaning to events and objects surrounding them and how they change their behavior in light of these meanings. That is, meanings inform and guide action.

Moreover, such meanings arise from social interaction and communication among individuals (Locke, 2001). In order to uncover this socially constructed reality, interpretative research takes the *emic* point of view, stating that researchers have to participate in the social world in order to understand how actors make sense and construct their shared reality. Only then they can give their interpretation of the meaning system of the actors they have studied and reveal the social processes in the setting (Schwandt, 1994). Therefore, scholars employ ethnographic methods to take the point of view of a group of organization members or engage in participant observation resulting in detailed descriptions of social activities, processes, and interactions that foreground the informants' interpretations (Gioia et al., 2013; Locke, 2001). From this deep examination of the studied situation, interpretative frameworks or models should emerge that entail the researcher's interpretation of the social actors' meaning systems (Miles & Huberman, 1994). The interpretative paradigm is reflected mostly in grounded theory building approaches originally put forth by Glaser & Strauss (1967) and more recently refined by Gioia et al. (2013).

Against this backdrop, it follows that I have to situate the current study within the interpretative paradigm because, as pointed out above, the research purpose implies inductive theory building in contrast to a more modernist hypothesis testing approach. Thus, the research method of this study follows an interpretative, grounded theory building approach (Gioia et al., 2013; Glaser & Strauss, 1967) to generate process theory on the embeddedness of CoPs.

According, to Langley (1999) grounded theory is an appropriate method to generate process theory that incorporates the interpretations of micro-level actors living through the same activities and events. An interpretative research approach should thus correspond well with the overall aim of developing a model that explains the processes and dynamics between the local context of a community and its broader organizational ambiance. Moreover, as the literature review has already demonstrated, the community of practice notion is initially rooted in a constructivist worldview (Jarzabkowski, 2004) as it is primarily about the collective, social processes of sensemaking and negotiation of meaning among people who come together to fix their practice dilemmas (Brown & Duguid, 1991; Wenger, 1998). Likewise, a complexity lens emphasizes how networked agents construct their schemas (Anderson, 1999; Stacey, 1996). Thus, these notions recognize the socially constructed nature of reality and the ongoing processes of meaning-making. One of the particular mechanisms of interest in this study is how these local meanings relate to the broader organizational culture of formal hierarchy. Therefore, an interpretative approach that uncovers such perspectives and believes from the members' points of view seems especially helpful (Yanow, 2000).

Unsurprisingly, there is no single approach to grounded theory but a multitude of nuanced methodologies (Corbin & Strauss, 1990; Glaser & Strauss, 1967; Strauss & Corbin, 1994) accompanied with a discussion among scholars about what constitutes good grounded theory research (Locke, 1996; Pratt, 2009; Suddaby, 2006). Originally the methodology of grounded theory was developed by Glaser & Strauss (1967) as a critique of the extreme positivism that, at the time, was prevalent in most of the social sciences. In particular, they rejected the assumption that the purpose of social sciences is to test pre-existing explanations of social behavior. In contrast, they propose that empirical reality is the ongoing interpretation of meaning produced by the people involved in a research project (Suddaby, 2006). Hence, Glaser & Strauss (1967) suggest, with their grounded theory methodology, to inductively generate theory from data that has been systematically gathered and analyzed. That is, the theory should emerge from the substantive area under investigation and thus be grounded in the words and actions of those individuals under investigation. Following on from this is that grounded

theory has two related meanings: on the one hand it describes a methodological strategy for gathering and analyzing data and, on the other, it refers to the outcome of this process, meaning the theoretical account that has been produced (Charmaz, 2006).

According to Gioia et al. (2013), such an interpretative, grounded theory building approach rests on two main assumptions: first, informants are assumed to be knowledgeable agents, in the sense that they are capable of expressing their thoughts and know what they are trying to accomplish. Consequently, researchers must pay close attention to not impose prior constructs or theories on the individuals under study as an ex-ante explanation of their experience but, instead, report the informant's unfiltered interpretations. Secondly, researchers are also expected to be knowledgeable, meaning they can surface concepts and relationships within the data and can translate them into theoretically relevant terms. This means, grounded theory is not simply about a pure description of the events and activities one was able to observe but, rather, fundamentally involves abstracting the empirical data towards a theoretical level, so that the logic behind the observed is revealed and theorized and, in doing so, can speak to similar occurrences in other contexts (Locke, 2001; Suddaby, 2006).

Thus, the tenet of conducting grounded theory research is close contact with the phenomena under study to gain an understanding of the social context and uncover how people in this setting construct their meaning systems and take action upon them (Pettigrew, 1979; van Maanen, 1979). That is, grounded theory in some interpretations (Gioia et al., 2013; Strauss & Corbin, 1990) suggests taking a more emic approach in the sense of *"get in there and get our hands dirty"* (Gioia et al., 2013, p. 19). That is, the researcher gains knowledge about a particular local setting from the inside by taking the insiders' perspective which should enable him to reconstruct how people feel about and interpret their situation (van Maanen, 1979).

As three of the four members of the research team—myself included—are or were officers of the armed forces with 8 to 13 years of experience in the rank of captain, we certainly took an insider approach to our study of communities of practice within the armed forces. This insider perspective enabled us to interpret informants' statements about their values, norms, and shared beliefs, even when we had no particular experience of the actual practice area under investigation (e.g., blasting or TDL management). The main problem of such an ethnographic approach is to take over the informants' interpretative view completely; therefore, an outsider perspective is also required to abstract the informants' language into more theoretical terms (Gioia & Chittipeddi, 1991). Our doctoral adviser held this

role throughout the research project. Also, we deliberately tried to switch between the insider and objective outsider perspective when interpreting our data.

On the other hand, grounded theory rests on the rejection of *a priori* theorizing in order to give enough room for the discovery of new insights and concepts (Gioia et al., 2013; Locke, 2001). In particular, this point of not going in the field with preconceptions has been up for debate among qualitative researchers in general and also among the methods founders. For instance, purists of grounded theory demand to ignore the existing literature and theory and only focus on the area under study: *"there is a need not to review any literature in the substantive area under study"* (Glaser, 1992, p. 31). Only then should the opportunity for real discovery of newness be given. However, Corbin & Strauss (1990) more realistically concede to researchers the knowledge about prior theory and personal as well as professional experience in a chosen field which helps them to gain insights into the data.

In the current study, I lean more towards the latter view as the purpose was, from the very beginning of the research project, to investigate informal and self-organizing groups within a formal organizational context. Thus, we as a research team had some prior knowledge about communities of practice and our search for interesting areas to study was in some way guided by the interest to understand the interplay between formal organization and CoPs.

The actual procedure of constructing grounded theory entails two mainstays: constant comparison and theoretical sampling (Glaser & Strauss, 1967). Put into simple terms, this means that researchers should continuously compare the categories that arise from the data which leads to further categories. These categories, in turn, lead to further data collection to specify these emergent themes (Locke, 1996; Suddaby, 2006). Hence, data collection and data analysis should occur simultaneously so that the emerging theoretical insights determine the search for further empirical instances until additional occurrences no longer add to the understanding of the phenomena of interest (Burgelman, 2011). That is to say, data collection, coding, interpretation, and comparison with extant work is recursively intertwined and often overlaps (Locke, 1996).

As the last point indicates this also means that once the analytical core of the emergent theory has taken shape from the data, researchers should consult prior work to find linkages to existing notions, establish meaningful differences, and look for areas for possible contributions (Burgelman, 2011). Some refer to this as the shift from induction to abduction as the researcher now considers data and existing theory simultaneously (Gioia et al., 2013; Suddaby, 2006). Strauss & Corbin note in this context that grounded theory requires *"an interplay between induction and deduction (as in all science)"* (1990, p. 137). As I have repeatedly

pointed out earlier, I also made this analytical shift as I recurrently interpreted and made sense of the data which ultimately yielded in applying a mixture of practice-oriented approaches with complexity theory to my findings.

Because of this recursive and messy nature of grounded theory building, it is even more important to give readers of qualitative research a thorough impression of how one came to one's conclusions (Gioia et al., 2013; Pratt, 2009; Suddaby, 2006). In the following sections, I will, therefore, provide a detailed report on how we collected the data for this study and how I analyzed it and, in doing so, systematically outline how the emergent process theory of this study is grounded in the empirical data.

4.2.2 Data Collection

In the previous section, I provided the rationale behind the interpretative theory building approach of this study. In the next two sections, I will outline how I conducted the qualitative research beginning with the data collection. As has been mentioned before, grounded theory development is an inherently recursive process. For the sake of readability, however, I introduce the steps here in an ordered, sequential manner.

In the first phase of our research project, beginning in late 2013, we introduced the study's overall aim and scope at the upper hierarchical levels in all different military services in order to receive hints of where to find community-like networks. Such high-level meetings granted us access to the lower levels of the respective branch. Moreover, these conversations enabled us to identify promising practice areas for further investigations. Once we identified possible communities of practice, we visited the respective locations and began our actual fieldwork. Consequently, we gathered a large part of our qualitative data within several communities during a second phase of the project from early 2014 to 2017. More specifically, we were able to gather data from different sources, as is often the case in qualitative, interpretative research. In particular, we conducted interviews, gathered archival data, and engaged in participant observations, which allowed us to triangulate our emerging insights across different data sources (Yin, 2009). Below, I will describe how we obtained the data and how this helped us to gain an understanding of the three communities under study.

Interview data. We collected data via 41 semi-structured interviews with 36 community members from the three communities of practice (see also Table 4.1). In each of the three communities, we first interviewed the most active and experienced members of the group to gain an initial understanding of the practice areas

at hand. These experts were often recommended to us as knowledgeable informants during initial conversations with the respective area's commanders. For example, Christian, one of the founders of what we refer to as the Chief Blaster Community, had over 35 years of experience within the army's engineer service and was responsible for several initiatives in the military blasting domain such as the chief blaster training course. Hence, we conducted 12 initial interviews using the elite sampling technique (Yin, 2009). After each conversation with such a core member, we asked the informant which of their comrades might have additional insights on the group. In this way, we elicited further informants in each community using purposeful sampling, in the sense that these individuals provided us with an excellent opportunity to learn more about the specific community and its practices (Glaser & Strauss, 1967).

The interview guide initially had four broad sections: the respondent's official background and post and his/her relationships with the community; the history of the community and conditions of its emergence; the internal community work and coordination processes; and, finally, the respondent's motives to participate in informal activities. After this first round of interviews, we began to transcribe the data verbatim. As I analyzed the first transcripts, several interesting themes emerged from the data. For instance, it became apparent that members generated new resources and pushed initiatives forward that would enable them to fulfill their official jobs and missions in more efficient ways. Moreover, themes emerged indicating that these community members were also shaping their own informal cultures that, in part, deviated from traditional military norms and values. Also, categories emerged giving insights into how members and formal superiors interacted with each other, suggesting a shared construction of meaning among community members and superiors, which is rather surprising for military hierarchies. Based on these preliminary findings we started to concentrate our inquiries more on this interplay between informal cultures of a CoP and broader organizational culture and the interaction between members and formal leadership. That is, the emergent insights and interpretations of the data determined the further data collection (i.e., theoretical sampling) (Glaser & Strauss, 1967; Locke, 1996; Suddaby, 2006). Hence, we conducted a second round of interviews in which we revisited some of the key informants in each CoP for follow-up interviews and again asked for further possible interviewees. The interview questions, by now, were more focused on the emergent themes and categories. For example, we asked how members would describe their relationship with their leaders and how superiors would influence community activities.

Overall, our sample involves 36 interview participants ranging from staff sergeant to general with seven or more years of tenure in the FAF. The majority

of community members either held the rank of captain or major among officers or master sergeant or sergeant major among noncommissioned officers (NCOs). The rank structure indicates that the investigated communities comprise of more experienced soldiers and experts, who potentially have greater autonomy in their positions. Because the three communities were either located within the Army or Navy, the sample predominantly contains soldiers from these branches in addition to three soldiers from allied forces. Except for three informants, the informants were male. In general, the sample included active soldiers (33) and civilian employees (3) between the ages of 25–61 years. For more information see also Table 4.1.

Table 4.1 Overview of informants

Informant	Name	Community	Tenure	Age	# Interviews	Sampling technique
1	CHRISTOPHER	CAC	19	45	2	Elite
2	DENNIS	CAC	25	49	2	Elite
3	KEVIN	CAC	13	34	2	Elite
4	MARC	CAC	19	39	1	Elite
5	BERND	CAC	26	43	1	Purposeful
6	PETER	CAC	15	39	1	Purposeful
7	GEORG	CAC	20	51	1	Purposeful
8	MARY	CAC	9	29	1	Purposeful
9	CHRIS	CAC	26	55	1	Purposeful
10	MATT	CAC	16	45	1	Purposeful
11	JOE	CAC	30	55	1	Purposeful
12	PIERRE	CAC	18	40	1	Purposeful
13	LUIS	CAC	15	39	1	Purposeful
14	DANIEL	CAC	21	43	1	Purposeful
15	LILLY	CAC	12	41	1	Purposeful
16	GABY	CAC	10	45	1	Purposeful
17	WILL	CAC	25	55	1	Purposeful
18	ANDREAS	CAC	26	55	1	Purposeful
19	BILL	CAC	30	61	1	Purposeful
20	ROBERT	CAC	35	59	1	Purposeful

(continued)

Table 4.1 (continued)

Informant	Name	Community	Tenure	Age	# Interviews	Sampling technique
21	FRANK	TDLC	18	36	1	Elite
22	LUKAS	TDLC	18	38	1	Elite
23	ANDI	TDLC	30	53	1	Elite
24	VIKTOR	TDLC	4	25	1	Purposeful
25	OTTO	TDLC	20	43	1	Purposeful
26	MARTIN	TDLC	17	36	1	Purposeful
27	PAUL	TDLC	7	29	1	Purposeful
28	FRED	TDLC	9	28	1	Purposeful
29	CLAAS	TDLC	20	38	1	Purposeful
30	JACOB	TDLC	25	44	1	Purposeful
31	LARS	TDLC	13	37	1	Purposeful
32	CHRISTIAN	CBC	35	61	2	Elite
33	BOB	CBC	17	46	2	Elite
34	KARL	CBC	15	34	1	Purposeful
35	NICK	CBC	13	33	1	Purposeful
36	HENRY	CBC	28	56	1	Purposeful
			Ø 19,41	Ø 42,17	∑ 41	

Also, we conducted countless informal conversations with community members and their formal superiors. These discussions, for example, occurred while one member of the research team participated at the Coping with Culture Conference from the Cultural Advisory Community or during our visits to the informants' units, where the commanding officer regularly welcomed us. These talks involved broad discussions on the armed forces and the respective unit or department, the general state of the organization, as well as present organizational changes and challenges. After each session had ended, we wrote field notes from our experiences (Emerson, Fretz, & Shaw, 2001). In sum, these informal conversations gave us additional contextual insights.

Archival Data. In addition to interviews, we gathered further insights by analyzing archival materials. In general, archival data can be helpful as it offers the researcher a running history of the organization, usually in the form of internal documentation and emails (Sonenshein, 2014). In my particular case, I was able to sight many openly available publications specific to military culture and the

armed forces in general. These include mostly handbooks on military organizations, experience reports from active and former soldiers, official strategy papers of the armed forces such as White Papers but also internal documents like regulations and field manuals. In total, I gathered and analyzed 96 documents (see also Table 4.2). Thus, I sighted scientific articles such as ethnographies conducted in missions abroad or reports from past studies by the Center for Military History and Social Sciences involving a broad array of topics such as leadership, missions abroad, or military cultures.

Table 4.2 Overview of archival data

Document Number	Description	Author[a]	Author Background
01	Scientific article on military culture	Tomforde (2010)	scientific
02	Scientific article on intercultural competence	Tomforde (2009)	scientific
03	Scientific article on military culture	Tomforde (2015)	scientific
04	Scientific article on intercultural competence	Tomforde (2008)	scientific
05	Scientific article on military leadership	Hellmann (2015)	scientific
06	Scientific article on military culture	Ohm (2010)	scientific
07	Scientific article on soldiership	Leonhard & Biehl (2012)	scientific
08	Scientific article on mission cultures	Tomforde (2006)	scientific
09	Scientific article on military ethnology	Tomforde (2016)	scientific
10	Scientific article on military socialization	Apelt (2006)	scientific
11	Scientific article on military culture	Hagen & Tomforde (2012)	scientific
12	Scientific article on military missions abroad	Seiffert (2012)	scientific

(continued)

Table 4.2 (continued)

Document Number	Description	Author[a]	Author Background
13	Scientific article on military cohesion	Biehl (2010)	scientific
14	Scientific article on soldiership	Klein (2006)	scientific
15	Scientific article on soldiership	Elbe (2006)	scientific
16	Scientific article on military organizations	Gareis, Haltiner & Klein (2006)	scientific
17	Scientific article on military missions abroad	Seiffert (2015)	scientific
18	Scientific article on soldiership	Leonhard (2018)	scientific
19	Scientific article on military change	Huber & Eggenhofer (2005)	scientific
20	Scientific article on military leadership	Kozica (2014)	scientific
21	Scientific article on military organizations	Apelt (2012)	scientific
22	Scientific article on military tasks	Haltiner (2006)	scientific
23	Scientific article on soldierly identities	Libero (2012)	scientific
24	Scientific article on soldierly identities	Warburg (2010)	scientific
25	Scientific article on military change	Bredow (2010)	scientific
26	Scientific article on military leadership	Wiesendahl (2014)	scientific
27	Empirical study on ISAF mission	Seiffert (2016)	scientific
28	Scientific article on intercultural conflict management	Berns & Wöhrle (2006)	scientific

(continued)

Table 4.2 (continued)

Document Number	Description	Author[a]	Author Background
29	Scientific article on intercultural competence in the FAF	Keller & Tomforde (2007)	scientific
30	Scientific article on intercultural competence in the FAF	Langner (2012)	scientific
31	Scientific article on intercultural competence	Heiberg (1991)	scientific
32	Book on military psychology	Matthews (2014)	scientific
33	Scientific article on military leadership	Keller (2012)	scientific
34	Scientific article on military change	Hamann (2009)	scientific
35	Article on data link transmissions	Rützel (2009)	scientific
36	Article on data link transmissions	Grützner (2007)	scientific
37	Article on data link transmissions	Ebert (2007)	scientific
38	Article on military transformation	Collmer (2007)	scientific
39	Article on missions abroad	Bredow (2015)	scientific
40	Article on missions abroad	Gareis (2006)	scientific
41	Soldiers Act	BMVg (1956)	military
42	Defense policy doctrine	BMvg (2003)	military
43	Conception of the Federal Armed Forces	BMVg (2004)	military
44	White paper on military strategy	BMVg (2006)	military
45	Information material of the army	BMVg (2014)	military
46	Leadership manual of the Federal Armed Forces	BMVg (2008)	Military

(continued)

Table 4.2 (continued)

Document Number	Description	Author[a]	Author Background
47	Regulation on soldierly appearance	BMVg (2015)	military
48	White paper on military strategy	BMVg (2016)	military
49	Practitioner article on military leadership	Weigt (2014)	Military
50	Practitioner article on military leadership	Bach & Sauer (2016)	military
51	Practitioner article on military leadership	Haupt (2014)	military
52	Practitioner article on military leadership	Beck (2016)	military
53	Practitioner article on military leadership	Glatz (2016)	military
54	Practitioner article on military planning	Schneider (2016)	military
55	Practitioner article on military leadership	Weigt (2016)	military
56	Practitioner article on military leadership	Sauer (2016)	military
57	Practitioner article on leadership in combat	Sembretzki (2016)	military
58	Field manual of the army	Heeresamt (1955)	military
59	Practitioner article on intercultural competence	Lohmann (2014)	military
60	Practitioner article on intercultural competence	Ullrich (2011)	military
61	Practitioner article on intercultural competence	Ullrich (2012)	military
62	Practitioner article on intercultural competence	Ullrich (2014)	military

(continued)

Table 4.2 (continued)

Document Number	Description	Author[a]	Author Background
63	Practitioner article on intercultural competence	Ullrich (2016)	military
64	Practitioner article on intercultural competence	Tappe (2015)	military
65	Practitioner report on ISAF mission	Schwitalla (2010)	military
66	Practitioner report on military leadership in missions	Carstens (2014)	military
67	Practitioner report on military leadership in missions	Blumröder (2014)	military
68	Field report of an NCO	Schultze (2016)	military
69	Practitioner article on military leadership culture	Schneiderhan (2016)	military
70	Practitioner article on military leadership	Nichting (2016)	military
71	Practitioner report on the chief blaster exercise	Halsholzner & Lankes (2014)	military
72	Practitioner report on the chief blaster seminar	Gwerder (2010)	military
73	Report on the chief blaster training	Nagels (2015)	military
74	Internet report on chief blasters	Tiedke (2018)	military
75	Internet report on chief blasters	Tiedke (2018)	military
76	Overview of the history of engineer troop		military
77	Exercise report on engineer training	Staller (2014)	military
78	Internet film on chief blaster training	Bw Tv	military

(continued)

Table 4.2 (continued)

Document Number	Description	Author[a]	Author Background
79	Article on tactical data link exercise	Hardthöhen Kurier (2011)	military
80	Blog post on tactical data link exercise	Deutsche Marine (2016)	military
81	Experience report on missions abroad	Wietling (2010)	military
82	Practitioner article on military leadership	Sauer (2011)	military
83	Practitioner article on military leadership	Senger (2011)	military
84	Practitioner article on military leadership	Gorski (2011)	military
85	Practitioner article on military culture	Beck & Singer (2011)	military
86	Field report of a battalion commander	Grohmann (2011)	military
87	Field report of a company commander	Andritzky (2011)	military
88	Practitioner article on military leadership	Trautvetter (2011)	military
89	Strategy paper of the Federal Armed Forces	BMVg (2013)	military
90	Informational material on navy frigates	rk marine (2018)	military
91	Newspaper article on partnering	Löwenstein (2010)	political
92	Newspaper article on partnering	Gebauer (2010)	political
93	Newspaper article on missions abroad	Koelbl (2011)	political
94	Official report of the parliamentary ombudsman	Bundestag (2016)	political
95	Official report of the parliamentary ombudsman	Bundestag (2015)	political
96	Newspaper article on military bureaucracy	Demmer (2011)	political

[a]Full references are listed in archival data inventory

The archival data also contained many experience reports from higher officers (i.e., generals) in which they provide their perspective on military leadership, the future of the armed forces, and their mission experiences. This data enabled me to compare the emergent insights from the interviews—especially leadership and culturally related categories—and also caused me to reflect on my interpretations of military virtues and leadership practices from my experiences as an officer. Additionally, archival materials were helpful in retracing the communities' history of emergence by offering historical overviews for the specific practice areas under study (i.e., the history of different tactical data links). Overall, these documents helped me to develop a better understanding of the particular communities of practice and enabled me to triangulate the emergent themes from interviews and observations. I provide a list of all archival materials in the archival data inventory in the appendix of this study.

Observational data. In addition to interviews and archival materials, we also observed community meetings and workshops besides getting invited by some informants to observe their actual workplaces. For example, we were able to visit a frigate, where we received an in-depth briefing about several workstations and work practices within the combat information center on board, which afforded us the opportunity to get a feel for the complicated tasks of data link operators. Additionally, we engaged in direct observations of two of the three communities under study. In particular, we were able to observe two exercises of the data link experts, giving us an opportunity to see how the community members collectively fixed problems during live missions and how they engaged with each other. Besides, we participated at two conferences on intercultural competencies planned and managed from Cultural Advisory Community members, where we observed their discussions in several workshops and sessions. Throughout each observation, we took extensive field notes that enriched our overall understanding of the particular context, enabling us to triangulate our findings (Emerson et al., 2001). For example, we were able to observe practices of open collaboration involving mutual respect and unimportance of military rank among community members along the tactical data link exercise.

In summary, the three data sources offered us deep insights into the three communities of practice and their organizational surroundings from which to build process theory. We collected data in each community until we reached the point of theoretical saturation, meaning that no further insights on the community and the themes would emerge from additional informants (Strauss & Corbin, 1990; Suddaby, 2006).

4.2.3 Data Analysis

As I mentioned before, data analysis and data collection coincide in interpretative research, because interpretations of the data guide further inquiries. In this study, therefore, I recurrently switched between data interpretation, literature reading, and further data collection. In addition, this intellectual journey of data collection, analysis, and literature reading equally comprised to fathom the employed methodology of interpretative theory building.

In general, a broad array of articles and handbooks suggest different approaches to the analysis of qualitative datasets (Burawoy, 1991; Eisenhardt, 1989; Miles & Huberman, 1994). These recommendations describe different pathways of how one gets from raw data to theoretical categories and concepts. Even the founders of grounded theory development discuss different techniques in this context (Locke, 1996). For example, Strauss & Corbin (1990) recommend a formalized coding hierarchy of open coding (finding first categories), axial coding (finding relationships among categories), and selective coding (validate the relationships) coupled with different sampling techniques, while Glaser (1992) only refers to open and selective coding and bemoans the concept verifying character of Strauss & Corbin's analytical process (Locke, 1996). Despite these differences, the ultimate goal of coding qualitative data in interpretative research is always to either find a core category or construct a framework or grounded model that emerges from the raw data, accounts for the action one was able to observe, and organizes and integrates the conceptual categories (Gioia et al., 2013; Locke, 2001).

Subsequently, I will outline how I went about constructing the grounded theory that explicates community emergence and embeddedness from the data that we gathered. The analytical process of the current study, thereby in most parts, follows the recommendations for analyzing qualitative data from the "Gioia Methodology" that was developed in the work of Danny Gioia and Kevin Corley, who refined the ideas from Glaser & Strauss into a coherent approach for conducting interpretative research (Corley & Gioia, 2004; Gioia et al., 2013; Gioia & Chittipeddi, 1991; Gioia, Schultz, & Corley, 2000; Nag et al., 2007). This methodology offers a structured procedure for integrating informants' experiences and the researcher's interpretations into a grounded framework or model (Gioia et al., 2013).

The analytical process started as soon as we obtained the first data from the field in the form of interviews and observations. We initially started screening our materials to gain a first understanding of each community of practice. That is, we discussed the different practices such as military blasting or intercultural advisory

that we were able to investigate and shared our experiences from the fieldwork because we did not conduct every interview or field trip together as a team of four. From these discussions, we wrote up first vignettes for each practice that entailed brief descriptions of the respective practice's history and social relationships that formed around it. These memos gave us a first feel for the respective area under study and guided our further data collection efforts. Thus, we decided, based on these first impressions, where we should intensify our research activities, which informants to contact, or what events to attend. We refined the vignettes as our research went along and they recurrently informed subsequent discussions among us about the phenomena under study.

As we gathered increasingly more data, each of us started coding the material with his interest and research question in mind. For example, my interest was, from the very beginning, the interplay between informal CoP and formal hierarchy, whereas other members of the research team were more interested in the knowledge sharing processes unfolding in these communities or inquired on how these CoPs drive the dynamic capabilities of the organizations (Andresen, Schulte, & Koller, 2019; Kreutzmann, Koller, Andresen, & Schulte, 2016).

The coding procedure began with a first-order analysis of the data which is similar to an open coding approach recommended by Strauss & Corbin (1990). Thus, I selected first statements in the data by using sentences and paragraphs as a coding unit (Corley & Gioia, 2004) and categorized similar statements into themes, labeling them whenever possible using the informants' own language or related terms, thereby capturing their level of meaning (van Maanen, 1979). This yielded a plethora of tentative categories or first-order themes that describe members' activities and specific events; simultaneously, they reflect informants own interpretations of these situations, developments, and actions. These first-order themes emerged around the broad questions from our initial interview guide such as the history of the respective practice area (i. e., domain) and how members made sense and interpreted their practice. As I allowed for further themes to surface from the data, I identified codes indicating several dynamics and interactions between community members and their formal organizational context. For example, informants recurrently described how they started several initiatives and programs that, over time, grew into resources like specialized training courses, equipment parts, annual exercises, or official handbooks. Moreover, informants repeatedly expressed the importance of overarching military values but also voiced several social practices that seemed at odds with military cultures and customs such as the unimportance of rank within the communities.

The emergence of the first-order themes caused us to refine the initial interview guide and focus the data collection more towards these issues. Simultaneously, I

consulted the literature and started to read extant research, being more attentive to the dynamics of emergence as well as cultural and leadership mechanisms within complex organizations to find prior explanations that would inform my interpretations. This recursive process also included following up on reviewer recommendations and suggestions from colleagues at conferences where we presented earlier versions of this study. In particular, several fellow researchers at the Annual Meeting of the Academy of Management and conferences of the Strategic Management Society pointed us towards complexity theory explanations for our findings. Taken together, this prompted me to extensively study prior research on cultural practices and resources (Feldman, 2004; Feldman & Worline, 2012; Giorgi, Lockwood, & Glynn, 2015; Howard-Grenville et al., 2011; Swidler, 1986; Swidler, 2001b), emergent self-organization in complex systems (Anderson, 1999; Lichtenstein, 2000), and leadership of informal, adaptive networks (Lichtenstein & Plowman, 2009; Marion & Uhl-Bien, 2001; Uhl-Bien et al., 2007; Uhl-Bien & Marion, 2009). With an improved understanding of the data at hand, I recoded the material distinguishing between themes that speak to the process of emergence, cultural dynamics or categories that describe the relation between community members and formal superiors.

Concurrently, I conducted a second-order analysis (Gioia et al., 2013) involving coaxial coding (Strauss & Corbin, 1990), which means that I examined the relationships within the data by comparing first-order codes, searching for similarities and differences between them, and finally assembling them into higher-order categories. This reduced the number of categories drastically. For example, I ascribed first-order themes such as "being a good soldier", "conscientiousness in task fulfillment", and "self-initiative" under the category "internalized norms on military duty" as they all illustrate behavioral expectations that the informants learned throughout their time in the service. Second-order themes are thus more abstract and reflect more of my—the researcher's—interpretation of the data at hand. Again, this coding work was followed by further data collection where the focus was increasingly on these more theoretical categories and the relationships between them. For instance, at this point, archival materials came more into play as I consulted prior studies on practices emerging within missions abroad to compare my findings. I switched between coding and data collection to the point of theoretical saturation, meaning that no additional first-order codes that would refine the second-order themes would arise from continued exploration (Glaser & Strauss, 1967).

A final step during this analytical process was that I tried to further distill the second-order themes into even more overarching theoretical dimensions that help to explain the processes or dynamics I observed. That is, similar second-order

categories were grouped under the same theoretical or "aggregate dimensions" (Gioia et al., 2013). In keeping with the above example, I introduced the theoretical dimension of "learned cultural repertoire" consisting of the two second-order categories of "internalized norms on organizational behavior" and "internalized norms on military duty".

According to Gioia et al.(2013) first-order themes, second-order themes, and aggregate dimension together build the basis for constructing the so-called data structure—a visual aid that helps researchers representing how they progressed from raw data and informants' claims towards themes and conceptual categories. I will display the data structures at the beginning of each findings section so that the reader can follow my interpretations and see the data-to-theory connections.

The data structure not only gives readers a visualization of the actual data but, more importantly, also lays the groundwork for the grounded theory or grounded model as the outcome of the research process. That is, a final step in the analytical process of this study was to build an inductive model that explains the processes and dynamics of community emergence and embeddedness within the formal organizational hierarchy of the FAF. The grounded model thereby contains all aggregate, theoretical dimensions that emerged during the data analysis stage and integrates them into a coherent framework by making the relational dynamics between them transparent (Gioia et al., 2013). To put it differently, the grounded model depicts the inductive generated process theory of this study. The processual nature of this model also becomes apparent when looking at the theoretical dimensions that make up the model and predominantly contain the gerund form ("-ing"), indicating activities, practices, and dynamics, instead of static states or entities (Patvardhan, Gioia, & Hamilton, 2015; Wenzel & Koch, 2018).

On a final note in this section, I would like to point out the measures I took to ensure a rigorous research approach. First, as mentioned before, I iteratively cycled through the analytical steps; that is, I constantly moved between literature, the developing grounded model, and the actual data, making repeated refinements throughout this process (Sonenshein, 2014). Second, although each researcher in our team had his agenda and coded the data for himself, we nonetheless, almost daily, discussed our emergent themes and categories and how to make sense of them. Overall, agreement was rather strong, although the instances in which disagreement occurred forced me to rethink and modify the data structure (Nag et al., 2007). Third, to increase the trustworthiness, I also discussed the emerging patterns in the data with colleagues from our department not included in this particular research project. This led to critical questions, discussions and, subsequently, additional modification in the grounded model (Corley & Gioia, 2004). Moreover, several friendly reviewers, who commented on papers that capture parts

of this dissertation, validated my interpretations but also pointed out weak spots in my rationale. Fourth and finally, I was encouraged to refine the data structures and the inductive models in the aftermath of academic conferences, where we presented preliminary drafts of this research.

Findings

5

This informal community emerges from necessity and from these informal interactions some semi-formal structures evolve and some part of these semi-formal structures eventually will obtain formal character.

Informant of the Chief Blaster Community

Below, I will present the findings of this study in three main parts. The first unpacks how changes of environmental conditions shaped the context for the formation of communities of practice in the armed forces. Further, it presents how individuals across units and departments experience these external pressures and collectively start to resource new activities, knowledge, and professional connections. In doing so, I explicate the emergence of the three studied communities of practice as collective responses to an increased environmental complexity. The second part concentrates on culture as an organization-internal contextual feature. More specifically, it unpacks how community members experience their cultural surroundings within the armed forces and how they resource new cultural practices that ultimately enable their collaborative praxis. Thereby, I explain the interplay between organizational culture and the emergence of new practices in communities as both at the same time changing and stable. The third part uncovers how formal leaders engage with community members and how they simultaneously shape the atmosphere for community emergence and transformation of emergent outcomes. Concurrently, I outline an approach for leadership on the interface between the formal organizational hierarchy and emerging communities that recognizes the self-organizing nature of CoPs. Together, these three parts

B. Schulte, *The Organizational Embeddedness of Communities of Practice*, Forschungs-/Entwicklungs-/Innovations-Management,
https://doi.org/10.1007/978-3-658-31954-0_5

build the basis for the comprehensive, grounded, cross-level model that illustrates the dynamic interrelations between communities of practice with the broader context of the formal hierarchy.

Illustrating such a model usually depicts the last step in grounded theory development. However, I will present fragments of the model within each section to develop the main components of the framework individually. By this means, I give early structure to the findings' narrative and successively build the study's grounded model. In general, I follow best practices for presenting qualitative data by relying on a thick description of each community of practice and its particular context and their members' actions. Further, I provide a detailed account of the study's data by incorporating informants' quotes into the narrative and, where feasible, include archival data to support my interpretation and the grounded model (Eisenhardt & Graebner, 2007).

5.1 Findings Part 1: Changes, Needs, and Community Emergence

This section starts with the description of how in numerous practice areas the organizational environment profoundly changed, leading to an increasingly complex setting for duty. After this illustration, I proceed with describing how organizational members engaging in these practices experienced needs related to this increased complexity, which caused them to react to these altered conditions by leaving formal avenues and resource new activities, connections, and knowledge in evolving communities of practice. I outline these processes for each of the three studied communities. I do this by providing detailed examples from all three communities in each subsection. Figure 5.1 pertains the structuring of the data related to this first part of the findings. It displays a description of informant codes and researcher-induced second-order themes that are in conclusion reduced to overarching theoretical dimensions. Table 5.1 portrays additional first-order data to support the narrative.

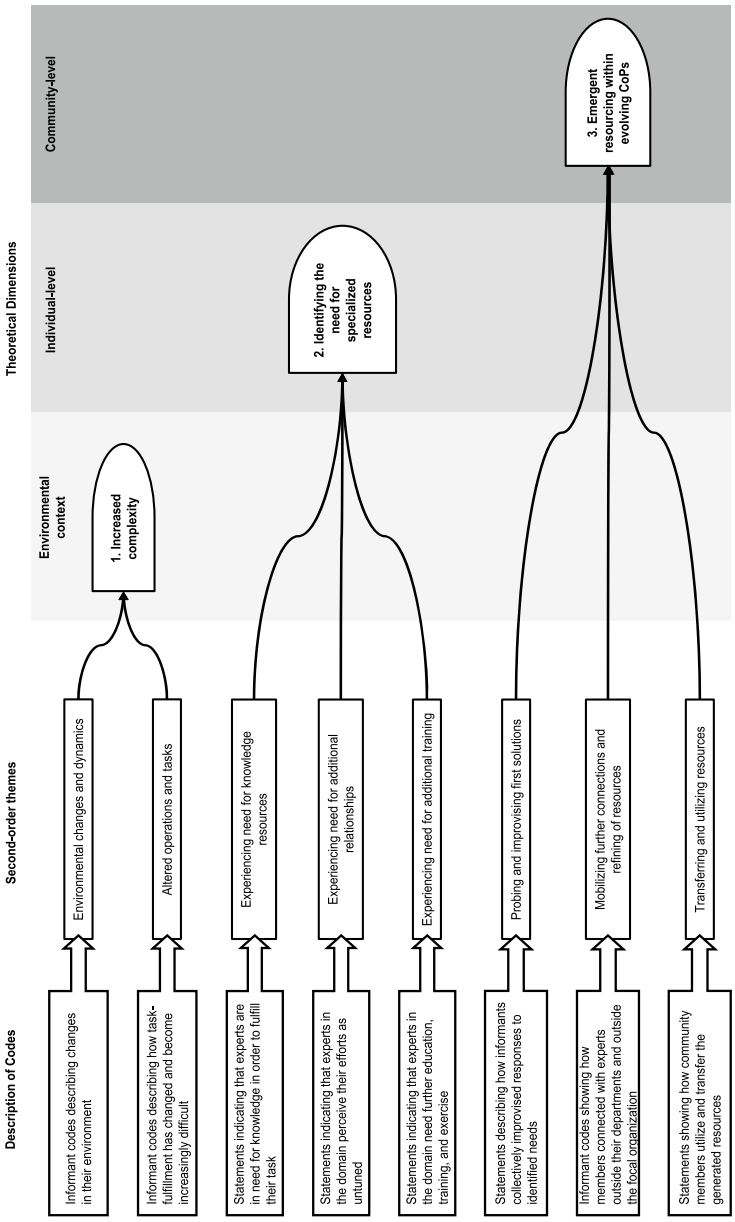


Figure 5.1 Data structure findings part 1

Table 5.1 Representative quotes underlying first-order themes (Findings part 1.1)[a]

Increased complexity	
Environmental changes and dynamics	*Tactical Data Link Community* **Paul:** "The whole domain of TDLs just has become an increasingly complex area of expertise." *Chief Blaster Community* **Christian:** "And in today's peace-keeping missions we need other techniques than the old, traditional destruction blasting. It has to be more precise without much collateral damage." *Cultural Advisory Community* **Kevin:** "And in the past, we had the open battles where tanks and infantry fought against each other. Now, however, we have a completely different scenario, where we fight against insurgents and have to acknowledge the local population and have to establish relationships. Other things become important."
Altered operations and tasks	*Tactical Data Link Community* **Martin:** "And the whole link system really is becoming complex. I mean, we are really diving into the details here. For example, the whole international networking and the network architectures and so on and so on. In the past, it was really easy. You drive your system up and watch how your messages are sent and received – that is ping pong. However, this really has changed over the years." **Fred:** "And now we have Link 11, 16, and Link 22. Moreover, the difficult part now is to prepare for missions, where we have to establish complex link architectures, meaning you have to bring all these different systems together, without having too many redundancies." *Chief Blaster Community* **Henry:** "And the task is no longer to just blast a concrete structure on the training area. That is just not it anymore. It is more the controlled teardown of constructions and buildings that we are now trained in." *Cultural Advisory Community* **Marc:** "And in the beginning, I was in Bosnia in 1998, and we did not know who was Muslim, or was a Catholic, where are the Croatians nobody thought about such things. However, they are critical now."

(continued)

Table 5.1 (continued)

Identifying need for knowledge, connections, & skills	
Experiencing the need for knowledge resources	*Tactical Data Link Community* **Andi:** "And such problems are actually from a technical perspective solvable, however, on board, there is not much knowledge and experience. It is just not there. Additionally, they work for the most time with Link 11 and not so much Link 16 due to their missions. Moreover, if they are just shipping around than Link 11, the pure Navy link is just fine. This means that the knowledge about the newer versions is relatively thin and after the three-year rhythm it is lost." *Chief Blaster Community* **Christian:** "We are the ones who train and educate the blasting techniques, we are really at the frontlines, and we see where the problems are, and I think it is better to engage in this process of adapting the guidelines now, rather than later complain about it. Moreover, I experienced it that we made recommendations for changes in the guidelines. However, they did not correctly apply them." *Cultural Advisory Community* **Marc:** "And I got myself several books on my own time to get knowledge for this area for example because in the service the knowledge was basically missing."
Experiencing the need for additional relationships	*Tactical Data Link Community* **Frank:** "And there is really just one reason why you participate in this community, because you really are thrown into it due to your position and your task of being responsible for the functioning of the data links or because you are responsible for the airspace situation and these data also exchange via the link. So no matter what your task is, you are actually forced to communicate with the others. Hence, it is really viable that you have these connections in a further network." *Chief Blaster Community* **Christian:** "And the whole network evolved because the trainees experienced that they need some kind of connections. I think that is similar to a lance corporal channel (German: Obergefreiten Dienstweg)." *Cultural Advisory Community* **Hans:** "The process started in 2005/2006 where we realized that there was no coordination in this field. Everyone did his own thing and cooked his own soup. Moreover, this became important in 2006 due to the increased engagement in missions abroad." **Will:** "And much was about the coordination within the domain, provision of training materials and to find and create an expert network because there was nothing and nothing existed. Thus, we thought we need a network, and the result of this was what we nowadays know under the term Coping with Culture Conference."

(continued)

Table 5.1 (continued)

Experiencing need for additional training	*Tactical Data Link Community* **Claas:** "I mean there are some basic courses for Link 16 how it works and so on. Moreover, there are operator courses, but the most you learn by training on the job." *Chief Blaster Community* **Karl:** "We just want and need further education and training with these new, civilian explosives. We do not get this in the official duty." *Cultural Advisory Community* **Kevin:** "and it started with an experienced need, something is in a poor state and in our situation the training situation was in a poor state because it was non-existing." **Hans:** "And the training was not really specified and not really systematically organized, for example, we never included experience from mission or lessons learned into training for intercultural competencies" **Dennis:** "And a matter of fact this was all new, and in principle, I had really quick training, "training by laying on hands," and after that, they put me on the airplane."

[a]Some of the presented quotes have been published in Schulte, et al. (2020)

5.1.1 Increased Environmental Dynamics in Several Practice Areas

Tactical Data Link Community (TDLC). Western armed forces have been employing Tactical Data Links (TDLs) since the 1960s. Most basically, TDLs:

> *"(…) are message standards from NATO [North Atlantic Treaty Organization][1] to exchange information with each other. Tactical data links are used for fast, interception-proof and interference-free transmission of data. They can transmit enough data in quasi no time for a strategic and tactical overview of the situation"* (Archival data inventory: Grützner, 2007, p. 10).

The primary purpose of TDLs is the exchange of wide-ranging information between different platforms, units, and weapon systems to generate and update a comprehensive situational overview of the battle area for troop commanders. TDLs were first applied within electronic warfare (Link 1) and the coordination of airplanes (Link 4). The first TDL versions such as Link 4 and Link 11 in

[1]Each Tactical Data Link standard is defined in NATO Standardization Agreement (Stanag).

the 1960s had different areas of applications and differing advantages and disadvantages. For instance, Link 11 is a highly reliable but relatively slow message standard that was used in the Navy, whereas Link 4 is fast but unencrypted and thus not interception-proof.

Developers of these first generations of TDLs did not intend an extensive exchange of information between systems. Instead, the armed forces developed TDLs for specific weapon systems. As Frank, a Navy commander and member of Tactical Data Link Community, recalled:

> *"When the first data links were introduced in the air force more than 40/50 years ago, Link 1 and Link 1b were introduced. These were data links for connecting land-based centers for air defense with air traffic control. Simultaneously, Link 11 was introduced in the navy to connect ships with each other. However, the two areas were separated. Moreover, these two areas were separated for many years, apart from a few points of contact, and really did not communicate at all with each other."*

As Frank pointed out, Army, Navy, and Air Force were isolated in the early developments of the TDL technology, since there was no need for cooperation and communication between them. The organizational environment, hence, was relatively stable for an extended period and the respective practices and processes were clearly describable causing each area to develop their guidelines for the utilization of tactical data links. In the late 1990s and early 2000s, however, two external developments in the overall environment of the TDL domain had a lasting impact on how TDL experts would go about their duty.

On the one hand, a new version of the Tactical Data Link standard—Link 16—was developed in 2000 and implemented in numerous new land-based, airborne, and maritime weapon systems via the Multifunctional Information Distribution System (MIDS)[2]. For example, Link 16 is employed in navy frigates of the F122, F123, and F124 class[3], in the Eurofighter Typhoon jet[4], in the AWACS[5] early

[2]MIDS is the actual radio system that is installed in weapon systems that uses TDLs for radio data transmission.

[3]The operational tasks of navy frigates of the F124 class are mainly the antiaircraft fighters of a naval formation and the expanded air space monitoring. To this end, these ships are equipped with a wide-range radar SMART-L (detection range of more than 200 nautical miles) and a fire control radar APAR (Archival data inventory: rk Marine).

[4]The Eurofighter jet is multi role (air to air/ air to ground) fighter developed by Germany, Spain, Italy, and Great Britain as a European cooperation project.

[5]AWACS stands for Airborne Early Warning and Control System and is basically an airborne radar system for airspace reconnaissance and supervision.

warning system, and in the PATRIOT[6] air defense system. The Link 16 standard is reliable, encrypted and of high capacity due to its high bandwidth. With the help of Link 16, it is possible, for the first time, to create a common information base for the different weapon and command systems of various branches. This allows the data exchange and the generation of situational overviews in nearly real time. Former TDL versions, however, were not replaced; rather, Link 16 complements these older standards. As a result, individual TDL systems, which in the past functioned as closed-off islands that comprised a manageable number of weapon systems, have now become complex information exchange networks. This new technological standard, thus, helps to connect the formerly separated areas, particularly, the Navy and Air Force branches. With this newfound interconnectivity, however, technological problems and complexities arise on the practical level. Again Frank recalled:

> *"The technical systems on the ships, in aircraft, and in headquarter vehicles by which we exchange the data links all stem from different manufacturers and in parts from different nations. Moreover, because every ship and every airplane has its own project manager and specific requirements for procurement the technical components are not always implemented by the same standards and thus are often not the same. Moreover, these in parts really hidden different technical specifications cause different platforms not to communicate with each other this is a huge challenge for us from the technological perspective."*

As Frank pointed out, the increasing European cooperation in regards to military procurement projects that involve a plethora of manufacturers from different industries and nations causes a multitude of technical problems in the implementation of TDLs. Additionally, developments to connect the TDL standard to other systems and information technologies deepen the technological complexity. Moreover, the shortening of development cycles increases the overall dynamic in the Link domain. For instance, Link 22 a further advanced version of the Link 11 standard is currently in the testing and introduction phase. Paul another TDL-community member, noted in this context:

> *"And Link is just a really complex field of expertise you do not learn it within two to three years. It is just because it is always changing and in constant flux. There are always new systems, new software updates. Thus, it is a permanently changing business."*

[6]PATRIOT is a US developed land-based, mid-range antiaircraft missile system for the defense against airplanes, cruise missiles, and medium range tactical ballistic missiles.

This increased technological complexity consequently complicates the actual operation of Link 16 and Link 22. Therefore, an ad hoc operation of Link 16/22 is no longer practicable; rather, it requires a thorough up-front planning process that designs the network architectures for each operation and also necessitates supervision of such network structures during live missions and exercises. The armed forces installed the so-called TDL Management Cell (DEU TDLMC) for these planning and management tasks. This formal department designs, plans, and supervises TDL networks. Frank summarized this whole development as follows:

> *"When Link 16 was introduced and utilized in the Air Force, Navy, and also the Army, we were practically forced to communicate with each other by this technological innovation across the armed forces. The technology has basically forced us into partnership."*

On the other hand, there has been an increased strategic demand for joint[7] and internationally connected armed forces since the early 2000s. Against the backdrop of a fundamentally changing security environment and the, therefore, altered tasks for armed forces from mainly national defense to global crisis- and conflict management the German Department of Defense (DoD) initiated the transformation of the armed forces within the 2003 issued Defense Policy Doctrine (Archival data inventory: BMVg, 2003). The term transformation describes:

> *"The design of a continuous, foresighted adaptation process to a changing security environment, to increase the operational capabilities of the German Federal Armed Forces and maintain them in the long term" (*Archival data inventory: BMVg, 2003*, p. 10).*

A central aspect of this strategically- and top-down-induced change process is the emphasis of the FAF as deployment forces ("Armee im Einsatz") that requires a high degree of interoperability between the different branches and the increasing integration of the armed forces in multinational systems of collective security. These demands reflect that contemporary armed forces are almost exclusively deployed as parts of allied formations in multinational missions. Given this, the armed forces identified the capability for Network-Centric Operations ("Vernetzte Operationsführung" NetOpFü) as one of the core fields of activity within the transformation process. Network-Centric Operations:

[7]The term joint describes the collaboration of all three main branches Army, Navy, and Air Force.

> *"means the command and deployment of armed forces on the basis of a joint and interoperable communication and information system across all command levels that connects all relevant individuals, points of contact, troops, and facilities"* (Archival data inventory: BMVg, 2003, p. 12).

This concept stems from the deliberations that any decisions, particularly military combat decisions, are based on the information about enemy behavior and own force fighting capacities. In this context, the concept of Network-Centric Operations aims at incorporating modern ICT into military planning and command processes on a large scale to network all actors within a specific operational area.

In light of these developments, the Link technology has become an ever more critical means to network the different branches, units, and platforms that operate together and, thus, is essential in the actual realization of Network-Centric Operations (Archival data inventory: Rützel, 2009). This increased strategic significance of TDLs, however, also means that the operation of Link and the design of Link architectures, invariably, almost always involves a multitude of soldiers from different branches and different nationalities who, in the past, developed their practice with its procedures and rules independently. To put it differently, the operation of TDLs nowadays implicates the cooperation and communication between a vast number of individuals, departments, and units, who have to come to a common understanding. Again Frank explained to us while we were visiting the annual TDL exercise:

> *"And because we are joint and multinational connected. For example, you may have noticed we are even connected beyond the NATO, our work is so complex and difficult. Moreover, we have to face this complexity and have to work through it. For example, there are always conflicts of interest, different procedures, or different goals about how we realize something."*

As Frank pointed out, in addition to the increasing technological complexity of the Link system, the demands for Network-Centric Warfare and thus the increased amount of individuals and organizations involved in the TDL area adds to its overall complex nature.

Chief Blaster Community (CBC). The capacity to enhance own troops' mobility and simultaneously hamper the mobility of opposing forces has, for a long time, been a central military combat support capability that is usually executed by army engineer troops (German: Pioniertruppe). Specifically, since the invention of gunpowder around 1500 a. C., organized armed forces have been appointing soldiers who are specially trained in dealing with explosives to either create mobility for own troops or hinder enemy movement.

Nowadays engineer troops mostly employ conventional explosives such as TNT or PETN[8]. The associated blasting practices lend themselves to engineer operations in conventional warfare scenarios. In such classic combat situations, engineers are typically deployed together with combat troops like tank or mechanized infantry formations. Tasks include, for example, breaching of minefields to enhance the mobility of own combat troops or blasting of critical infrastructure such as railroads, bridges, or highways to interfere with the enemy's logistics. The blasting practice in these scenarios is often described as traditional destruction blasting, meaning that high amounts of explosives come rapidly into action and eradicate the obstacle, building, or structure at hand. These practices, however, stem mostly from the Cold War era. As several of the informants recalled: *"And this is the pure destruction blasting with the technical know-how that is on the level of WW II."* (Archival data inventory: Nagels, 2015, p. 36). Likewise, Bob, a chief blaster trainer recalled:

> *"And if you take a look at the blasting techniques that are available to us right now. This is all destruction blasting. I mean that all stems from the times during the Cold War, even though they changed here and there the date, for the most part, this was up-to-date in the '70s and '80s."*

As these statements indicate, the blasting practice was relatively stable during the Cold War era with clearly defined tasks and procedures formalized in blasting guidelines and training manuals. Thus, the training in dealing with explosives was more or less the same for over 40 years.

In the course of the numerous missions abroad, however, these traditional procedures and the employed explosives have become increasingly outdated because missions like KFOR (Kosovo Assistance Force) or ISAF (International Security Assistance Force) are primarily peace-keeping missions that include a broad continuum of tasks ranging from police-like responsibilities to counter-insurgency (Archival data inventory: Haltiner, 2006). Within such a complex and uncertain context, the utilization of destruction blasting would be counterproductive to the overall mission goals of shaping a secure and stable environment. In particular, the destruction of infrastructure or residents' homes would be counteractive to minimizing so-called "collateral damage". Even more, it could enhance resistance and spur insurgents' attacks on own troops. Also, informants of this study acknowledge that conventional blasting techniques are unfit for such modern and complex missions abroad. For example, Bob mentioned:

[8]PETN (Nitropenta) is a chemical-based explosive that is more known as plastic explosive under the term C4 or Semtex.

> *"And the traditional destruction blasting has nothing to do with these new missions abroad and peace-keeping missions. I mean in traditional combat situations these techniques are well established, however, in these new missions we have a completely new situation."*

In this context of a dynamic environment that necessitates a renewed blasting practice, including other blasting charges, new procedures, and thus a wholly adapted training program, the FAF introduced a novel blasting conception in 2009 and a novel training course which incorporates civilian blasting procedures in 2011. The chief blaster training course is the highest training level within the military that teaches efficient blasting techniques with state of the art explosives in line with civilian training:

> *"And these techniques we work according to the rule only as much as necessary, but little as possible. This means we plan with temporal stages when igniting and use explosives that are calculated to the gram. Hence we do not destruct buildings; rather they are deconstructed. This allows us to reduce security zones to a minimum. Accesses are now created through doors, walls, and windows with small quantities of explosives"* (Archival data inventory: Nagels, 2015, p. 34).

Mainly responsible for these developments were two experienced blasting instructors (Christian and Bob), who served at the Army's school for engineering. Henry, a CBC member summarized this dynamic:

> *"So the chief blasters did not exist before, well we had the authorized blasting personnel, and there were a few engineers, and we knew each other. However, the first chief blaster course—the pilot course—was done in 2011 where you can achieve the chief blaster qualification. This was initiated by Christian and Bob, who launched this course and integrated it into the training course landscape. This was really the starting point."*

Cultural Advisory Community (CAC). Up to the 1990s, during Cold War era, intercultural aspects were essentially not regarded at any level of military mission planning and excecution. For example, Kevin, an informant and member of the CAC, explained how, in regular exercises, the civilian population was disregarded: *"And in the traditional scenarios in which we trained they always started with the same sentence: the civilian population has been evacuated, and medical assistance will be taken care of."* As this statement makes clear, dealing with the civilian population in an operation area was not considered and trained during the Cold War era. Instead, the focus was on tactical combat and the know-how of fighting against organized military forces.

During the 1990s, however, the shift in the security environment—from a bipolar world to a multipolar environment with diverse security threats and conflicts such as international terrorism, failing states, migration, pandemics and regional conflicts—caused fundamental change of military tasks from national defense to multinational crisis and conflict management (Archival data inventory: BMVg, 2006).

This extended the spectrum of military tasks ranging from humanitarian support, peace-keeping, and observation, to combat or peace-enforcing missions. Also, the nature of a given mission can suddenly change from peace-keeping to more combat-focused operations. The primary purpose of such missions is no longer solely towards the military defeat of an opposing enemy; instead, the focus in these multinational commanded missions is on immediate humanitarian support, the restoration of order and security, and overcoming of regional or local conflicts, which may include the use of military force as one possible means to fulfill the mission's overall goal (Archival data inventory: Bredow, 2015). Consequently, the demands on soldiers in these environments have changed and now range from helping, protecting, mediating—typically tasks not associated with soldiers—to traditional fighting and combating (Archival data inventory: de Libero, 2010).

These extended military tasks, thus, deliberately involve the intended dealing with a country's civilian population. Furthermore, establishing a good and stable rapport between coalition forces and the local civilians can be of pivotal importance for the own troop's security and the mission's overarching objectives of installing security and order. That is, contemporary military operations require a deep understanding of local structures, local customs, and therefore, a profound knowledge of the local cultural context in which the troops operate on every level. For instance, on the tactical level, troops have daily contact with the civilian population and, therefore, engage consistently in intercultural interactions. Own troops are in regular contact with the civilian population in the country of deployment during for example military operations such as reconnaissance patrols, training assignments of local forces, or coordination meetings with regional leaders such as warlords or police chiefs. Likewise, they have contact with the socalled "locals" within their camps, describing civilians who are employed by the allied forces and work within the garrisons.

Moreover, approaches like the "partnering" strategy in Afghanistan further require allied troops to live, train, and fight side by side with Afghan soldiers and other security forces[9]. Finally, soldiers serve in multinational staffs and have to

[9]The "partnering" strategy in Afghanistan involved ISAF and Afghan Troops collaboratively training and operating together. It was mainly developed and implemented under

cooperate with members of NGOs and other organizations and, therefore, interact with individuals coming from different institutional and occupational backgrounds on a daily basis. In such a culturally diverse and complex environment, a lack of intercultural awareness or cultural sensitivity can easily cause misunderstandings which, in turn, can trigger increased stress in a naturally stressful situation and—in the worst cases—can lead to open conflict which may jeopardize the mission's overall objectives.

On a more strategic level, a lack of cultural understanding can lead to unrealistic expectations and objectives for such missions abroad. For example, in Afghanistan, the allied forces have long pursued a nation-building approach by implementing democratic structures following a central government model, which has entirely ignored Afghan tribal traditions, loyalty structures, and historical particularities (Archival data inventory: Tomforde, 2010).

The entire failure of operations abroad and the occurrence of conflictive incidents, thus, can ultimately be traced back to a lack of intercultural competence and an absence of understanding for local structures and their cultural contextualization. For instance, Canadian forces, who tortured a young Somali to death in 1993 led to the failure of UNOSOM II. Another well-known example is the torture and vulgar display of prisoners of war at Abu-Ghraib Prison by US soldiers during the Iraq War, which caused such an immense, negative media echo that US command temporarily considered early withdrawal from Iraq. Also, German troops have had their share of cultural misconduct in operations abroad; for example, in 2006 paratroopers desecrated a mass grave in Afghanistan by taking the so-called "skull pictures", which severely damaged the image of the helping, peace-keeping soldier at home.

Many commanders and high-ranking officers recognized the significance of intercultural competence in contemporary military conflicts relatively early. For instance, a British General aptly noted: *"To operate without cultural understanding is to operate blind and deaf"* (Archival data inventory: Tomforde, 2014, p. 128). Similarly, a German Lieutenant Colonel recalled his experiences in Afghanistan and the role of cultural sensitivity:

> *"It is always an exciting thing when Christians and Muslims meet each other. If, however, one of them is wearing a uniform he should be prepared for interacting with this completely different religious world. No matter how outlandish some reactions and behaviors may seem, he should always keep in mind that he is a guest in a Muslim country"* (Archival data inventory: Schwitalla, 2010, p. 63).

---

the command of General Stanley McChrystal beginning in 2010 (Archival data inventory: Löwenstein, 2010).

Likewise, the following statement from a study about the UNIFIL (United Nations Interim Force in Lebanon) mission summarizes the pivotal role of military-civilian interactions in such modern warfare scenarios:

> *"Stated in a nutshell: a relationship to local civilians built on communication and confidence is a necessary factor for success; a relationship characterized by mounting hostility, suspicion, and lack of communication is a sufficient cause for failure"* (Archival data inventory: Heiberg, 1991, p. 148).

From an organizational perspective, however, there were no notable efforts to react to this increased cultural complexity of missions abroad throughout the 1990s (Archival data inventory: Tomforde, 2008). Only in the mid-2000s, several departments began to address the intercultural topics of modern warfare aiming at increasing intercultural knowledge within the troops. In 2006 intercultural education was officially stated in the White Paper on security policy to be an integral part of leadership development within the FAF (Archival data inventory: BMVg, 2006). Moreover, in 2008, the FAF defined intercultural competence in the revised handbook on leadership development as a key organizational capability that is essential for mission accomplishment and own force protection in modern warfare scenarios:

> *"The correct interaction with humans of different cultural background—the intercultural competence—increases agency and behavioral safety of soldiers and also secures the acceptance of minorities within the Federal Armed Forces. Within deployments abroad, intercultural competence is an important precondition for mission fulfillment own force protection"* (Archival data inventory: BMVg, 2008, p. 27).

In summary, the above narratives from the three different practices—tactical data links, military blasting, and intercultural aspects—showcase how the environment for military task-fulfillment has dramatically changed since 1990. In particular, each practice is characterized by an increased environmental complexity, which is mainly induced by the different nature and the unique requirements of today's missions abroad. This environmental complexity is characterized by fast-paced technological developments and the increased interconnectedness with other branches and organizations as is apparent in the TDL case. Likewise, the blasting practice is suddenly exposed to a dynamically changing context for task-fulfillment by novel peace-keeping missions that require fundamentally changed operational techniques. Meanwhile, deployments abroad, in general, depict culturally diverse and complex environments that demand entirely new skillsets from

soldiers—often recalled as soft skills such as ambiguity tolerance and intercultural sensitivity—that are typically far off from traditional military proficiencies.

5.1.2 Identifying the Need for Specialized Resources

Against the backdrop, of an increasingly dynamic and complex environment, several individuals in each of the three practices experienced their resource endowment as insufficient and scarce. That is, they experienced the need for specialized resources such as specific knowledge resources, a more extensive network of experts, or advanced and more in-depth training resources. Below, I will again outline these developments for each of the three observed domains.

Tactical Data Link Community (TDLC). Members of the TDL domain identified relatively quickly that, in particular, due to the increased interconnectedness with other branches and the multinational character of their practice, they had to adapt, rethink, and harmonize their tactical procedures and guidelines in order to be able to operate jointly. They, thus, perceived the currently provided knowledge resources—manuals, formal guidelines, and official handbooks—as insufficient to cope with the new situation characterized through rapid technological advances and numerous new actors in the field. For example, Frank noted:

> *"And we have a great challenge in front of us, and that is on the practical and operational level, because the Army, Air Force, and Navy still work with different tactical procedures, practices, and official guidelines. The German Navy, however, is strongly integrated into the NATO structure, the Army not so much. Also, the NATO procedures for the Navy and Air Force are still different. So we had to work on this."*

As this quote illustrates, members in the TDL practice identified the need to adapt existing knowledge resources, in particular at the TDL management level. In order to discuss and adjust the guidelines and procedures, members also identified that they had to network with each other, not only from a technological perspective in live missions and exercises but also from a social perspective. Thus, members sensed that they needed relationships and cooperations between the different actors involved in the overall area to work through these difficulties. Lukas (22), an experienced member of the TDLC, recalled:

> *"What is really a problem is the formal guideline situation in the TDL domain. Everybody does his own thing, without looking left or right. This always causes problems as each branch develops their concepts. We have to talk to each other."*

Likewise, Frank pointed out the need for additional linkages in the practice and their importance for effective task-fulfillment:

> *"We have to network with each other in order to be able to work together in live operations effectively. I mean this is when it counts, and in the worst case this might cost us lives if we do not come together and solve our problems up front in this multi-link environment."*

Also, soldiers stationed on board Navy ships experienced a lack of knowledge and experience regarding the operation of the actual link terminals. Notably, due to the ever-increasing technological complexity in conjunction with relatively short official training periods, these young link operators were often overwhelmed with troubleshooting and operating their workstations on board. To make matters worse, in most cases these soldiers are left on their own because on each ship there is generally just one or two link operators deployed. Fred, who had just finished his service time on board as a link operator, noted in this context:

> *"And on board, we have a problem because we ship alone, there is no one we can exchange information with and communicate with if we have a problem or an error message. We have the Maritime Command Control Information System. However, this is to exchange situational overviews. So we have no contact."*

Moreover, several individuals in the link area identified that because of the relatively short training courses for link operators and the ongoing technological developments, further training and exercises were urgently needed to enable the link personnel on board to adequately fulfill its duties. Lukas explained the training problem as follows:

> *"The training to become a Navy operations master, that is, the training with the levels from petty officer second class to petty officer first class usually takes around two years, however, the specific TDL courses are relatively thin. If you take all courses of a link operator, you maybe have 8 to 10 weeks. And, such a few weeks are really not enough."*

Likewise, Andi recalled how he perceived the lack of official training while the new versions of the link standard where introduced, from which the need for advanced training and exercise arose:

> *"And as the Link 16 machinery was introduced in 2001 and 2002. The first terminals were installed on these ships, and no one really knew them, there was no*

one, who had real knowledge on how to operate these systems because we had no official courses and thus no mentionable know-how."

Chief Blaster Community (CBC). Very similar to the TDLC, individuals in the blasting practice sensed that with the changed requirements of modern-day missions abroad in which blasting needs to be much more precise and protective, their existing knowledge resources such as formal guidelines and field manuals were severely outdated. In particular, Christian, an experienced Army Captain, long-standing engineer, blasting expert, and now the instructor of the chief blaster training course experienced that formal regulations about the blasting training in the armed forces needed adaptation to the new circumstances of civilian-like blasting procedures. He recalled this:

"One could say my job is to do the training. However, the training only makes sense if we have a foundation and a basis from which to train. If I do not have this, the whole training does not make any sense, because then we train and educate things that are way too old. Hence, we noticed we do not advance this way, and we have to do something about the blasting manuals."

As Christian pointed out, he sensed the need to adapt and modernize existing knowledge resources, mainly in order to be able to fulfill his officially assigned task of training and educating soldiers in state of the art blasting techniques. To this end, Christian identified that he required an extended network of blasting practitioners to gather knowledge and, in particular, to test the feasibility of new procedures in actual missions and operations. Again, Christian elaborated on this:

"And to do so, you really need a group and a network of people that you can trigger. For example, you need to know how is the situation for the troops, is it actually practicable this way, or where are the actual problems and so on."

Christian, thus, experienced a profound need for additional relations to other practitioners. Moreover, because the newly introduced blasting techniques and exploders mainly stemmed from civilian procedures and were only available on the free market, members in the blasting practice had a keen interest to establish relationships that went beyond organizational boundaries to the private sector (e.g., businesses and blasting associations).

Newly trained chief blasters, who passed the new chief blaster training course at the school for Army engineers, also experienced the need for ongoing collaboration in a network of like-minded people, mainly because they were the only ones with this kind of specialized training in their respective battalions or units.

Hence, they felt a lack of local knowledge sources and contacts to other chief blasters. Bob recalled:

> *"And if the new chief blaster trainees, who past the training return to their units after the course they want to introduce the new detonators and explosives to their unit. However, they have no access to these materials, or they need some training materials like a PowerPoint or something. Then quickly they turn to us and ask us here at the school if we can help. They always stay in contact after they leave the course."*

In addition to these needs, related to knowledge and relationships, chief blasters also experienced a need for further exercises after they finished the formal training program because blasting with civilian explosives and detonators is currently only allowed at the Army's school for engineers, meaning that in all dislocated units blasting has to follow the conventional military techniques with military explosives. Henry explained this problem:

> *"And for us, it is important that we keep ourselves up to date and essentially train following the civilian techniques and with the civilian explosives, however, that is not possible while on duty due to several reasons."*

Besides these mentioned needs, chief blasters also identified problems with the currently provided equipment which, in part, was no longer suitable for the fulfillment of the manifold tasks of chief blasters within several changing scenarios. In particular, some members in the domain realized that they needed a specialized backpack for their explosives and other blasting materials. Karl, a platoon sergeant, and chief blaster explained this example:

> *"And we have a problem with our backpack, or more specifically we do not have a specialized backpack for blasting materials. When we are in exercises or missions, and we have to dismount (from the combat vehicle) we have to take everything with us like tools, explosives and so on and every soldier has 10 pounds of explosives, and this becomes heavy. However, we do not have an extra backpack for it, and this was really unsatisfactory."*

Cultural Advisory Community (CAC). As mentioned earlier, the domain for intercultural competence was still in its infancy during the early and mid-2000s. In general, two main areas of activity started to develop. On the one hand, first regional experts were deployed in ex-Yugoslavia, in 1999, as a first attempt to consult the acting commanders regarding regional particularities within the operation area. Mostly, these were former soldiers, who had studied history or alike

and who the armed forces specifically rehired for these assignments. In 2003, however, an internal study commissioned by the Center for Operative Communications (COpCom) concluded that: *"There is no training regarding intercultural sensitization either on a global or a specific level in the Federal Armed Forces"* (Archival data inventory: Tomforde, 2009). In order to increase intercultural competence and awareness on a broader scale, thus, the general mission preparation training was extended as elements about regional knowledge and codes of conduct were integrated into this two-week training assignment. This training should teach every soldier basic intercultural aspects before deployment (Archival data inventory: Langner, 2012). In hindsight, this first attempt was somewhat insufficient because untrained teaching personnel conducted these few hours of theoretical classes. Robert, for example, a former commander of the COpCom, experienced such training as follows:

> *"And we know that the education regarding intercultural competence is not really good. Mission contingents have one or two hours of such training, mostly in the evening hours, where 80 % of the people fall asleep because they were the whole day outside training and exercising. I know this not only from stories, but I also experienced it myself."*

To shed light on these issues, the COpCom assigned a survey to search for concepts and documented experience regarding intercultural competence in the FAF in 2007. The main findings were that concepts were rudimentary and not well coordinated throughout the organization (Archival data inventory: Tomforde, 2009).

To strengthen the overall intercultural competence within the troops, the Department of Defense developed strategic concepts in 2009 and 2010. As a consequence, the training and education for intercultural mission advisors (or foreign area specialists) were now formally assigned to the COpCom. Around the same time, the inspector general of the FAF installed a Coordination Element for Intercultural competence (CEIC) at the Leadership Development and Civic Education Center (LDCEC).

Even though the FAF introduced these formal concepts of intercultural competence and official post, several soldiers and civilian employees on the frontlines still perceived the resource endowment in the domain as limited. For example, Hans, a lieutenant colonel at the CEIC whose tasks involved coordinating the manifold initiatives in the field, recognized that several intercultural awareness courses were in need of improvement. His field of activity was not formally described in official guidelines but he sensed that a multitude of units and departments worked on intercultural aspects of modern warfare scenarios while there

was no mentionable exchange between the involved actors. As he described: *"And the process started when we realized that there was no coordination in this field. Everyone did his own thing and cooked his own soup."* Another informant, Christopher, also described the need for further networking and exchange with other experts in order to effectively work on his task that mainly involved regional studies and preparing support data on countries and their civilian population. From his perspective, this included the examination of cultural aspects as well. Within his department, he was somewhat on his own with his interest in intercultural competencies. Christopher, therefore, noted: *"During this time I had to connect with several other departments, and thus many connections evolved from this time on the frontline."* Later on, he joined Hans at the CEIC, where he also underlined the importance of relational resources:

> *"Also here we just need a network, you can imagine with just two individuals [he and Hans] it is nearly impossible to work for the whole FAF. Thus, without a network, we cannot fulfill this job."*

Similarly, Kevin and Marc (4) two foreign area specialists at the department for intercultural mission advisory[10] at the COpCom, noted that to fulfill the task of an intercultural mission advisor, one depends on a broad network of fellow practitioners because the necessary knowledge for effective consultancy is too extensive. Kevin, for example, explained: *"Networking always was essential for us, this means to stay in contact with other departments. However, we did not know who the right experts were and who had which abilities."*

Kevin's official tasks involved supporting cultural advisors in live deployments, writing reports for higher command, organizing daily staff work, and training new advisors. As the informants recurrently pointed out, intercultural mission advisors require in-depth training in multiple disciplines. The training situation at the time was, however, that the center hired intercultural experts from the civilian market who, afterwards, were mainly trained on the job. The informants experienced this as insufficient. As Kevin recalled:

> *"And we basically recognized we live here from hand to mouth because there is no real support from the official site and there are no real resources in this practice. Thus, we need to structurally better train our people. As I said before, there were no training guidelines, no training courses, actually, there was nothing to train someone as a foreign area specialist."*

[10]Intercultural mission advisory arose from the first attempts of regional consultancy. Intercultural advisory involves a broader approach than just a focus on regional aspects.

As this quote exemplifies, individuals within the intercultural competence practice identified the need for advanced training programs for their foreign area specialists.

In summary, individuals within the three domains identified—in light of a dynamic and complex environment—the need for adapting and renewing their resources to fulfill their formally prescribed tasks.

5.1.3 Self-organized Resourcing within Evolving Communities of Practice

In the context of a complex and changing environment, individuals on the frontlines of the organization now started to act on the identified needs collaboratively and, in doing so, generated novel resources such as guidelines, meetings, or opportunities for practicing together (i.e., training courses or exercises) within their communities of practice. As I did before, I will outline this process of self-organized resource generation for each community individually. Table 5.2 displays additional informant quotes in support of my interpretation.

Table 5.2 Representative quotes underlying first-order themes (Findings part 1.2)

Emergent resourcing within evolving Communities of Practice	
Probing and improvising first solutions	*Tactical Data Link Community* **Lukas:** "And we identified within the community that the link operators due to their education and their lack of know-how are no longer able to understand error messages, and thus they need further support from the outside. Hence, we installed a little committee via email in 2008/2009 and called it TDL Helpdesk, where every link operator could report his problems." *Chief Blaster Community* **Christian**: "And usually we start internally and look in our area for a solution, and if we don't advance anymore then we spread the information within the network." *Cultural Advisory Community* **Peter:** "Moreover, we sat down and just started to structure our contacts a little bit, just organize our business cards and asked ourselves what does this one know on what issue we might contact him or how can a further connection be established, and so we draw a first excel sheet with all the contacts we knew of"

(continued)

Table 5.2 (continued)

Mobilizing further connections and expansion of resources	*Tactical Data Link Community* **Lukas:** "And this little help desk was really well used by the link operators. It was just body to body level. This developed further, in a sense, that we said we could use this kind of quick communication and exchange for other systems on board and the technical systems and not only for the link operators if someone on board has the need for a contact person and needs quick help." *Chief Blaster Community* **Henry:** "And one of us chief blaster currently is positioned at the Department for Army Development, and he has to write these regulations. However, we always critically read and discuss the draft of the manual and give advice for alterations because we are the ones who actually work with it in practice." *Cultural Advisory Community* **Dennis:** "and in February 2009 we invited all others to our department and sat together and looked what is the common sense, where can we begin to work conceptually together. That was actually the starting point." **Bernd:** "And basically when we organize things in the network someone takes the lead based on his interests and competencies, and then others join. For example, the training course was initiated by *Kevin* and *David* and afterward others from the network than joined and supported them"
Transferring and utilizing resources	*Tactical Data Link Community* **Lukas:** "And then we developed the Navy coordinating post, which is now at the Navy Support Command. This is by now an official post and an official help-desk that works with a ticketing tool. These tickets are forwarded to an expert, who can help with the problem solution. This was really small in the beginning, but it developed over time, and now it is official." *Chief Blaster Community* **Nick**: "And if we go on a civilian blast and make our experiences or something has to change (within the manual) we report it to the school (Christian and Bob), and then it gets incorporated." *Cultural Advisory Community* **Mary:** "And in principle, this training course has been further refined and now is a complementary part within a whole masters course, and the community is constantly working on it in the form of lecturers and developing the issues further."

Tactical Data Link Community (TDLC). Confronted with the increasing complexity of the link technology and the growing demand for interconnectedness, individuals within the TDL domain began to improvise and probe first solutions to their multiple challenges. For example, at the Navy Support Command, several

members of the link domain started playing with two newly introduced Link 16 terminals in 2001. They connected the two terminals and exercised with them on an improvised scale. Lukas recalled this:

> *"So we in the Navy we were the first movers when it came to Link 16, and we relatively early on recognized that we need education. Thus, we joined forces and just took two terminals one from that ship and another one from this ship and set this up in our basement, connect it, and did a little exercise with it. I mean this was just Navy internal."*

After this first exercise members mobilized further relations to other branches and areas that were also grappling with the new technology and invited them to join the exercise the next year. Again Lukas further explained this dynamic:

> *"And then the Air Force said we have the PATRIOTS*[11] *and we desperately need trained personnel, and we said come to us we speak about it, and we will set up something here. Thus, it incrementally grew, and further people joined it. And of course, by that, you get to know more people. Moreover, at some point, the TDL Management Cell came on board because you have to oversee these links."*

As Lukas pointed out, the community of TDL experts and operators evolved around this small improvised exercise as increasingly more members in the practice area were invited to join. For example, as Lukas mentioned, the primary purpose at the beginning of the exercise was the education of link operators (NCOs), yet, over time several Officers from the DEU TDLMC (the new implemented TDL Management Cell situated at the FAF's Management Support Command) also participated in the, now called, NetOpFü Exercise (German: Vernetzte Operationsführung Übung). This opportunity for practicing together—or training resource—was continuously further refined while community members established additional contacts. Not only do all branches of the FAF now participate in the NetOpFü Exer, but even several allied nations such as the Netherlands are also now part of the bi-annual exercise. Again, Lukas recalled:

> *"At first the actual purpose of the exercise was to train our operators. However, we are now way past this stage. By now we have two NetOpFü Exercises per year. For once the summer NetOpFü and the winter NetOpFü. In the summer exercise we train the operators, and now some people from the Army also joined and several other nations too because in the summer we can do things live. At the winter*

[11] PATRIOT is a surface-to-air missile system, which is operated by Air Force antiaircraft rocket groups.

meeting, we focus on the technical aspects, and there are people from the FAF's Planning Command and Manufacturers."

Somewhat parallel to this dynamic several other at first informal meetings in the domain started to develop following a similar pattern. As a case in point, community members once met as they were accidentally near the same garrison in Bremerhaven at the Navy Operations School. They used this opportunity to prepare the next NetOpFü Exer which by now had grown into a full-scale exercise. Andi experienced this development:

"The main reason behind this was that the Management Cell was responsible now for planning the NetOpFü Exer and they had the idea to bring all people involved to a table to prepare this exercise because at the moment they also had a lack of personnel."

As the above quote illustrates, at one point community members improvised an informal meeting to coordinate their activities and, over time, this meeting developed into an established workshop as members again started to refine this particular resource by contacting further units and departments across the organization. Consequently, this TDL management workshop is now the central networking place for the whole TDL domain, where community members discuss, negotiate, and plan all aspects involved with TDLs. The informants recurrently expressed how important this meeting is for establishing further contacts and getting to know other experts. Lukas noted in this context:

"And then we have the joined workshop—usually at the beginning of each year—where we meet for one week and discuss our results, future projects, and possible deployments. We talk about what we specifically need, what we currently have to do, or which exercises do the soldiers need to have. It is also about the training and how we manage this across all branches."

Claas added:

"At this workshop, everybody involved with TDLs participates. There we talk shop or generally just stay in contact during the side sessions and along the presentations and discussions. This is the real value of it."

The link community, thus, was able to establish a relational resource in the form of the joined and boundary crossing workshop through continuous refinement.

Besides the exercise and workshop mentioned above, members of the link community were also able to innovate a formalized and specific knowledge resource that mainly helps younger link operators to fulfill their often challenging and complicated tasks on board. This handbook, at first, was an improvised compendium that entailed essential telephone numbers, an overview of relevant manuals and guidelines, and simple how-to instructions. It was mainly distributed and used at the NetOpFü Exer to give younger operators aid in practicing.

Over time the link community again refined and continuously expanded this handbook by gathering all their Navy acronyms, code words, and procedures and, in a second step, also incorporating Army and Airforce procedures. Through this collaborative refinement in the community, the TDL Handbook is now known as an excellent up-to-date knowledge repository far beyond the boundaries of the FAF. Martin, for example, described it as follows: *"And this here is the 2015 version (points to the TDL Handbook). We always print it and give to all units. (…) This is quasi like a little bible that every link operator has."* Also in this context, Andi recalled the growth of the Handbook:

> *"And in 2005 I think it was my predecessor here (Navy Support Command) together with a lieutenant commander from the Navy Command who had the idea to give the link operators some study guide with all the numbers and so on. Then members from DEU TDLMC noticed this book at one NetOpFü Exer and acknowledged it as a good thing and wanted to adopt it. After a few struggles between the different branches, this is now the official version for the whole FAF."*

The above narrative of the TDLC illustrates how members were able to generate several specialized resources within an evolving community of practice as a collective response to an altered environment. The starting point for these dynamics was always ideas and improvised solutions from Navy soldiers that, over time, grew as the community evolved and members crossed their departmental and organizational boundaries. As a result, community members were able to develop these resources from mostly improvised ideas to established exercises, manuals, and meetings that enable them to fulfill their tasks effectively. Otto summarized this dynamic:

> *"This TDL community, I would describe it as swarm intelligence. This makes it really interesting. You are constantly learning when others report something or new errors occur. Not a day goes by when we do not learn something. Thus, this community is really essential for us. Without this community, we would not be able to fulfill our tasks."*

Chief Blaster Community (CBC). In light of the drastically changed blasting procedures, individuals within the blasting practice also started to form a community to resource new equipment, knowledge, and training opportunities. This community mainly emerged around the new chief blaster training course, as participants informally decided to stay in contact after they finished the training. Henry noted in this context: *"And it just emerged as we sat down with a beer and decided to stay in contact and build a group for all chief blasters and the trainers at the school."*

Beyond this, the network of chief blasters spans much further and even beyond the focal organizational boundaries. For example, Christian and Bob cultivated contacts to foreign blasting experts, who annually met on the so-called "blasting seminar" to exchange information and practices together with the civilian blasting procedures (Archival data inventory: Gwerder, 2010). Additionally, they also established linkages to multiple civilian blasting agencies and associations. Community members, thus, were able to build up a vast network of relationships along the practice.

As mentioned before, the members of this community identified the need for adapting their formal guidelines in light of the changed blasting techniques that incorporated mostly civilian explosives and procedures. Hence, Christian wrote the first draft of the new chief blaster manual: *"And I set down and wrote this chief blaster manual, which orients itself on the civilian guidelines for blasting. I completely wrote this first version by myself."* Christian, however, recognized that he as a trainer held no official authority over formal guidelines and also needed further feedback and support from other blasting practitioners. Consequently, he mobilized linkages to a formal position at the Department for Army Development that was mainly responsible for publishing such field manuals and, on the other hand, he actively included the now evolving community of chief blasters in this process. Christian explained:

> *"And actually we have an advantage because the editor for the guidelines participated in the first chief blaster course in 2011. (…) I told him we have to do something about these regulations and since then we have been working closely together."*

Also, Christian distributed the draft of the new chief blaster field manual among all graduates of the training program. As Nick, another CBC member, recalled:

> *"I participated in the second course. Back then we had the draft, and it was around 50 pages, double-paged, and then we got our hands on it and worked with it. We found several aspects that weren't suitable or were minor mistakes. It*

was continuous progress, and by now we have 100 pages. Thus, all existing chief blasters with their different perspectives had worked through this draft."

As Nick pointed out, community members continuously refined and expanded the chief blaster field manual within the evolving CBC. As a result, the community was able to collaboratively generate and continuously advance this critical knowledge resource for their practice. Ultimately, they were able to transform this draft into an official field manual as they had established the connection to the official editor. Again Nick further elaborated on this:

"And for example with the safety regulations, they are not precisely regulated in civilian guidelines. Then we discuss it, and somebody says I will take care of it, and a few days later there he has a proposal, and we discuss it again, and now it is under official review."

Following quite a similar pattern, members of the CBC were also able to innovate new equipment parts. More specifically, the community conceived and resourced a new military backpack for blasting personnel. This process started as one experienced member drafted the first prototype for a new blasting backpack. That is, he at first designed a backpack for all possible deployment scenarios including different configurations of pockets for their blasting materials, different packaging options, different fabrics, and connecting systems for other personal equipment pieces. These design prototypes were later discussed and refined within the community. In detail, another community member, who also participated within the first chief blaster course, was officially appointed at one technical center of the armed forces. These are research centers responsible for testing and running trial measures for new equipment. He was thus able to officially experiment with these prototypes, i.e., testing their material compatibility and strength in different scenarios according to official regulations. Bob recalled this development:

"And on the official channels, nothing is happening, resulting in that we get the wrong equipment. Thus, we just need this network. For example, one HQ platoon leader[12] *of an engineer company has really deeply thought about a blasting backpack, how it should look like and what should be included. We just needed to refine it, but actually one can take it one for one. (…) Moreover, we had the contact to the technical center and to the experts, who make all these experiments: when does it break under pressure, what is happening if you put in on a parachute and so on."*

[12]HQ platoon leader (German: Kompanietruppführer) is an NCO who assists the commanding officer of a company in planning and organizing.

After the technical center completed its assessments, the CBC was also able to run field trials with two prototypes, meaning Christian sent out backpacks to several community members, who tested it during exercises in their daily duty. In the last step, Christian was also able to establish relations with the department for procurement and, in doing so, he transformed the community's idea of a backpack into an official procurement project.

Besides the examples mentioned above, members of the CBC were also able to generate a wide array of opportunities for practicing together, mainly through their contacts to private blasting companies. Again, Bob and Christian served as central links in this network as they would receive information from blasting companies about exciting projects were military chief blasters were invited to assist and then forwarded these invitations to other community members. Therefore, several community members were enabled to participate in the—hitherto—most considerable construction blasting in Europe, for example. This demolition assignment of an inner-city tower in Frankfurt involved around a week of planning and preparatory workings. Christian and Bob reflected on this training:

> *"This advanced training has shown how important it is to cultivate relationships to private blasting companies. That is the only way that the acquired knowledge and abilities of chief blasters can be deepened and enacted in practice"* (Archival data inventory: Hasholzner & Lankes, 2014).

As this quote illustrates, the CBC was able to generate several opportunities for practicing together over their network of relationships. Training assignments such as this skyscraper demolition are regular events, in the sense that community members are always aware of such training opportunities and utilize them whenever possible. In summary, the community was able to create diverse training resources for themselves by establishing relational resources in the form of a network that went beyond the focal organization.

Cultural Advisory Community (CAC). In the context of ever more complex missions abroad, members in the intercultural competence domain also began reasoning on their needs for more collaboration and more effective training for foreign area specialists. As in the cases above, this process started with individuals drafting preliminary solutions to the identified needs. Returning to Kevin, he recalled how he and a few comrades initiated their community activities:

> *"Basically, several things were born out of necessity, thus we sat down together after official duty hours with a beer and a cigarette and discussed how to structure a network better, how to document it, and what kind of experience we had made, whom we actually knew within the overall practice domain."*

As this quote shows, instead of accepting the status quo, the practitioners in the intercultural competence practice started to informally organize the relationships in their domain. Additionally, in order to respond to the identified lack of training resources and opportunities for cultural advisors, another member improvised a one-week training program for newly employed intercultural mission advisors in 2009:

> *"And one of my comrades said, we have to address the training situation, and so he knocked off a short training program, during which he did a tour de force through the whole field of the intercultural advisory"* (Kevin).

Building on these first efforts, the small group of practitioners mobilized its informal contacts to experts from other departments and units thereby forming the core of the CAC. Again Kevin recalled this process:

> *"And we decided to plan a network meeting for the whole domain, and in order to do so we met with five other departments, for example, we invited a professor from a federal college. Additionally, we said what about the Army's Staff College, they might be interested too. Also, we won them over. Then there was the Center for Geographic Information with another comrade, who was thankful that we took him along."*

As the above quote exemplifies, the community emerged as members cultivated informal relationships across departments and mobilized contacts even beyond the focal organization. Within this community, members started to collaboratively coordinate their activities in order to respond to the perceived resource lack. That is, several community members met regularly in order to plan and organize a first conference for the practice that would serve as its central networking and coordination opportunity, i.e., an opportunity for practicing together. In particular, Kevin, Hans, and Christopher recurrently met and discussed how this meeting should be structured. They compared their experiences to past meetings and conferences they had attended and, in doing so, developed a shared perception about how they would like to plan such a conference. Hans recalled this:

> *"And we met with each other and talked about how such a Congress might look like. For us, the workshop character was significant so that the people were able to bring their experiences into it and not just passively consume something. This was really the point to have really open spaces in this conference."*

As a result, in 2011 the community held the first Coping with Culture Conference with intercultural practitioners from several allied nations, other public agencies, and various universities in attendance. Christopher expressed how important this conference—as a relational resource—was and is for the work within the domain of intercultural competence:

> *"This conference is the expression of the whole network, and it is the opportunity to look each other in the eyes and meet face to face once a year (…). Because if one loses sight of yourself, the contacts will fall asleep, the network will end, and ultimately the work will die."*

Andreas, who was at the time appointed at the DoD to write the conceptual basis for intercultural competence within the FAF, also underlined the emergent character of the conference.

> *"And from my point of view the conference, for example, arose from the frontlines. The DoD did not initiate it through a top-down process; instead, the network among some individuals from different departments and units was able to do this."*

Moreover, Kevin and several other community members reflected on their improvised one-week training for intercultural mission advisors and decided to plan a more in-depth course covering all the major knowledge areas required for effective mission consultancy. As Kevin recalled:

> *"And we discussed it a lot because we realized that we actually had to build a specialized training course. After that, we discussed our plans with the Center for Leadership Development [Hans and Christopher] because we wanted them on board with this. Also, in 2012 we introduced our ideas at the conference [the Coping with Culture Conference] and discussed them with the participants, who were excited by it because they too hadn't had appropriate training."*

As described earlier, this quote again illustrates that after sensing a need and improvising a first response, several individuals mobilized their informal connections and started to coordinate further activities in order to create a training. Furthermore, Kevin and Marc introduced their plans to the broader community at 2012 Coping with Culture Conference and invited members to lecture classes in their fields of expertise. Developing from these dynamics was a six-week training course—the Foreign Area Specialist—that was held in 2013 for the first time at a University of the Armed Forces with 12 trainees in attendance.

Altogether, the narratives from all three "cases" illustrate how individuals started to exceed their formal, departmental boundaries to form a community of practice and, in doing so, were able to generate a multitude of new, specialized resources that enabled them to fulfill their official tasks and missions.

5.1.4 Summary of Section

In the previous section, I introduced the accounts about profound changes in three practices and how this spurred the emergence of three communities of practice, mostly relying on informant codes and archival data. In this subsection, I summarize these findings and make sense of them from a theoretical perspective. Figure 5.2 illustrates the first part of this study's grounded model, which outlines the process of self-organized resourcing in CoPs.

Previous work explains CoPs' emergence through individuals challenging and questioning existing notions (Boland & Tenkasi, 1995; Brown & Duguid, 1991). Mainly, organizational members, who engage in a shared practice develop a social context where they revise existing routines, solve their practice dilemmas and create new courses of action around their practice (Bridwell-Mitchell, 2016). This study's findings add to this perspective as they show in more fine-grained detail how alterations in the overall environment cause community emergence.

It is at this point where I will interweave the current study's findings with an overarching complexity perspective. More specifically, I explicate the emergence of CoPs as a collective response to an increasingly complex environment. Environmental complexity and dynamics describe the range of environmental contingencies or the levels of variety among elements in the environment (Ashmos, Duchon, & McDaniel Jr., 2000; Boisot & Child, 1999; Havermans, Den Hartog, Keegan, & Uhl-Bien, 2015). Usually, dynamic and complex environments are characterized by rapid changes and developments in addition to a high degree of interconnectedness and interdependence of elements and actors (Stacey, 1995). Likewise, rapid technological developments, the interaction of a variety of organizations and units, or cultural ambiguities and quickly changing situations in missions abroad define the environment in the three domains under study (1. Figure 5.2).

Such complex and rapidly changing environments cause what complexity theorists refer to as adaptive tension, meaning the difference between the organization's current state and what it needs to accomplish to optimize its performance (Kauffman, 1993; Maguire & McKelvey, 1999). Adaptive tension, thus, moves the organization into the far from equilibrium states (Nicolis & Prigogine, 1989;

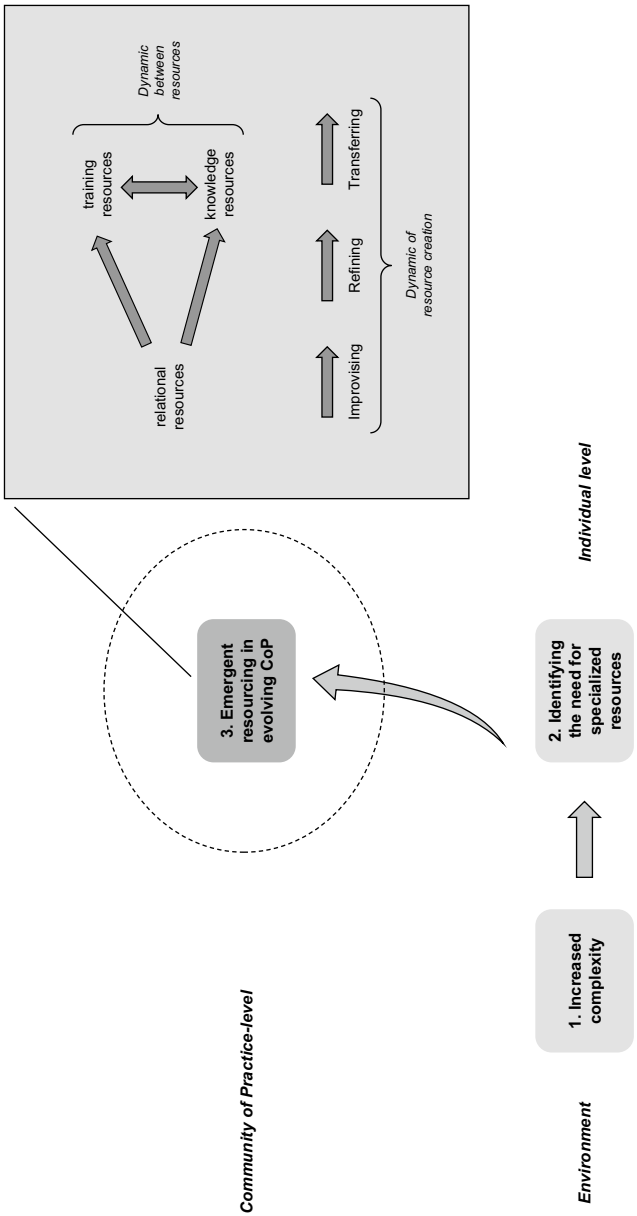


Figure 5.2 Grounded model of findings part 1

Prigogine & Stengers, 1984) where there is little or no fit between the organization and environmental contingencies. In such situations of adaptive tensions, individuals strive to adjust to such pressures (Uhl-Bien et al., 2007).

Likewise, practitioners in the three practices perceive their current resource endowment as insufficient for their tasks and missions in light of an altered, increasingly complex environment. That is to say, individuals either identified essential resources for their activities or sensed that existing resources needed renewal in order to increase overall fitness. Hence, adaptive tension, in this case, can be understood as a function of how individuals perceive their current resource base as appropriate for effectively fulfilling their tasks (2. Figure 5.2).

As mentioned earlier, complexity theory argues that when organizations move into these far from equilibrium states, emergent self-organization unfolds within complex adaptive systems from which novelty arises (Kauffman, 1995; McKelvey, 1999; Stacey, 1995). Earlier, I defined emergent self-organization as the emergence of new but unpredictable order as a result of the unscripted interactions of interdependent agents, without the imposition of an overall plan by a central authority (Anderson, 1999; Chiles et al., 2004). Likewise, the current findings illustrate individuals within the three practice who not only identified an insufficient resource endowment but also started to act without a predetermined plan and strived to adapt their practice to these environmental pressures, out of which novelty in the form of new resources and resource configurations ultimately emerged.

The current study's findings explicate this process of self-organized emergence in CoPs in more detail. In particular, I show how the dynamic of emergence can be seen as a resourcing process that unfolds within CoPs. To elaborate on this, I turn to the practice-oriented literature on resourcing (Feldman, 2004; Feldman & Worline, 2012). According to Feldman (2004), resourcing describes the process of asset creation situated in practice. This view suggests that employees generate resources while they deeply engage in practice and these resources in turn help to propel further activities (Dutton, Worline, Frost, & Lilizs, 2006b; Spreitzer, Sutcliffe, Dutton, Sonenshein, & Grant, 2005). Endogenous resourcing, therefore, describes an active process as *"resources are not exogenous or fixed, but rather generated as they are brought to use"* (Feldman & Quick, 2009, p. 138).

The current study's findings show how community members were able to produce, expand, and innovatively co-create specialized resources while they interact with each other across formal boundaries (3. Figure 5.2). More specifically, two resourcing processes become apparent: The process of resource creation and the relation between the resources in CoPs.

According to the resourcing perspective resources are produced when individuals act in agentic ways at work. Agentic work behavior describes people who are active and purposeful at work and in this sense are said to act agentically (Spreitzer et al., 2005). Resources, according to this view are thus seen as by-products of the doing of everyday work. Community members display high degrees of agency as they create resources in practice. That is, they deeply engage in their practices and, in doing so, recognize issues and needs that require further action and collaboration. To achieve these desired outcomes, community members intentionally and autonomously take action without being instructed to do so. Through these purposeful activities they begin to shape new resources in the doing of work, i.e., in practice.

Furthermore, these findings offer a nuanced description of the self-organized resourcing process consisting mainly of three stages: First, individuals creatively and innovatively improvise first solutions to their experienced needs. After that, they collectively refine and fine-tune these resources within a growing community. Moreover, finally, members transform these new resources to formally acknowledged resources (e.g., the formal chief blaster field manual or the official conference on intercultural aspects). The resourcing, I observed, thus starts somewhat unplanned and randomly from everyday workings compared to designed and controlled innovation processes (Eisenhardt & Tabrizi, 1995). Over time, these resources grow and expand as more community members interact with each other and engage in this resourcing process. That is, unlike conventional assets these resources are not depleted when used but, instead, take on more shape as more individuals get involved with them (Feldman & Worline, 2012). This finding also underlines the socially embedded nature of resourcing. That is, resourcing processes do not unfold in isolation but, rather, occur—much like learning—within the social interactions among community members (Brown & Duguid, 1991; Gherardi et al., 1998; Spreitzer et al., 2005).

Moreover, the current findings show that the generated resources stand in a particular relationship to each other. Members firstly create relational resources by establishing relationships across formal boundaries of departments, units, or even branches and organizations. Relational resources refer to high-quality connections between people (Dutton, 2006a) that can take the form of an informal network (Feldman, 2004). These relational resources are established around community meetings, workshops, or conferences. Relational resources within the CoP allow members to generate further resources like training courses or opportunities for practicing together as well as new knowledge resources. Linkages among individuals, on the one hand, create access to specialized expertise and knowledge. That is, individuals learn who has relevant knowledge within the community (Moreland

& Argote, 2003). Also, through the collective engagement in practice members learn how to get things done by observation and interaction (Orlikowski, 2002; Wenger, 1998).

On the other hand, connections help members to develop advanced exercises and training courses. These training resources, for their part, help members to create and share new knowledge more efficiently. That is, through the collective engagement in practice during such advanced exercises members learn from each other and knowledge is continuously exchanged and newly created (Brown & Duguid, 2001), which—in the cases of the CBC and TDLC—is partly "externalized" (Nonaka, Toyama, & Konno, 2000) in explicit knowledge resources such as handbooks or field manuals. As in the case of the CBC and TDLC explicit knowledge resources, in turn, have a strong influence on the design of the chief blaster training or the NetOpFü Exer as members continuously adjust the exercises and training programs to the field manual or the handbook.

In summary, I conclude from these deliberations that CoPs are collective responses to an increased environmental complexity and are sites for adaptive practice. CoPs, thus evolve as individuals identify adaptive tensions in the form of insufficient resource bases. Secondly, I suggest that the process of informal or self-organized emergence (Goldstein, 1999; Lichtenstein, 2000; McKelvey, 1999) can be understood as a process of self-organized resource generation that unfolds within CoPs when members collectively start to co-create new assets in order to enable efficient practice.

5.2 Findings Part 2: The Cultural Embeddedness of Communities

In the section above I have illustrated how three CoPs emerged within the FAF and generated new specialized resources. Up to this point, I have not focused on how this process of self-organized resource generation links to the broader formal organizational context. Thus, in this section, I will explore the cultural mechanisms between the evolving CoPs and their organizational ambiance. I start by describing the internalized norms of community members that represent a deeply rooted part of the organizational cultural repertoire within the studied military context. I proceed with outlining how members experience what I will refer to as cultural dissonance: that is, a contradiction between learned and internalized norms and observed and experienced practices in everyday organizational life. Following this, I will introduce the main cultural processes unfolding within the studied communities of practice that explicate how community members work

through such cultural tensions. Lastly, I will outline how members shape a new community schema through their collaborative practice. Unlike in the section above, I will now interweave the narratives from the three cases because these social mechanisms were for the most part similar across communities. Again Figure 5.3 displays the data structure for this findings section and Table 5.3 illustrates additional informant's codes.

5.2.1 Learned Cultural Repertoire

As three of the four members of our research team were officers, we were familiar with many of the armed forces' cultural particularities and contextualized meanings. These are, for example, military customs such as waiting to sit down until the highest ranking officer has taken his seat at the table, the meanings of colored knurls on military uniforms as signs of membership within a particular unit or subunit, military ceremonials at the command handovers of units, or the implicit rule that one should carry one's suitcase with the left hand so that one can salute with one's right hand. As these few examples already illustrate, soldiers and members of the FAF utilize a multitude of cultural resources of a broad cultural repertoire to maneuver through everyday life within the military. To focus the subsequent deliberations adequately, I will describe the normatively and formally provided features of the FAF's cultural repertoire, relying heavily on informant accounts about salient and internalized norms in conjunction with archival data reflecting formally provided cultural codes. This allows me to focus my reflections on the part of the cultural repertoire that pertains to the informants' particular experiences.

More specifically, two salient categories of norms and beliefs became apparent during data analysis. These are, on the one hand, internalized norms on military duty and task-fulfillment and internalized norms on organizational behavior in military hierarchies.

Internalized norms on military duty. Within each of the three studied communities of practice informants at some point during the interview referred to learned norms, shared beliefs, or military values of soldierly service as some exemplification or rationale behind their actions and behaviors. Surprisingly, this happened without a researcher asking specific culturally oriented questions but, rather, informants quite unconsciously verbalized sayings or adages that had some underlying and broader meaning. In this sense, informants often interweaved shared norms or beliefs in their explanations and accounts about their praxis. These norms and shared beliefs reflect behavioral expectations and guidelines for

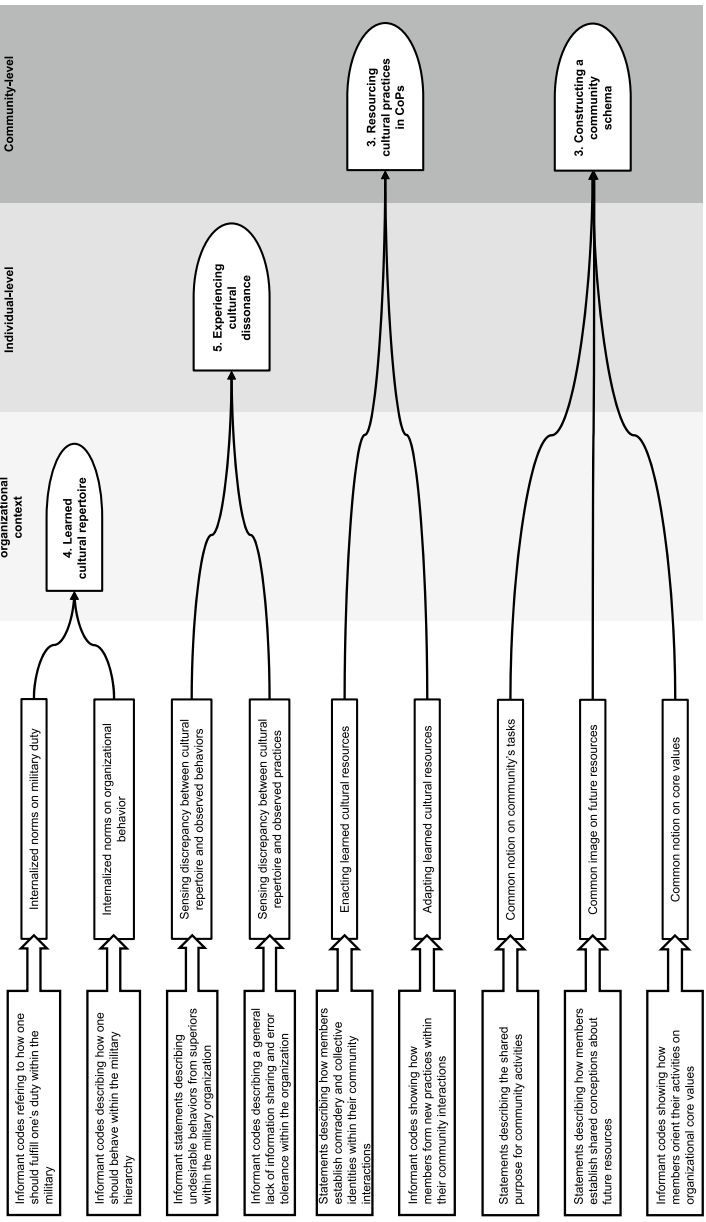


Figure 5.3 Data structure findings part 2

Table 5.3 Representative quotes underlying first-order themes (Findings part 2)

Learned cultural repertoire	
Internalized norms on military duty	**Frank:** "And for me, it is important to fill out my position really, and that is to do more than just what the book tells us. You have to do more; you have to show some own initiative to do your job well really. It is not only the writing of roster and a little bit of classroom." **Christopher:** "It is important to work with others collectively. Because I once learned during my active time of duty, now I am a civilian employee, the principle of joint and combined warfare. Meaning you cannot do something by yourself you have to do it collectively." **Henry:** "And really it is the self-initiative that keeps these things going. You cannot expect that something is given to you."
Internalized norms on organizational behavior	**Dennis:** "I think we are still a military system and we will not deviate from a hierarchical structure any time soon. And within a hierarchical system, there is the function principle of command and obedience, although we now have communities and networks it is still a salient characteristic of the military." **Bernd**: "We as soldiers know a lot about dos and don'ts. I mean we cannot do something that is against the formal regulations and rules." **Christian**: "And we all know that secrecy is an important issue within the military. Meaning if we share data openly here, we know that secrecy is pronounced within the armed forces. Sometimes this limits us a bit."
Experiencing cultural dissonance	
Sensing discrepancy between cultural repertoire and observed behaviors	**Mary:** "Unfortunately quick solutions are often hampered by hedging thoughts of superior authorities that is they fear that someone else can take a look at their hand."

(continued)

Table 5.3 (continued)

	Otto: Often within official symposia, you have some officers, who quickly present their slides and if you ask a question they feel offended, or the commander defends him and so on. So it is really just political talk." **Christopher:** "And within our organization, we often have the problem that we work beside each other instead of with each other, without knowing who works on what and what is the other department doing at the moment; that is, we do not know what is left and right from us."
Resourcing cultural practices in CoPs	
Enacting learned cultural resources	**Christian:** "And sometimes there develop real friendships from this where you met yourself outside of the duty or exchange experiences and stay connected. Thus, it is not always purely duty-oriented. Often it is just that staying connected if someone is here and comes by and so on." **Otto:** "And every January we met, and there you feel that this is a clique, you feel they belong together. This collective notion is really noticeable there." **Karl:** "And we have our coin with the holy Barbara, who is the saint for all artificer and we identify with this. Many also have the chief blaster tattoo I think around a dozen or so."
Adapting learned cultural resources	**Frank:** "Well we have the same rank structure as anywhere in the armed forces. However, we focus more on the professional aspects. We have sergeants and lieutenant colonels, but they all communicate with each other. It is about the competence not so much about rank and authority." **Andi:** "And because we know that we depend on each other to fulfill our jobs it kind of shapes this open atmosphere. That is, mutual respect on a really comradery level."
Constructing a new community schema	

(continued)

Table 5.3 (continued)

Common notion on the community's task	**Fred:** "I would say that through the exchange of this information between the different people there is a common understanding just present (…) for example you just know who has the most knowledge on TDLs. Thus, this understanding about the domain and the tasks are just there." **Frank**: "We called it brain to brain interoperability." **Christian:** "We are now working on a new blasting regulation for the whole armed forces. And there are many actors involved, and in the beginning, there were many discrepancies between the different branches (…) However, as we got to know each other better at meetings there developed this experience exchange."
Common image on future resources	**Christopher:** "And we have our common interest, and our common goal and that is the whole question of how to develop the intercultural competence within the organization." **Otto:** "And we developed a notion about how things should be within the new systems. That is, we will get the new F 125 class frigates, and we discussed how the systems should be configured. And now it actually will be implemented this way."
Common notion on core values	**Christopher:** "In the end, our work within the community and the issues we work on and develop further should help soldiers and also civilian employees to fulfill their missions. That is why we do this for the organization." **Otto:** "I believe this exchange not only benefits the individual within his everyday duty, but also the whole community, and therefore, actually effects the whole armed forces and makes many things easier." **Karl:** "In the end, our developments will save money for the armed forces and the engineers will make a big leap forward." **Martin:** "We move the whole flotilla forward." **Dennis:** "And in the end, we all serve our country, and we swore to protect it and serve it. And the community is part of this service."

military task-fulfillment. That is, they encompass normative standards about how soldiers should go about their duty.

Most prominently, informants recurrently referred to expected behavioral patterns of professional soldiers with the phrase: "trying to be a good soldier" or just "be a good soldier". Behind this phrase "good soldier" several meanings and role expectations are concealed that, together, shape the self-image and identity of a professional soldier. Bernd, a member of the CAC, for example, summarized this self-conception of professionalism as follows:

> *"And like a good soldier, I am here to serve. If you think about the meaning of the word to serve, you realize that it means that on every post you are assigned to you have to do your job."*

Other informants mentioned the qualities that make up "good soldiers". For instance, several occurrences in the data indicate that conscientiousness is a central characteristic of military task fulfillment; this means, that soldiers consistently handle official tasks precisely and studiously, even if they are mundane and routinized. Nick, a member of the CBC, noted:

> *"And it is our self-understanding that you look into the handbooks, even when it is your 100 blast exercise. And you have to show it; you have to set an example by doing it."*

As Nick pointed out, a professional self-conception involves the conscientious performance of one's duty. Similarly, Henry perceived his duty:

> *"And it is our self-conception, and we claimed it for ourselves if I do something I do it 100 %. Otherwise, I better keep my fingers off it. It is just doing something the right way."*

Likewise, the joint service regulation for civic duty and leadership—Zdv 10/1—officially notes: *"Soldiers of the German Federal Armed Forces are convinced by the norms and virtues of the constitution. In this sense, they are brave, faithful, and conscientious (…)."* (Archival data inventory: BMVg, 2008, No. 507).

Informants additionally described that showing self-initiative within their daily service comes naturally to them and is an important part of how they view themselves as professional soldiers. Self-initiative, thus, involves doing more than what is required and expected in official job descriptions. This facet of soldierly self-conception is often described with the phrase "going beyond the call of duty" and has become one of the most researched constructs in organizational behavior.

It is widely known under the term organizational citizenship behavior (Bateman & Organ, 1983; Podsakoff, 2000). Fred, the young link operator, described this special form of self-initiative:

> *"And for me personally, when I have a task, no matter what kind of task, I put my heart and soul into this job, for starters I read what I have to do on this particular post."*

As this quote exemplifies, members stressed the importance of self-initiative on the military task at hand. Self-initiative also encompasses the voluntary takeover of tasks and missions, even in uncertain and risky situations. For example, Christian described a voluntary but dangerous mission of two community members:

> *"And during the last flood of the Elbe [a river in Germany] a dike collapsed, and a whole area was in danger of flooding. Two of our chief blasters then said out of their self-initiative, we have the knowledge and a possible solution strategy for this dangerous demolition task and they did it voluntarily."*[13]

This kind of bravery and willingness to sacrifice is a common military virtue and, furthermore, is officially expected from soldiers. For instance, one of the central, formally prescribed duties of soldiers reads as follows: *"The soldier has the duty to serve the Federal Republic of Germany faithfully and to bravely defend the rights and the freedom of the German people"* (Archival data inventory: BMVg, 1956, § 7).

Another salient belief that our informants mentioned recurrently as part of their self-understanding is their role as a trainer, educator, and superior. These are the role expectations they put on themselves and others, which go beyond being an ordinary soldier. In this sense, they involve the significant attributes of a leader of men such as setting an example and being a role model for subordinates. As Bob, recalled it:

[13] *In 2013 during the flood of the Elbe a dike collapsed in Fischbeck, Saxony-Anhalt, and threatened to flood vast tracts of land. Henry (CBC) was assigned as a consultant to the Brigade Headquarters and came up with the idea to blast two barges into the collapsed dike as some kind of barrage. The blast was yet only possible with civilian explosives that were not available to ordinary troops. Henry, however, was able to procure the necessary means via Christian (the head trainer of the chief blasters). Altogether, parts of the Chief Blaster Community, thus, were able to quickly coordinate the deployment of modern explosives and techniques in a live mission.*

> *"And it is the way you as a trainer live it. If we train something, we have the same equipment on as the trainees, and if we expect punctuality, we better be there too at 0730 sharp."*

Also, Nick expressed a similar internalized belief: *"And I have to set an example because this is my role as a superior and I expect it from my subordinates that they do it the same way."* In particular, the role of a trainer and educator and the associated behavioral expectations were salient among informants in the Rank of NCOs. This finding is not surprising because sergeants have long been the central educators and holders of subject matter knowledge in the armed forces (Archival data inventory: Klein, 2006).

Moreover, for most informants, their self-conception as a leader was firmly bound to the principle of mission-type tactics leadership. The mission-type tactic is the general leadership principle of the FAF and describes leadership that sets mission goals for subordinates and units but, at the same time, grants relative freedom in the way the goal is achieved (Archival data inventory: Gareis, Haltiner & Klein, 2006; BMVg, 2008). The central leadership manual notes in this context: *"Mission-type tactics is the form of leadership that best fits the image of the citizen in uniform. Thus, co-responsibility for the achievements of a common goal becomes alive"* (Archival data inventory: BMVg, 2008, No. 613).

A final internalized belief in military task fulfillment that became evident in data analysis was military comradery. Hence, informants viewed helping others as a taken-for-granted aspect of military life. As one informant noted: *"We have the soldier law, and paragraph 12 states the obligation for comradeship. It is just normal to help and support"* (Daniel). Likewise, Bob noted: *"And most things I think are just natural. I mean it is just decency, general decency, and that belongs to the soldierly profession."* This central cultural idiosyncrasy of the military is also formally noted within the Soldiers Act:

> *"The cohesion of the German Federal Armed Forces is essentially based on camaraderie. It commits all soldiers to respect the dignity, honor, and rights of the comrade and to assist him in distress and danger. It includes mutual recognition, consideration, and respect of different views"* (Archival data inventory: BMVg, 1956, § 12).

Together, the above deliberations show that the informants of this study learned and internalized large parts of the cultural repertoire of the military organization in regards to task-fulfillment.

Internalized norms on organizational behavior in military hierarchies. Besides shared beliefs on how to accomplish military tasks, other occurrences in the data

pointed towards the internalization of behavioral norms and expectations about general conduct in military hierarchies. Many informants, for example, acknowledged the central military functional principle of command and obedience as important and irrevocably, meaning that they were aware of the fact that ultimately instructions from superiors must be followed to allow for efficient and coordinated task fulfillment within military operations. As Dennis explained it: *"We will not organize the whole military as a matrix organization. In doubt, this is way too time-consuming. In doubt, we have to act according to command and obedience. I am really convinced of this."* In a similar vein, Jacob, another Link expert, noted in this context:

> *"And we have a chain of command, and orders always state situation, mission, and execution. Then you have to click your heels [referring to the position of attention in military foot drill] say yes we do it this way even when you have the opinion that the other way would be better but we have decisions and they are based on formal order."*

As these quotes exemplify, informants recognized the hierarchical nature of the FAF with its vertical lines of communication and the associated rank structure as necessary and permanent features of the armed forces. It is, therefore, no coincidence that recruits have to internalize the military's pronounced rank structure with its evident rank badges as one of the first things in basic training. Unsurprisingly, this normative obligation for discipline and obedience is officially grounded in several laws and regulations about soldierly service (Archival data inventory: BMVg, 1956, 2008) and thus is a pervasive resource in military cultures (Archival data inventory: Gareis et al. 2006; Leonhard & Biehl, 2010).

As I explained before, formalization and regulation characterize the military bureaucracy. This feature of military culture, therefore, was also apparent in the data. Informants recurrently mentioned that one has to comply with the protocol and formal requirements. Martin, a member of the TDLC, described it as follows:

> *"And it is due to our soldierly self-understanding that we always have to act in line with the actual handbooks and regulations; that is, our action is always limited or restricted. Of course, we have somewhat of a right and left border in which we can act, and that is the official guidelines."*

As this quote showcases, individuals internalized that their agency within the organization is constrained by the various formalities and regulations. Some even noted: *"We as soldiers know much about the don'ts"* (Bernd), expressing that there is a plethora of institutional constraints.

One instance where this cultural resource of formalism and bureaucracy becomes particularly apparent is in the treatment of classified information and secret documents. Armed forces unsurprisingly have a strong need for secrecy because reconnaissance and information superiority against the opposition have been key success factors in warfare since the ancient world. Military organizations, therefore, demand confidentiality from each soldier even beyond his or her active time of service (Archival data inventory: BMVg, 1956). The attention to formal rules for secrecy was thus a recurrent theme within the data. Again Martin recalled: *"It is just normal to consider the secrecy issues. General secrecy rules, classifications and who has clearances for what"*. Similarly, Henry noted: *"And of course we do not exchange classified information via open text messengers such as Facebook or WhatsApp."*

In sum, individuals learned and internalized compliance with formal rules and adherence to bureaucratic regulations as a pervasive cultural element of the FAF. The adherence to formal rules might be explained by the military idiosyncrasy that the non-compliance can and often will be sanctioned via the military disciplinary code.

In general, members learn and internalize the elements of this cultural repertoire during the process of military socialization starting with the first days of basic military training and continuing on specialized military courses and education. For example, Nick recalled this process from his own experience:

> *"And our profession is not just another profession. It is not a usual job. There are several different characters, whom you meet regularly again and again as your superiors along your professional career and they will shape and influence you as role models. For me personally I was always able to learn something from my trainers and superiors, I thought was worthwhile to adopt, and so I tried to do it myself and found my way."*

As Nick pointed out, the process of military socialization—that is the learning and internalizing of the cultural repertoire with its norms, values, symbols, and expectations—occurred through observation of others and social interaction with others along military education and training.

Altogether, the cultural repertoire of informants in the FAF consists of vast parts of knowledge structures referring to normative values, professional identities, role expectations, shared beliefs and behavioral norms, which members learn and internalize through observation and social interaction.

5.2.2 Experiencing Cultural Dissonance

The above-explained cultural repertoire illustrates that individuals cherish and adopt many of the normatively prescribed behaviors and virtues into their professional self-conceptions and identities. The data analysis, however, revealed that organizational members experience cultural contradictions in everyday organizing at their units and departments. That is, observable behaviors and practices are in contention with the once learned cultural repertoire. Individuals sensed that in formal relationships learned cultural resources were no longer apparent. This dissonance refers to perceived leadership behaviors and, on the other hand, to more general practices within formal organizing.

Sensing discrepancy between cultural repertoire and observed behaviors. Informants consistently reported on how rigid legal safeguarding, meaning the in-depth examination of formal guidelines before any official action or decision, by formal superiors and superior authorities, often hindered innovative developments and collaboration. Although our informants learned the norms of organizational compliance and rule adherence, they perceived inflexible legal safeguarding as obstructive because it regularly impeded efficient and professional practice to a considerable extent. According to informants, legal safeguarding tactics were part of individual career agendas of higher officers. As Christopher recalled: *"It is often the fear that the own career will be damaged. I cannot understand this."* The perception of legal safeguarding is widespread within the FAF. For example, the annual statement from the parliamentary ombudsman for soldiers regularly reports on a general hedging logic within the armed forces: *"Instead, a hedging mentality and work to rule manifest themselves too often. There is a waste of time, money, and justification to stick to something that is no longer useful."* (Archival data inventory: Deutscher Bundestag, 2016, p. 7). Likewise, officers who report on their experiences from missions abroad note that legal safeguarding is dysfunctional for mission accomplishment: *"In a formally regulated culture at home, however, values of responsibility and independence find less correspondence. Control management and hedging logics easily hinder a culture of responsibility."* (Archival data inventory: Seiffert 2012, p. 97).

Such a tendency to legal safeguarding is often reflected in leadership behaviors that tend to micro-manage subordinates and subordinate units. Informants described this as leadership by command—describing leadership via strict order for any action taken—which they perceive as contradictory to the once learned principle of mission-type tactics. Kevin for example recalled:

> *"If you have military operations in urban terrain, you have a lot of standardized actions, and you have to guide with direct commands (…) within my current position they are a lot of creative activities, where you cannot set a clear command because you do not know the result. Unfortunately, we tend, within our culture of leadership, to give more and more of such commands that eventually form micromanagement."*

This impression is also confirmed by a wide array of studies conducted by the Army's Institute for Social Sciences or further published experience reports from soldiers (Archival data inventory: Bake, 2010; Senger, 2011). For example, soldiers report on the increasing bureaucracy and controlling in missions abroad: *"Indeed we tend to move away from mission-type tactics. What we always held high and trained countless times during exercises and it worked. However, now everything is commanded and hedged into detail"* (Archival data inventory: NCO in Bake, 2010, p. 32).

Note, that informants did not automatically associate these dysfunctional behaviors with their direct superiors; instead, they experienced safeguarding and a command-like culture as a general, unspecified tendency in armed forces leadership.

Sensing discrepancy between cultural repertoire and observed practices. Other perceived cultural contradictions include, for example, a culture of political communication during official meetings, committees, or conferences. Our informants recurrently noted that during formal meetings problems were not discussed openly but, rather, discussions were held to a generic and superficial level not involving controversial aspects or practical difficulties in official meetings. Problem-solving, therefore, was hindered along official communication channels. Andi (TDLC), for example, noted: *"Sometimes formally addressing someone is more important than the actual content that needs to be discussed."* Likewise, Nick experienced a general lack of communication within the armed forces:

> *"Meanwhile we have a big problem within the FAF that one does not talk with each other anymore, but we talk above each other. It is definitely moving that way; at least that is my feeling."*

Other studies about military cultures note that such behaviors are common in armed forces and refer to it as defensive communication patterns (Archival data inventory: Apelt, 2006, 2012) that in general impede open collaboration.

Closely connected to such communication habits, many informants stated that they experience a general lack of information sharing and cross-departmental

collaboration within their formal surroundings. In particular, departmental agendas would hamper collaborations beyond formal boundaries. For instances, Christopher (CAC) explained:

> *"You should not underestimate the arguments between two departments or duty stations when it comes to restructuring initiatives or budget negotiations, because this connects with the loss of positions and resources. Thus, they do not want the other department to look too closely at their own processes and operations. I think they often fear this."*

One should note that such experiences were not related to the actual frontlines but rather informants associated them with higher command levels of the hierarchy.

Moreover, informants also expressed a misguided error culture within the armed forces. That is, they repeatedly reported on the inadequate handling of errors or wide-ranging error prevention strategies. Their experiences involved problems that were often not communicated along the official channels due to the fear of unfavorable consequences. Information sharing and dissemination along the chains of command, therefore, was frequently caught up due to official filtering by formal authorities or superiors. For instance, members of the Tactical Data Link Community described how they were unable to send error messages that occurred during a mission on a Navy frigate to the experts at home because all official correspondence leaving and entering the ship was examined and filtered by higher officers not involved in the practical specifics. Again Andi recalled:

> *"And that is a thing that has not worked properly for decades. One ship does it in great detail; other ones write a three-liner everything is fine. However, later one finds out everything is not fine because they have some qualms to approach the superior department with any problem when they know maybe the mistake is also a bit on the unit and then they are a bit scared."*

Furthermore, some informants observed that, in general, the reality of everyday duty did not anymore reflect soldierly values such as the self-initiative or professional identities mentioned above. Instead, they experienced a shift in what they refer to as "job thinking", which describes the perceived circumstance:

> *"That too often comrades have the attitude that being a soldier is a nine to five job, you arrive on time, you clock out on time, and that is your duty, instead of being ready to take on tasks even after official duty hours"* (Archival data inventory: Bake 2010, p. 131).

In a similar vein, Karl (CBC) expressed his experiences:

"Nowadays, a majority of the people that come to us as soldiers view what they do just as a job. (…) And this kind of job thinking, we cannot allow this to unfold because the leap from job thinking to complete resignation is not that far."

Overall, the above impressions show that in light of a dynamic environment individuals consider traditional habits and behaviors, a too rigid holding on to formalisms, or command-like leadership as unfit for coping with the adaptive challenges. Indeed, they perceive central features of their learned, internalized, and valued cultural repertoires as no longer being practiced in routine service, leading to the experience of cultural dissonance.

5.2.3 Resourcing Cultural Practices in CoPs

Against the backdrop of these perceived cultural contradictions occurring in everyday duty, the data analysis revealed how community members shaped their own informal cultures around their social interactions as they worked on finding adaptive responses to their practice challenges. In particular, two dynamics become apparent: First, community members enacted, once learned, cultural resources within their community practices. Second, they adapted their cultural repertoire by molding cultural resources to navigate the dissonance and enable collaborative efforts.

Enacting learned cultural resources. Within each of the three CoPs, the data suggest that members reproduce parts of their cultural repertoire in these informally, spontaneously emerging interactions and relationships. Learned cultural resources, thus, are drawn into use and become actualized along with the resourcing activities of community members. In particular, members utilized cultural resources such as the norm of comradery, as the invisible bond between service members (Siebold, 2007), and professional soldierly identities within their community activities. As Christian so aptly put it: *"And that is the place (the Chief Blaster Community), where we live our comradeship, where we help each other, where we exchange our knowledge, and where we constantly learn new things about the process."* This norm of comradery, thereby, is embodied through the formation of a collective identity and performed altruistic helping behavior among members.

Constructing a collective identity satisfies member's need for comradery, sense of belongingness, and self-evaluation (Siebold, 2007; Wenger, 1998). Establishing such a collective identity means coming to a shared understanding of "who we are" and "what we do" as a social group (Gioia, Price, Hamilton, & Thomas,

2010), in other words: making sense of a collective self. In each of the three cases, such a collective understanding of the communities' salient characteristics became evident. Informants, for instance, recurrently pointed out what they believe their practice was all about. This shared notion encompassed a common understanding about the community's way of doing things. The Cultural Advisory Community, for example, shared the notion that the use of force should always be the last mean in armed conflicts. Christopher expressed this belief as follows:

> *"And what is a basic attitude within the community is that the usage of arms is the ultima ratio for every soldier. It is really the last means, and we have to utilize intercultural competence beforehand in order to reduce conflict potential as far as it is possible. This is our collective belief because we all understood that intercultural competence, indeed, spares blood. That is, human lives."*

Likewise, members of the Chief Blaster Community expressed the shared notion that demolition is not simply about pure destruction; instead, they viewed the blasting practice as a precise art of creating access or sparingly demolishing buildings. Christian again expressed this in his own words: *"And the ordinary engineer has demolition as one task of many. However, the chief blaster is a specialist in this area. Not only for the pure destruction, but rather for the filigree."* Meanwhile, members of the Tactical Data Link Community shared the belief that in order to achieve the principles of Network Centric Warfare—that is interconnectedness of all units—one has to start by connecting individuals and their perceptions, attitudes, and worldviews. Frank recalled this:

> *"And we call it brain-to-brain interoperability. That is a US notion. It means that we recognized that it is not enough to harmonize the procedures and the technical side, but we also have to connect our brains to each other."*

As the above statements illustrate, the collective identities of the observed CoPs were always constructed around the practice be it demolition, cultural advisory, or establishing data links. In other words, in each community a shared orientation on professional task fulfillment was evident. The completion of the actual tasks, missions, and orders thus stood above everything else. Informants underlined this strong task focus of their activities as they recurrently expressed that the community was about "getting the job done". Again Frank expressed this for the TDLC:

> *"And I believe what brings us together as a community is that everyone wants to do his job as good as possible. That is that ships, airplanes, ground vehicles can*

efficiently communicate with each other. That is our strongest motivation. It is just to fulfill our missions."

The chief blasters, further, expressed that beyond accomplishing their task they also share a common passion for their demolition practice. This affection and positive emotion towards their practice was thus a central driver behind their collaborative efforts to advance themselves and the overall domain. Henry, one of the CBC members, in this context noted: *"I think it is this passion and this affection for the blasting practice that ties us together."* Other members compared their communities to families within the service which, again, underlines the positive emotion they were feeling towards these social groups. Lukas expressed this:

"And I actually did not experience this before in my career. It is just like a family, a family in duty. That is how it is, you know each other, and anytime someone is at your garrison he shortly says hi or he or she call you regularly."

For example, the practice that CBC members had established a birthday list for all members and congratulated each other regularly embodies such feelings of togetherness and belongingness.

Overall, the professional collective identities were generated and recurrently produced while members engaged with each other in their activities. This process of identity construction usually starts with training courses and a career progression in the specialized practice areas of blasting or tactical data links. Many TDLC members explained that one knows each other from jointly completed training courses. Similarly, CBC members know each other for a long time as they mostly originate from the engineer troops. Subsequently, the community's identity is strengthened and deepened around the community meetings such as the TDL workshop, the CAC's annual conference, or the joint training exercises of CBC members. In particular, through the collective engagement in practice the community's identity became apparent to members as they can observe others and the passion they put into their activities. Nick recalled his experiences:

"And it is about the individuals within this group. For example, we have some Navy Seals within the group, and for them, it is just natural that you always give 120 percent. I believe that such individuals pull others along. This must not be verbalized you can see it, and others say ok I am in it too."

Besides, observing and interacting with each other while practicing together during training assignments or professional discussions, members engage in community rituals such as social events at these gatherings and meetings. For example, Lukas recalled:

> *"It is not just that you meet on the official level, but at all those meetings you always make a big social evening then you drink a beer with somebody, and you talk about it. We also talk about other things than just link. We always find ways to do that, even at the NetOpFü exercises."*

Other community rituals involve common farewells for comrades who end their active duty careers. The Chief Blaster Community, for instance, gathered together at the Army's School for Engineers when Christian was leaving the armed forces in 2016. Multiple informants expressed how vital such events were for them and the cohesion within the community. As Nick pointed out:

> *"And it is just the comradery. We all would have gone on our free time without an official order to discharge Christian. I mean, I know him for such a long time. And we just went there for three days and also did some advanced training and knowledge exchange."*

Besides such rites, community members also expressed their collective identity as they generated shared symbols for their communities. During the first chief blaster training course, one of the trainers for fun wrote "tattoo of the chief blaster badge" into their duty roster. As command officially approved the duty roster, three trainees and Christian got themselves inked with this tattoo. Since then this has become a persistent part of the training courses' duty roster, and several others followed their examples. Furthermore, the CBC has created a coin with the chief blaster insignia on it, which every soldier receives after successfully finishing the chief blaster course. Similarly, TDLC members created their own patches that soldiers wear on their uniforms during the NetOpFü Exercise. More specifically, they designed two patches for each year's exercises. One that one wears during duty hours and another that has more of a fun theme, which is only worn at social events or in the evenings. Again Lukas mentioned in this context:

> *"And we have different badges; you can see all of them on the wall [point's finger to patches]. (…) You immediately recognize someone as a link expert if he has his patch. Moreover, we have them in different versions. This one has a gimmick on it. It is just for fun."*

Altogether, the generation of a shared identity in practice through rituals and symbols is the ongoing enactment of cultural resources such as comradery or professional self-conceptions within the social praxis in the community.

Besides this collective identity, the enactment of comradery as a central cultural resource is evident in community members' altruistic helping behavior that was pervasive in any of the three communities. Informants repeatedly mentioned that helping other members and offering one's support within the community was natural to them. As Nick from the CBC recalled:

> *"For me that is comradery. It is just natural to do things you are capable of. If someone needs help and I have the opportunity to help him, I should do it. Or, if I am aware of someone else needing help, but he is afraid to call out, I should approach him."*

Such helping behavior was primarily focused on mutual support during task-fulfillment and thus frequently comprised assisting other community members in finding ad-hoc solutions to suddenly occurring problems. For instance, we were able to observe how members willingly helped each other out in establishing a lost data link connection to an aircraft during an exercise or how the chief blasters collectively fixed difficulties with a specific blast setup. This altruistic helping behavior, however, was not simply limited to official duty hours but, rather, in each community members also called each other on private cellphones when they needed quick support. For example, Christian told us the story that he while shopping in the mall on the weekend he was contacted several times by community members, who were deployed in Afghanistan and needed his advice and his opinion on a blast setup. Community members of the Tactical Data Link Community also established a similar reach-back procedure via an official laptop that some members were always carrying with them on and off official duty. Claas from the TDLC explained:

> *"We know that within critical situations there is always someone reachable. We also have this laptop in the community, and they always have it with them, and thus they can always send and receive messages independently from duty hour regulations or the intranet. This would break away if we abolished this informal side."*

Furthermore, many informants recurrently expressed that without this helping behavior and mutual support effective task-fulfillment would hardly have been possible, particularly in light of the increasingly dynamic nature of their domains. The ongoing performance of the cultural resource of comradery further reflects the absence of direct reciprocity within communities of practice. As Wasko & Faraj

(2005) note, community members do not expect future help from the same recipient of support; rather, it is collectively acknowledged that any problem will be dealt with by the community. As Bob, a chief blaster pointed out:

> *"You do not go to a single member, and you say be aware I have helped you three times now it is your turn. No, definitely not. It is more general like someone will be found who then will help out."*

The absence of direct reciprocity, however, does not mean that lurking is an accepted behavior within these informal exchanges. Comments from informants suggest that community members, indeed, observe each other's contributions and do not accept continued help refusal by others. As Nick described it: *"Of course you realize who is helping you and who does not. Sometimes one asks oneself: Is he not able or does he not want to help. But these things are clarified one to one."*

When asked why they help each other, answers often included sayings like "that is how it should be" or "because we are soldiers". Hence, voluntarily helping each other and sharing information about the joint activities can be read as the situated and ongoing instantiation of the learned norm of comradery.

Adapting learned cultural resources. In addition to the ongoing actualization of learned cultural resources, the data analysis revealed how members contextually adapted their cultural repertoire by molding cultural resources within their community interactions. Such revised and contextually adapted cultural resources were, on the one hand practices ensuring quality and excellence in community activities and, on the other, practices of open collaboration.

As mentioned before, the praxis within the communities is focused on the respective task at hand, which also becomes evident in several practices that aim at ensuring a high quality of community solutions. In particular, the data analysis revealed four mechanisms by which members secured ongoing high quality within their informal activities.

First, members regularly incorporated formal guidelines, regulations, and official field manuals into their activities, so that developed solutions were applicable within the whole organization. As the explanations above have shown, many of the communities' resourcing activities evolved around formal knowledge resources like field manuals or official documents that were considered natural constraints to problem-solving. However, this does not imply an unreflective application of formal rules but, rather, official guidelines were always interpreted and critically questioned about their usefulness and appropriateness to everyday operations. In this way, our informants always viewed formal requirements as malleable. As Otto explained the TDLC's handling of formal guidelines:

> *"We have our official field manuals on how to set up our networks, but we handle the sequence relatively freely because if we only operate after the same steps the result will always be the same, and we might overlook other aspects."*

Members, thus, acknowledged the formal requirements; yet, at the same time, they intentionally worked in grey areas or exhausted their limits in order to enable effective practicing in a changing environment. Simultaneously, members routinely searched for ways and channels to formalize their community-based solutions. The culture of formalism, thus, continued into community interactions but, at the same time, was contextually attenuated. Also, this finding illustrates how bureaucratic structures and formalisms are engaged by organization members who creatively search for responses and solutions (Milosevic, Bass, & Combs, 2018).

Second, informants within each CoP described that errors occurring within discussions or exercises were always proactively handled, in the sense that the community immediately addressed and corrected problems or inaccuracies. As Bob recalled:

> *"The quality is basically ensured by the community itself, in the sense if someone says something wrong, which can happen because not everyone is as deep into every topic, then automatically others will correct it. It is basically a form of self-censorship."*

As this quote exemplifies, high quality was secured through self-regulation within the communities. At the same time, informants of the CBC and TDLC regularly emphasized the natural character of errors or mistakes during practicing due to the domains' complexity or the general novelty of procedures and techniques. Hence, members viewed errors as parts of the trade and handled them benevolently. Beyond that, data link experts sometimes even deliberately deviated from well-known procedures in order to discover further possible malfunctions of their communications terminals and to collectively develop promising problem solutions during their meetings.

Third, to ensure high quality and professional discussions around the tasks, membership in the communities was in some ways limited. That is, only soldiers, who had passed particular training programs or individuals with a relevant professional background became part of the practice. For example, the CBC limited membership to soldiers, who participated in the chief blaster course. Likewise, membership in the Cultural Advisory Community exclusively comprised individuals with knowledge of cultural, ethnological, or regional aspects. These membership limitations, however, were not formally prescribed; instead, they

were naturally emerging from the self-selected nature of these informally unfolding interactions. Thus, membership is self-selected based on one's expertise, personal interest, and motivation to engage with others in the practice.

Fourth, informants recurrently reported that the official rank of community members was of secondary importance during community interactions; rather, professional knowledge and competence were essential parameters of one's influence on coordination within the CoP. As, for example, Karl from the CBC pointed out: *"I would say that rank does not play a role. Actually, the hierarchy is somewhat evaded because everyone in our community talks about the same things and has the same goal."* This development was observable across all three communities. Claas expressed it for the TDLC as follows: *"And the reason behind this is that the rank nowadays actually does not say anything about the professional competence."* High quality community solutions thus were secured by adapting learned norms on hierarchy in favor of coordination based on professional competence. Overall, it is evident that members at the same time incorporated and altered learned cultural resources about formalism, bureaucracy, and hierarchy in their shared practice.

Besides molding cultural resources to achieve high quality, community members shaped a norm of open collaboration to counter the observed developments of political communication and lack of information sharing in official meetings. Collaboration within the observed communities was centered on idea and knowledge exchange to solve ad-hoc problems or create resources such as training courses, workshops, or handbooks. These collaborative efforts, in particular, relied on mutual openness and outspokenness, in the sense that controversial discussions and critical questioning were allowed and continuously performed behaviors in community interactions.

Members cultivated this openness through several social practices situated in the context of the CoPs. On the one hand, members developed their own informal but professional languages that allowed them to openly communicate and collaborate with each other (Brown & Duguid, 1991). Such a shared language evolved in each case around the specific knowledge area of a given community and members continuously refined it while they engaged in joint praxis. The development of professional verbiages such as acronyms, technical terms, and conceptions is, again, an indicator of the strong task focus of the inquired communities. This shared language was in some instances derived from official artifacts such as the communities' official field manuals or handbooks, but in instances where official knowledge resources were scarce members relied on developing their own terminology. Returning to the tactical data link experts, Andi expressed: *"These are all*

deeply ingrained acronyms and notions, which establish an own language and if you do not know this language then you are lost. That is just the way it is."

This shared language was not simply limited to professional verbiage, members also regularly introduced new informal notions, terms, or acronyms into their social praxis. Again, an example from the TDLC illustrates this dynamic:

> *"Afk [abbreviation for: away from keyboard computer language], I do not know where this is coming from, definitely not from the official regulation and it is not an official TDL acronym that is general chat language. I think someone started it last week and by now it is accepted"* (Claas).

Additionally, it was evident that members practiced what they refer to as "comradely tone", describing an informal, unofficial language among them. Individuals within the communities thus were mostly on a first name basis despite rank differences. Again, as Claas described: *"The community lives from this laissez-faire style such as being on a first name basis even with officers and superiors"*. Also, the chief blasters developed their language; for example, other members called Christian the "old one". This informality also included non-domain-specific communication among members which occasionally involved blowing off steam or sharing personal problems and concerns with other community members.

Most informants mentioned mutual respect as additionally aiding open collaboration, meaning that even when rank hierarchies where obscured, community members engaged with each other with decency and politeness. As Paul recalled the discussions within the TDLC:

> *"And when there are officers in our workshops you just deal with them respectfully, that is not something special, if he is talking, you are listening, and if you have a question you ask it, and you discuss it. It is reasonable."*

Moreover, informants recurrently mentioned mutual trust among community members as a central feature of their relations that enabled open collaboration. In particular, open knowledge exchange and controversial discussions were enabled via trust in other members' integrity, in the sense that members felt the safety that critical topics or remarks verbalized during meetings remain inside the community. In the Cultural Advisory Community, for example, any interactions at the annual conference were under the Chatham House Rule[14]. Dennis highlighted this:

[14]The Chatham House Rule originates from the Royal Institute for International Affairs and states: "When a meeting, or part thereof, is held under the Chatham House Rule,

> *"In our community [the CAC] we have the security that sensitive data will not be used otherwise and you can really speak your mind. That is, this trust between us and that is a huge plus for us."*

Likewise, members of the other communities established such a risk-free environment via more implicit rules that enable openness. Andi, for instance, describes the discussions during the TDL workshop:

> *"And we really go down deep, I mean we really mean business. It might occasionally happen that people quarrel with each other. However, afterward, they will drink a beer because they just expressed their opinion and it can be loud sometimes but always with respect. That is just part of it."*

In sum, community members adapted their cultural repertoire as they formed their own informal cultures by resourcing practices such as open collaboration and high excellence within their community interactions in order to navigate the experienced cultural contradictions and to finally be able to develop adaptive responses.

5.2.4 Constructing a New Community Schema

During the processes of generating new specialized resources, explained above, community members develop a new shared schema that is shaped within and guides their ongoing interactions. These schemas are central to sensemaking because they enable individuals to negotiate a complicated and potentially confusing world. People draw on their schemas to interpret, understand, and react to events or stimuli occurring around them (Balogun & Johnson, 2004; Gioia & Poole, 1984; Labianca, Gray, & Brass, 2000). A community schema, thus, can be viewed as a shared knowledge structure that encompasses shared understandings about the community's history, tasks, goals, and activities that enable member's interpretation and meaning-making of new occurring information and subsequently guide their activities in response to that information.

This shared schema starts to evolve as members collectively begin to make sense of their practice and interpret the environmental changes unfolding around

---

participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed" (retrieved from: http://www.chathamhouse.org/about/chatham-house-rule on 19.03.2018).

them. Thus, they start to collectively give meaning to unfolding events by discussing, negotiating and questioning them without a formal authority being present. From these collective meaning-making processes a shared notion about the community's task is constructed among members. That is, members negotiate and agree upon what they believe are essential features of their jobs. Informants from the Cultural Advisory Community, for example, reported how they quickly came to the understanding that intercultural competence—and in particular mission advisory—is an important asset in contemporary military operations. Kevin from the CAC noted: *"And we quickly recognized the meaningfulness behind this whole thing, that is, these intercultural mission advisors are a valuable asset for officers commanding troops in missions because we prevent friction in operations."* Dennis added to this: *"And we have this I would call it common understanding that we say intercultural competence is important because it bonds together, saves blood, and it protects you to keep your nerves."*

Likewise, members of the Tactical Data Link Community started to negotiate meaning about the dynamics in the link practice. As many informants noted, these collective meaning-making processes did not come without friction, describing that individuals with different worldviews—mostly because they came from different service areas—initially clashed with each other. Sensemaking within the TDLC, thus, was accompanied by struggling over the prerogative of interpretation. Frank recalled this:

> *"And initially we had many conflicts of interest, different procedures, different goal aspirations, and various notions about how we like to deploy this [TDLs]. We needed to fight this out, but as soon as we fought this out, we quickly became a community."*

As Frank pointed out, the community evolved as several actors negotiated a common understanding of the task at hand. Fred emphasized this: *"And we really have this shared understanding and notion across all branches now."* Simultaneously, members established shared understandings about how to develop their areas in order to answer the identified needs. To put it differently, members developed shared perceptions of the future as they negotiated meaning about how an ideal situation in their domain might appear. As Marc (CAC) recalled: *"We went about it pretty progressively as we asked ourselves how the system should be structured, what is the best possible condition for effectively and efficiently doing it on the ground."* Community members thus organized their activities around shared perceptions about what future specialized resources should look like. Consider the example of the annual coping with culture conference again. Kevin recalled:

> *"And we tried to go about these conferences a bit more strategically and looked at what kind of other conferences are there. For example, in Britain the Culture and Conflict this one was nice from a networking perspective but content-wise not as much. I mean it was just presentation of your topic, five minutes' discussion, and that is it. Then in Austria, we had a meeting, a copy room with ten guys this was also nice but not what we had pictured. Thus we came to the impression that we had to do our own conference which goes more into depth and has a workshop character."*

As this quote illustrates, members developed a shared perception about a future resource in light of their own experiences which members later enacted as they planned and organized the conference. These tentative ideas were adjusted over time while members started to enact their schema by building and shaping the actual resources in practice.

In addition to this sensemaking about the community's aspirations, the evolving community schema also entailed profoundly ingrained and widely accepted beliefs about how members viewed their role within the armed forces. That is, the knowledge structures on military service were still a salient part of the newly forming community schema, which becomes evident as members related their community activities to traditional core values of the military organizations. Hence, instead of experiencing community activities as contradictory to formal organizational hierarchy, they instead viewed their informal praxis as compatible to the formal organization. For instance, informants never viewed their activities as a means to themselves; instead, they interpreted these efforts as direct contributions to the overall system effectiveness. As Bernd from the CAC noted:

> *"The network helps to utilize this intercultural capacity for the whole armed forces because we bring everything together and make it useful. In particular, for the mission preparations but also for standard training."*

Likewise, members in the TDLC emphasized that the community's activities directly contribute to the organization. Andi explained it:

> *"In the end, we [the TDLC] produce a part of the information superiority of the armed forces, by enabling communication between vessels, aircraft, and the army in real-time."*

Other occurrences in the data showed that members made sense of their resourcing activities as aiding to the overall organizational development. For instance, informants recurrently expressed that their efforts would "push the armed forces

forward". In this sense, members inherently thought of their communities as drivers of organizational change. As Christopher aptly put it:

> *"These people [the CAC] don't want to advance themselves, they rather want to effectuate something in the system [the organization] not destructively but rather constructively in order to develop the armed forces and make it fit for the future."*

Similarly, Christian from the chief blasters pointed out: *"We always see it this way if we do not do it nobody will do it but we do it within the meaning of the organization and in the meaning for the soldiers."* This strong orientation on organizational core values also finds expression in informant's statements that relate their activities to organizational efficiency and cost savings. In this context Karl from the CBC pointed out what the introduction of civilian explosives might effect:

> *"We now work on introducing the civilian explosives into the armed forces and if we manage that they are relatively easy to order. I am sure that this will happen because other nations do it as well. Then the armed forces will save much money because these new exploders are way more efficient."*

Altogether, the findings show that community members arrange newly shared schemas that both entail knowledge and shared notions about how to react to the unfolding environmental dynamics and a shared orientation on organizational core values. Consequently, the resourcing activities are oriented towards finding solutions to adaptive pressures as well as doing this in line with the overall organizational mission.

5.2.5 Summary of Section

As I did in part 1 of the findings, I will again explain the above narrative description from a theoretical perspective and thereby develop the grounded model further (Figure 5.4).

The cultural dynamics between communities of practice and the broader organizational context starts with individuals learning and internalizing the cultural repertoire (4. in Figure 5.4). According to Swidler (1986), a repertoire entails diverse cultural resources from which actors draw to develop strategies of action. From a resourcing perspective, these resources remain potential resources until individuals put them into practice. Then the potential resource becomes a resource in use (Feldman, 2004; Feldman & Worline, 2012). More specifically, potential

resources are schemas or frameworks that become actualized when people utilize them in action. That is, resources are assets that allow individuals to enact a specific schema (Feldman, 2004). Following this logic, the cultural repertoire, consequently, consists of cultural schemas that can be understood as *"knowledge structures that represent objects or events and provide default assumptions about their characteristics, relationships, and entailments"* (DiMaggio, 1997, p. 269).

Similarly, Weber & Dacin define cultural repertoires as: *"schematic identities, frames, roles, stories, (and) scripts"* (2011, p. 289). Individuals reproduce these structures/schemas in everyday activities as they practice this structured knowledge (Sewell, 1992). Cultural resourcing, therefore, describes the process of individuals drawing on their repertoires and enacting their cultural schemas, thereby, reifying and most importantly modifying cultural resources in practice. Below, I will explicate this cultural resourcing process in detail.

The resourcing process unfolds as individuals start to make sense of their surroundings, in particular of leadership behaviors and formal practices of organizing, against their cultural schemas (the learned repertoire). Individuals, thus, utilize the cultural repertoire as they bracket their experiences (Weick, 1995; Weick, Sutcliffe, & Obstfeld, 2005), that is they identify, categorize, and evaluate relevant stimuli from their organizational environment (Canato, Ravasi, & Phillips, 2013; Harris, 1994). Cultural schemas, in particular, help individuals to interpret stimuli as ordinary occurrences or at variance within the expected (Harris, 1994; Weick et al., 2005). Resulting from these sensemaking efforts are cultural contradictions, or what I have termed cultural dissonance, meaning that stimuli occur in everyday organizational life which only fit poorly into the once internalized cultural schemas (5. in Figure 5.4). In other words, individuals observe and experience culturally inconsistent behaviors and practices around them.

The occurrence of such a dissonance spurs the cultural resourcing within the evolving communities of practice (6. in Figure 5.4). Members contextually reproduce and enact learned schemas of comradery and professional soldiering along their self-organized praxis. Using resourcing language, they draw on potential resources and transform them into resources in use by actually practicing them in local social interactions (Feldman, 2004). The enactment of these cultural resources reflects and embodies existing cultural assumptions from the broader context within a novel and informal local contexts for organizing (Hatch, 1993). Enacting learned cultural schemas in the context of the community is possible through the transposable nature of schemas. Transportability of schemas means that they can be applied to cases outside of the context in which they were initially learned (Sewell, 1992). Central elements of the broader normative culture

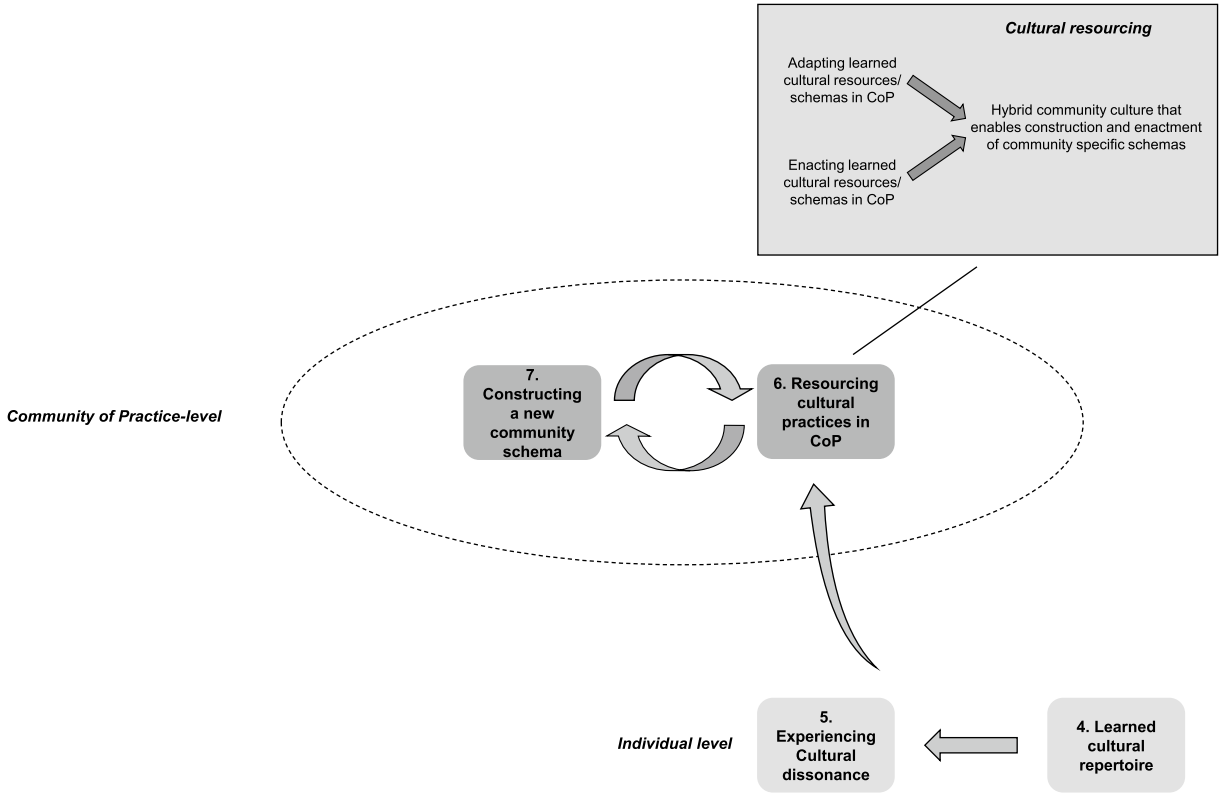


Figure 5.4 Grounded model of findings part 2

are, therefore, constituted and reconstituted in the doing of work (Giorgi et al., 2015; Hatch, 1993; Smets et al., 2012). More specifically, members resource these learned and internalized schemas in the doing of informal and self-organized community work. In particular, individuals construct these cultural resources such as comradery around community rituals and community symbols.

Simultaneously, the occurrence of cultural dissonance triggers what scholars describe with deliberate mode (DiMaggio, 1997), mindfulness (Weick, Sutcliffe, & Obstfeld, 1999), or intentful action (Jarzabkowski, 2004) meaning that during such moments of interruption or schema failure, individuals act reflectively and intelligently as they override programmed modes of thought (DiMaggio, 1997). Cultural resources are thus reinterpreted and contextually adapted where they are being viewed as contradictory or unrewarding (Hatch, 1993). For example, members in the studied CoPs contextually adapt and alter learned cultural resources of formality, hierarchy, and rank structure by reinterpreting and incorporating them into their emerging social practices, e.g., beliefs on formal requirements and bureaucracy are part of a high excellence norm within the studied CoPs. On the other hand, community members discard traditional schemas/resources and replace them with new practices within their community interactions; such is the case with norms of hierarchy and rank that members substitute with social practices based on professional competence. This cultural change thus occurs because actors continuously reweave their webs of beliefs to accommodate new experiences (Tsoukas & Chia, 2002).

The cultural change unfolding within CoPs is thus not a complete override of beliefs or internalized schemas (Bridwell-Mitchell, 2016) but, rather, the contextually driven nuanced adaptation and modification of cultural resources. As Kellogg (2011) notes, individuals without powerful cultural toolkits tend to informally organize for change as they convert existing resources instead of fundamentally transforming them. More specifically, community members juxtapose traditional cultural resources and newly resourced ones such as the openness and rank-free interactions within the context of the CoPs.

Together, this creates what Jarzabkowski (2004) terms hybrid practices that enable new modes for action while simultaneously retaining traditional practices. Similarly, Howard-Grenville et al. (2011) describe liminal spaces in which familiar and unfamiliar elements are combined to create a new culture. In this sense, the above narrative illustrates how individuals generate hybrid community cultures consisting simultaneously of old and new cultural resources.

This newly generated informal culture—established by cultural resources that are put into practice—in turn, energizes further action. The informal community culture allows members to develop and enact a context-specific community

schema that entails knowledge and shared notions about how members actually want to respond to their experienced needs and adaptive challenges in addition to shared notions on how their activities are oriented towards organizational core values (7. in Figure 5.4). Again, this finding can be explained using a resourcing lens. According to Feldman & Worline (2012), resourcing can be ampliative, which means that, once resourced, schemas can become potential resources for other schemas. In other words: "*resourced frameworks can become resources for other frameworks*" (Feldman & Worline, 2012, p. 635). In this sense, resourcing their own informal and local cultures enables community members to construct and enact their community-specific schemas and thus actually generate responses to the environmental complexity in the form of new handbooks, training courses and opportunities and so forth.

In summary, the current findings illustrate the cultural embeddedness of communities of practice within a hierarchical organization. That is, the local social praxis situated in communities is linked to the broader socio-cultural structure of the FAF via the mechanisms of cultural resourcing. The unfolding community activities are, thus, profoundly intertwined and embedded within the cultural context of the organization. Furthermore, the illustrated dynamics explain how, at the same time, cultural continuity and cultural change unfolds between CoPs and their organizational ambiance as members' praxis shapes hybrid community cultures. Consequently, organizational culture in this view is an ongoing accomplishment that is at the same time stable and changing and, therefore, always in the stage of becoming (Feldman & Orlikowski, 2011; Feldman & Worline, 2016; Tsoukas & Chia, 2002).

5.3 Findings Part 3: Formal Leaders Interactions with Emergent CoPs

To this point, I have focused my deliberations predominantly on community-internal processes that explicate community emergence as a process of self-organized resource generation (cultural resources and specialized resources) that occurs as a response to an increasing environmental complexity. In the following section, I will unpack how formal leaders influence these emerging processes. Although most of the above-described resourcing activities unfold without formal superiors and leaders being present in such communities, members nevertheless interact with formal leadership throughout their daily service which naturally affects their self-organized praxis. Intriguingly, the data did not reveal a single

superior or formal leader who influenced one of the three CoPs as a whole; instead, leadership relationships arose whenever community members interacted with direct superiors, department heads, or upper echelon leaders. Specifically, the data revealed four distinct influencing patterns dynamically occurring in these relations which I will introduce below. Again, Figure 5.5 displays the data structure for this section and Table 5.4 provides additional informants quotes.

Table 5.4 Representative quotes underlying first-order themes (Findings part 3)

Enabling CoP emergence	
Granting free space	**Dennis:** "You should not forget we are not talking here about a standard process. Instead, we are talking about something completely new, and now I cannot press this into a process; rather I need the freedom to develop it, and this is really important." **Will:** "And in such phases of a new domain it was mainly driven by pragmatism and fixing mundane problems in organizing. (…) And for such activities, you need to give freedom." **Bob:** "Most of the time they (formal leaders) just let us do our things."
Fostering trusting relations	**Christopher:** "What is really important in my opinion is that superiors do not distrust people working in such networks. In our unit that worked quite good." **Martin:** "And usually the superiors just trust in the frontlines and all the communities because they do not have that deep of knowledge in this area."
Resourcing additional assets to CoPs	
Granting material resources	**Bernd:** "The role of superiors and command is crucial for the informal work within the network because, in the end, they have to grant us time and budget for traveling to meetings. If I want to access this network I have to be there, I have to meet with others; I have to introduce myself to others and so on. If my command does not support this, it is dead. At least for our department." **Mary:** "And when you introduce something like a new course that also cost some money, and it needs a budgetary basis, and it is difficult to manage this from the frontlines. So you need support from superiors and other units."
Providing immaterial resources	**Bernd:** "And our commanding officer, a high general, participated at the first conference and he told us that he believes in the purposefulness of these activities around intercultural competencies and by that he really supported us. And more is not really needed." **Christian:** "And from my point of view the key thing is that there is some acceptance from formal superiors as well as the higher departments."

(continued)

Table 5.4 (continued)

Mutual adjustment of schemas	
Giving sense	**Dennis:** "And in this pioneering phase of something novel that needs to be built you need maximum freedom, but also a vision."
Negotiating sense collectively	**Christopher:** "And we had some leaders, who were interested in the overall issue and gave impulses. That is, they helped us to sort things out." **Christian:** "It is really different, for instances, our general here he is really interested, and we discuss it often."
Transforming emergent resource	
Formalizing emergent resources	**Andi:** "And this summer school is now part of an own master degree course, so it's a part a formal course that is done with the Center of Excellence." **Mary:** "And that's why the unit in the DoD is so important for us because they can support and formalize it. For example, they helped us with integrating it into the training catalogs and they promoted it within the organization. This are things that are hard to do bottom-up and are easier top-down because they reach further than we."
Supporting further activities	**Robert:** "And if leaders help to formalize these evolving things they also help to motivate."[a]

[a]The quotes are also used in a published journal article Schulte, et al. (2020)

5.3.1 Enabling CoP Emergence

This first section unpacks how formal leaders shape enabling structures for community emergence by creating conditions within their units or departments that allow and seed informal activities. In particular, enabling community emergence includes superiors granting space to their subordinates in addition to fostering trusting relationships with them. Informants, therefore, recurrently mentioned that especially during the beginning stages of their activities, formal leaders withheld direct influence in the form of specific instructions to them. For example, Bernd from the Cultural Advisory Community recalled: *"There weren't any direct interventions from formal superiors in a sense that we have to do this or that within the community specifically"*. Returning to the TDLC, Frank equally recalled how his formal leaders did not intervene with developments on the frontlines:

> *"Superiors who affect the community negatively are seldom. I actually can't remember a case where superiors hampered us in our community work. This is because*

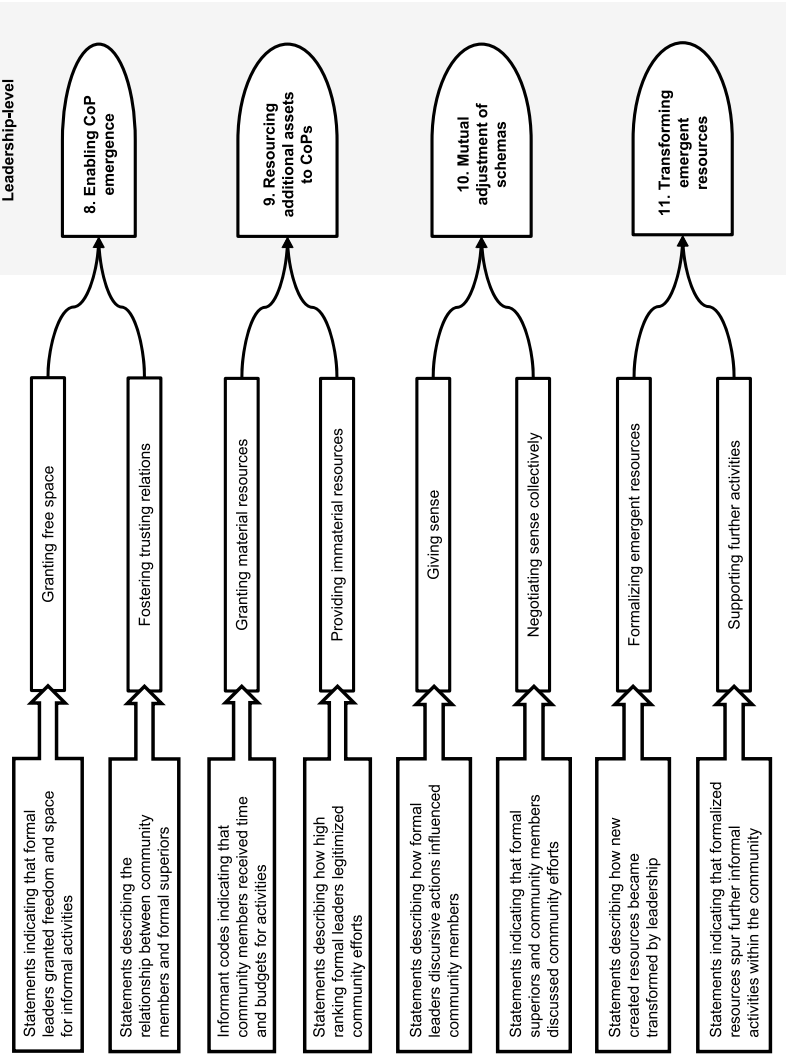


Figure 5.5 Data structure of findings part 3. (The data structure is similar to one published in Schulte et al. (2020))

> *most superiors on a certain level do not understand what we really do and thus grant us much space."*

In this context, many informants also stressed that too much external influence in the form of direct interventions, structuring, and governance of their activities by formal superiors would hamper their emergence or, in the worst case, would ultimately lead to their demise. For example, Lukas from the link community noted when asked what would happen if formal leadership would interfere: *"Actually, it would probably lead to a situation where also the formal communication and therefore the whole knowledge transfer between all areas would fall asleep."* Members in other practices areas mentioned similar concerns about too much external influence. Mary from the CAC recalled:

> *"And an outstanding active community is not manageable. As soon as someone would start managing it, it soon after would probably no longer exist. No, that is actually this informal side which is powerful."*

Consequently, informants recurrently underlined the importance of formal leaders enabling community emergence by tolerating and permitting informal praxis that went beyond formal regulations or specific orders. As Dennis (CAC) pointed out:

> *"The work within a network always needs time but I took it, and I always had superiors who let me do it even without a STAN*[15] *order. (…) In my case, it was my direct superior, who gave me maximum freedom."*

Self-organized resource generation within CoPs is thus recurrently linked to leaders granting space and freedom to community members. For instance, Christian from the chief blaster community emphasized how important such free space was for engaging in this growing network:

> *"In our case, it was definitely the freedom that was granted to this field of duties because it really was continuously emerging as novel things were introduced, a new course was conceptualized and I was part of this from the beginning and if all had been predefined there wouldn't be the opportunity to co-create this."*

Likewise, Henry pointed out the importance of enabling leadership:

[15] STAN stands for Stärke- und Ausrüstungsnachweis, which describes the planned endowment of material and personnel of an organizational unit within the FAF.

> *"And they [formal leaders] enable it by giving their permission to us for going to advanced training opportunities [civilian blasting assignments] and for us that is the battalion's commanding officer, but I have to say we were fortunate here. In the past years they always supported this."*

Not only did community members stress this form of autonomy but also formal leaders acknowledged that these new emerging developments need space. For instance, Bill, who at that time was a colonel and head of the Center for Operative Communications (COpCom) where Kevin and other intercultural mission advisers were stationed, pointed out: *"I have always tried to give those new, emerging issues enough freedom and space to develop."* Christopher experienced his formal superiors in a similar vein as he started to cross the boundaries of his official position at the Center for Geographic Information to connect with other intercultural experts:

> *"I started to develop the first contacts with other units, and this was the starting point actually. Thus it started to grow because the topic [intercultural competence] had a great significance for missions abroad. I also started to persuade my superiors, and they gave me the liberty to do this kind of work."*

As this quote illustrates, Christopher experienced superiors who allowed informal praxis and granted autonomy to him instead of instructing specific behavior via direct objectives. Additionally, this quote also exemplifies another critical facet of this leadership relation. That is, community members persuaded, informed, and educated their formal leaders about the tensions, needs, and the evolving resourcing dynamics. In other words, they engaged in issue-selling (Dutton, Ashford, O'Neill, & Lawrence, 2001; Howard-Grenville, 2007) by discussing and presenting pressing topics to their formal superiors. As Hans recalled: *"And actually there was a lot of persuasion work from the bottom, meaning I persuaded my superiors and it came to fruition because they were open enough to listen to me."* As Hans pointed out, this required formal leaders, who would take the time for such open discussions about new developments. Likewise, Kevin recalled how at the COpCom the new ideas for a training course and the annual conference were communicated to higher officials:

> *"And actually we distributed our ideas to command along our channels in order to look at how command reacts to it. Thus, we either gave these ideas to our staff [the staff of the commanding officer] or informally to the DoD because there were two departments that were also responsible for this."*

As Kevin pointed out, community members of the CAC informed their superiors and superior departments relatively early on about the ideas and initiatives emanating from the frontlines.

Furthermore, informants recurrently stated that superiors often facilitated experimentation, testing, and tryouts as the initiatives were informally pushed forward. For instance, Kevin recalled how he experienced his commander when he and his fellow comrades started playing with the idea of a specialized training program for intercultural mission advisors:

> *"There weren't any official instructions from our superiors such as you have to do it this way in this quality to that date; rather, we had implicit agreements with the commander, who recognized that this is beneficial and thus gave us space to develop our weird ideas and test them."*

This form of experimentation was often facilitated through a high error tolerance from command, in the sense that formal leaders established benevolent handling of friction. This involved tolerating the unconventional ideas and new ways of thinking emanating from community activities. As one of our informants pointed out:

> *"When I approached my direct superiors with a somewhat strange idea, they did not immediately shoot it down. (…) And this has something to do with error culture. Error culture is a big part and, therefore, the role of superiors cannot be overvalued."*

In the case of the Chief Blaster Community, Karl also emphasized the importance of experimentation and room for potential errors:

> *"In particular, in the area of blasting techniques, there are so many things, and you have to really stress that sometimes you just have to test things out unknowing of the actual outcome. For example, the blast at Fischbeck during the flood, the two chief blasters just tried it out because one led them freely do it."*

Besides the granted autonomy and free space, informants reported on how trusting relationships with formal leaders were essential in enabling community activities. In particular, members perceived the trust from leaders in community members' professional expertise as pivotal for operating outside of formal boundaries and official guidelines. Again, Dennis recalled: *"Establishing trusting relationships is a central leadership aspect, in particular within this new context of developing*

something [the practice of intercultural mission advisory] completely new. Speaking for myself, I experienced this ideal-typical by my own superiors." Likewise, members of the TDLC recalled how superiors' trust in the professional competence of NCOs and link operators was a crucial element in leadership relations. For example, Fred mentioned:

> *"And then they [formal leaders] give us freedom. For example, by now I know that I do not have to go to my superior with every triviality because meanwhile, the trust is there, in the sense that he says the professional knowledge is there and just do it."*

Similarly, Otto mentioned: *"And the command, you have to say so, they really took a leap of faith. This is actually a voluntary waiver of their right to intervene."* In general, such trusting relationships between formal leaders and community members evolved over time during ongoing social interactions. Intriguingly, the data show that interactions were regularly initiated through community members as they approached their direct superiors with their problems and needs, instead of being built by formal leaders.

Overall, the above narrative description illustrates that formal leaders grant autonomy and free space to community activities but also establish close and trusting relationships to single community members by taking time to listen to their needs and ideas. This might be counterintuitive as autonomy is usually linked with more laissez-faire leadership styles or loosely coupled relations, in the sense that formal leaders leave the communities of practice alone (Marion & Uhl-Bien, 2001). From the current study's findings, one might conclude that establishing close relations between formal leaders and community members regarding ongoing open discourse and mutual trust, actually enables granting more autonomy in thinking and acting to subordinates. Consequently, both autonomy and trusting relationships together foster the conditions for community emergence. These conditions or enabling structures are, therefore, continually constructed in social practice between members and formal leaders. Because leadership is embedded in these social relations, another difficulty that can threaten ongoing community activities is the fact that, in the military particularly, officers are regularly transferred to other posts which causes discontinuous relationships between members and superiors. Christian from the CBC noted in this context:

> *"This can really vary, at the moment there is much restructuring that means some units are dissolved, and now we are appointed to another unit, and many superiors changed. Therefore, many relations that grew over the years with the old boss are now gone."*

5.3.2 Resourcing Additional Assets to CoPs

In addition to establishing enabling structures, formal leaders also provided the resourcing activities with material and immaterial assets which supported and catalyzed them further. Hence, another critical leadership practice by formal superiors consists of providing community members with official resources and delegating the decision making power regarding their use to subordinates. Specifically, informants frequently mentioned two resources that were essential in conducting their community activities: namely time and budgets. Consider the CAC's annual conference, for example; although the idea for planning such a conference emerged from first informal discussions among a few soldiers, subsequent meetings with other experts in the domain at other departments required time during official duty hours and finances mainly used for traveling. For instance, Christopher remembered:

> *"If a unit or department wants these communities and their value in the form of new training and so on, they have to equip them with funds, and that means basically money, time, and personnel (…). If, however, I tell my subordinates to wait, to stay here and do your official jobs, then it gets critical because the network ultimately will fall apart."*

As this quote shows, ongoing community praxis was only facilitated after command had granted additional resources and the freedom to use them. As the granting of financial assets within the FAF always requires an official justification, which is usually a written order, members often drafted such orders for their meetings and passed them to their superiors for approval. Returning to the TDL Management Workshop, informants recurrently mentioned that after the first, mostly informal, meetings members started to draft written orders for this meeting. Otto for example mentioned:

> *"There is always a justification, and this comes from the DEU TDLMC [the management cell] and their colonel signs the order that [name] has to do this workshop and good. You know, you always need a budgetary basis so that people can travel and so on."*

Members of the CBC followed a similar pattern when civilian demolition companies invited them to blast assignments. That is, they also informed their commanding officers and prepared a written order for them to approve their participation in this training. Henry described this in his own words:

> *"And we talk to our battalion commander and when he approves we will write the order which of course he signs and that is the basis for us to be officially secured and participate in this activity. This is about insurance, accommodation, vehicles and all those things."*

In some cases, CBC members even participated in such advanced training opportunities on construction sites in their leisure time. Formal leaders, however, again had to approve personal leave for these activities. Nick, for example, mentioned: *"And our superiors enable this by granting us leave to go on these advanced training opportunities."*

Furthermore, formal leaders within the TDL domain in some cases even actively supported the networking and community building by encouraging their subordinates to take trips to meetings and conferences. Claas, for instance, described his superiors:

> *"And due to the complexity of these issues, our superiors meanwhile suggest this networking to us when they say there is a meeting be it national or international and tell us to find out, and what is it about, and is it relevant for our domain."*

Such proactive support of community activities was not apparent in every leadership relation between members and their formal superiors. For example, members of the Chief Blaster Community expressed the fear that with new superiors their community activities may be hampered. Christian noted, in this context:

> *"And he can kill it [the community activities] by simply not approving the business trips and then it is over and dead. At the moment I fear that some superiors now see the chance to take countermeasures."*

Overall, formal leaders catalyzed community activities in their units and departments as they regularly approved community-related business trips without the critical scrutiny of their official purpose. Additionally, formal leaders granting their subordinates time for endeavors that were not primary job assignments was as crucial, as was providing financial support for these activities. For instance, the link operators on board Navy vessels were regularly permitted to visit the informal link operator meeting at the home port. Lukas recalled this:

> *"And formal leaders support us; for example, if we attend the link operator meeting. All the link operators are exempt from their everyday duties at the time of the meeting without any problems because it is so important to maintain the contacts within the community. One exception is of course when they are at sea."*

Due to an increasing amount of missions and training duties for their vessels, however, informants also noted that time for such informal meetings was becoming increasingly scarcer. Again Lukas further noted:

> *"The main barriers at the moment are all these mission obligations or similar obligations. It is not like that anymore, that you have all 20 to 25 link operators present. If they all were present, that would be great. However, that is no longer realistic because all ships are now on missions, or mission preparation, or mission debriefing. Additionally, there are seminars and so on. So, if there are five to six at this meeting, we are many. These are the resources we can still use."*

Similarly, Dennis from the CAC emphasized the importance of having time to generally work on aspects regarding intercultural competence and develop these entirely novel issues further. In particular, this required formal leaders, who deliberately by-passed the institutional logic of only focusing work effort and human resources to formally predefined tasks but, instead, also allocated time and personnel to these new issues. Dennis recalled that this was, again, accompanied with issue-selling and persuasion of superiors:

> *"But time is a real problem, I mean time as a resource if you in the first phase only have one or two people working on this only in secondary tasks then you have to persuade others that the secondary task now has become a primary task."*

As Dennis pointed out, it was vital that formal leadership recognized and simultaneously acknowledged the dynamic nature of the changing practice and shifted resources—in this case working hours—towards them.

Formal leadership, however, not only channeled material assets to the dynamics unfolding within CoPs, they also catalyzed these activities by engaging in symbolic actions that underlined their support for the communities' efforts. Hence, they also provided immaterial resources such as legitimacy, recognition, and appreciation to members. Consider the training course example from the CAC again. Kevin described how he and his fellow practitioners experienced the visit of a high-ranking general during the first Foreign Area Specialist course as a symbolic form of acknowledgment and legitimization for themselves and their practice:

> *"And for example, the commander of another big department, a three-star general, acknowledged our training by saying he will participate in it and teach a lesson himself. Therefore, he took a whole day for us, I mean this is a three-star general, he is always busy, and that has to mean something."*

As Kevin expressed, the symbolic action of an upper echelon leader who participated in the course and highlighted its importance provided community members with a basis of legitimacy for their self-organized resourcing activities. Receiving this form of legitimacy was particularly crucial for the CAC because their domain was characterized by far-reaching novelty which involved promoting new ways of thinking that were, for the most part, in opposition to traditional military logic that views soldiers as fighters and not as armed social workers (Archival data inventory: Tomforde, 2006). To counter this resistance and gain more official resources from the organization, members relied on upper echelon leaders' symbolic support. Ultimately, such symbolic support not only provides legitimacy for the emerging bottom-up dynamics, it also has a strong motivational effect on members as they feel that their efforts are recognized and valued by high ranking officials.

Similarly, community members in the other practices experienced this form of symbolic support from their superiors. Lukas for example from the TDLC reported on how a formal leader visited their TDL Management workshop:

> *"And it is essential that superiors, for example, visit our meetings because there we have the time and the space to talk about these things. And then there is a heated discussion, and he [the formal leader] stands up and says I support you, I think what you are doing here is good."*

Also, informants repeatedly expressed how in their everyday service formal leaders' recognition and appreciation of the community's efforts served as motivation and legitimation. As Dennis again recalled, *"It is critical that our superiors give us the feeling that our work matters and is indeed a core task."* Similarly, Claas noted: *"It is always a motivator when your work is valued."* Likewise, Bob from the chief blasters recalled:

> *"And when you see that all the work you put into these new things gets honored in some way, and by that I do not mean any official rewards or bonuses, just being appreciated. Then I can take a lot out of it for myself."*

This form of recognition, yet again, requires formal leadership that is willing to spend time with members of the frontlines, shows interest in their problems, and supervises them in their day to day activities. As Christian noted:

> *"What we do is not a secret but, for example, I never had actual supervision in the last years when I was teaching in front of specialized courses. Then I ask myself*

why there is no interest from superiors and, as a consequence, superiors do not understand our problems when I point them out."

As Christian highlighted, appreciation of members' efforts also involved formal leaders who showed interest in the practice and discussed it with subordinates in everyday work. Many informants noted that this form of recognition did not require official meetings or presentations in front of commanding officers but, rather, short chats and private talks would be satisfactory.

Altogether, formal leaders catalyzed community emergence by equipping members with material and immaterial resources. This leadership praxis thus supported and legitimized the CoPs' ongoing resourcing activities.

5.3.3 Mutual Adjustment of Schemas

Mutual adjustment of schemas, or in other words the co-orientation of members and formal leaders, involves formal leaders who engage in both sensegiving activities and open discourse with community members, resulting in the mutual adjustment of actors' underlying interpretative frameworks. As I mentioned before, community members initially made sense of the environmental dynamics and how to respond to them autonomously. That is, they developed their specific community schema with its shared understandings and notions about how to respond to the identified needs. As the specialized resources such as the Foreign Area Specialist course, the new blasting manual, or the TDL management workshop developed over time, however, members became more involved with their superiors regarding these developments, and formal leaders inevitably began to affect the communities' activities. To put it differently, as the specialized resources evolved so did the relationships between members and their formal superiors in which formal leaders tried to give sense to these unfolding initiatives. Consider the example of the Cultural Advisory Community, again, where the commanding officer of the Center for Operative Communications repeatedly provided overall mission narratives to his subordinates. These narratives often involved broad visions about possible future states for the whole intercultural competence domain. Kevin, for example, recalled how he experienced routine briefings with the center's commanding officer:

"And of course, we had our usual weekly briefings with command where our commander introduced his vision and his agenda, describing where the whole domain of psychological warfare is moving and what are new issues and topics. Thereby,

he gave us points for orientation, and now I can say, okay, this is the domain, and I know in which direction we want to actually move, and this is how we develop the whole system further."

As Kevin noted, instead of directly demanding specific behaviors, sensegiving by higher officials was limited to providing wide perceptions about future developments in the practice, which enabled members to align their praxis accordingly but also left enough space for community members' creative efforts. Intriguingly, this is similar to how Bill recalled his leadership at that time as he was the commanding officer at the COpCom:

"And I always tried to give these new developments enough room. Also, I tried to set some goals where we would like to go, but I left the decision on how to get there with them. Actually, my chief of staff led them way more closely regarding all the operative things of the day to day activities."

Likewise, Hans from the CAC experienced formal superiors at the Leadership Development and Civic Education Center who also engaged in sensegiving by providing a broad vision:

"And what is equally as important as having autonomy is having a vision, which should be transported by higher command. In particular, things like what do we actually want and where are we going. My Colonel, for example, conveyed this vision with positive perseverance and energy."

In other practice areas, however, some informants reported that they sensed a lack of such provided visions from formal leaders. For example, Jacob from the TDLC mentioned:

"Sometimes I have the feeling that something is missing. I mean it works on the frontlines, but it would be better if one thinks about the whole system and makes sense about how we actually want to utilize Link 16. That is, the overall understanding is missing and not really given."

In other occurrences, sensegiving praxis simply involved formal leaders who verbalized general visions about the purpose of military duty and reminded their subordinates of soldierly core values. In this way, formal leaders inevitably influenced the schemas of community members by giving meaning to unfolding events or, more generally, on soldierly service.

However, members were not only passive recipients of top-down given sense and meaning but always made sense on their own and altered, rejected, or adopted

the meanings and perspectives formal leaders gave to them. Note that there was no single formal leader who formulated and influenced a CoP; instead, community interactions were inevitably influenced by multiple, distributed leaders and their sensegiving efforts. Consequently, members had to make sense of and negotiate multiple perspectives to construct their own understanding of the practice.

Furthermore, other occurrences in the data suggest that some members even functioned as sense givers towards formal leaders. In particular, members who engaged in the aforementioned issue-selling activities inevitably influenced the mental frameworks of leaders as they tried to persuade them of the significance of their efforts and initiatives. Consequently, community members and leaders mutually influenced each other's perceptions while they discussed the emerging issues and developments. This mutual sensemaking essentially entailed developing a shared understanding between members and formal leadership about the evolving projects, mainly making sense of the resource's configuration, its primary qualities, and purposes. Thus, external leadership of the community, in this stage, was not the authoritarian and asymmetrical influence exerted based on formal position; instead, leadership involved consensual negotiation of meaning between actors from different organizational levels.

Returning to the Foreign Area Specialist course that was initiated by CAC members, Kevin described how members from the frontlines and official positions—higher command and the Department of Defense (DoD)—at first had different notions about the emerging developments. In particular, several members frequently discussed the community's plan for the specialized training program with positions in the Department of Defense who held the functional responsibility and authority for the intercultural competence domain:

> *"Of course, both sides are required to keep each other informed on the things developing so that the other side can get a picture of it and its knowledge is connectable because otherwise, we talk about completely different things. Thus, we influenced each other. For example, for the department [COpCom] as well the DoD, the recruitment of additional advisors was always paramount because of the personnel problems we experienced; we weren't aware of this, and thus we incorporated this thought. On the other hand, command has not seen the exchange among practitioners and the training aspects we put in the center of things, and so we introduced those issues into their world of thought."*

As Kevin highlighted, interactions between members and formal leaders entailed a mutual adjustment of the actor's underlying understandings. In consequence, community members adapted the actual training course accordingly. Similarly,

Bill recalled his experiences as a commanding officer at the COpCom and how he made sense of these unfolding novel dynamics:

> *"And whenever possible I participated in their discussions and listened. Also in the discussions where they talked about structures and the general setup of the domain as well as conceptual papers that had to be written. I also read their [intercultural mission advisors] mission reports and telephoned them in missions as much as possible. From this, we recognized that they needed a more structured training."*

This quote not only shows how a superior made sense of the novel developments but also exemplifies the openness of a formal leader who was willing to listen to the concerns and suggestions from members of the frontlines and incorporate their thoughts into his own meaning-making.

In other practices, this form of mutual adjustment was also apparent but was complicated by frequently changing superiors or contacts at official positions. For instance, Christian from the CBC reported how difficult it was to negotiate the necessity of revising the blasting guidelines with official authorities responsible for this field manual in light of new civilian blasting techniques:

> *"And I have seen it. I mean, I noticed that within these talks [with official positions] the faces frequently change and people do not know what was discussed the last time. Thus, we really had to start in the beginning each time and explain everything why we have to change it and where the main problems are."*

As Christian pointed out, CBC members also engaged in shared sensemaking with formal authorities about the resource's properties; in this case the community's field manual.

Altogether, the above descriptions illustrate that formal leadership engaged in sensegiving about the change occurring in their departments and units and, therefore, indeed was able to influence the self-organized resource generation within the CoPs. This form of influence is more indirectly, broad, and emerging as relations between members and formal leaders evolve. Also, leadership in terms of influencing actors' thinking and behavior is more democratic than authoritarian, in the sense that members and superiors mutually adjusted their schemas in light of the unfolding change.

5.3.4 Transforming Emergent Resources

Transforming the newly created specialized resources refers to formal leadership that supports members in the last stage of the resourcing process; the transition from community-induced and improvised resources into formal organizational structures. Although several community-generated resources are bound to the respective CoP, such as the relations to external actors in the domain or the knowledge created in practice and thus cannot be transferred, some community solutions needed to be transformed in official organizational responses. This final stage of formalizing the bottom-up created resources often required superiors who held authoritative power over official assets such as personnel, finances, or concepts. In particular, this final aspect of the member-leader relation entailed that members often prepared community-generated suggestions and proposals on how to react to specific problems, which they forwarded to their formal superiors who, in turn, formally administrated them into the official channels. For example, Frank (TDLC) noted:

> *"And we also recognized problems of technical nature. For example, that we do not have a certain capability for data links or data transmission and then we write down the demand for requisition and negotiate it within the community and give it into the official channels. Unfortunately, it then takes time until it is actually implemented."*

Lukas added to this:

> *"Well it is not that our superiors scrutinize us by asking 10,000 times why we do it, rather it is actually this way that if we have a proposal that is sound, they will pass it forward."*

Particularly important in this phase of the self-organized resource generation process was that formal leaders in higher hierarchical positions occasionally served as promoters of the community solutions by disseminating information about the frontline developments on higher organizational levels. Again members from the TDLC noted in this context:

> *"And we have some officers who really say I will listen to my people and not only do what is expected from me from the next higher superior. Instead, they really represent our community opinion upwards. This is really important on a particular level where only staff officers work; there you need a staff officer, who has your back and supports you"* (Claas).

Likewise, Christian (CBC) reported how he regularly approached higher ranking officers, particularly, in situations that needed a decision about finances or personnel.

> *"And sometimes I skipped a few levels and directly went to my general and presented the developments to him. In particular, when I was at a certain point where I could not move forward, or certain levels blocked it."*

In this sense, high ranking officials were often crucial in promoting and sponsoring the communities' activities and, therefore, enabled the transformation from informal ideas to formal structure. Note, that this facet of the leadership relations was also regularly induced from community members who searched for appropriate channels into the formal organizational hierarchy. Also, some superiors demanded and encouraged such behaviors in their respective areas. For instance, Robert, who, temporarily, was the commanding officer at the COpCom noted:

> *"But when there are things with relevance which really necessitate a decision I insist on formalizing such things. However, this was actually pretty easy because my subordinates knew this and had a feeling for it. If something needs to be formalized they do it themselves and prepare it, and then I do the next steps."*

To provide the reader with an actual example of this form of leadership, consider the training course for mission advisors again; informants described how the training needed to be verified by national and international agencies responsible for administering the course catalogs of the armed forces, and NATO in general. This transformation process was supported by a high-ranking NATO general. As Marc recalled:

> *"And we aspired to formalize the course, and this is where the informal and formal world meet each other. You need to have an official cause if you want to send someone on a training. That is, the training must be officially ratified, and it must be in the catalogs, and this was a critical problem because no one knew anything about it, so we had to make a thousand phone calls until we finally got the right department and by mere accident I contacted a three-star general, who helped us to set this up."*

Additionally, the community was able to integrate the course into formal organizational structures further as it became an integral part of a Master's degree course, open for officers in 2015: *"And after that, the course was transformed into a Master's course. However, this network continuously works on it and develops the course further"* (Bernd). The training for intercultural mission advisors that at

first was improvised by a few practitioners thus became a persistent organizational resource with the support of leadership.

Similarly, informants of the CAC described how their annual conference was transformed into an official meeting backed with official assets in 2013. Formal leadership was, therefore, again instrumental in formalizing the new resource. As Will, a colonel positioned at the DoD and responsible for writing the conceptual foundations for the field of intercultural competence explained:

> *"For sure, at one point in time you have to utilize your administrative authority, and that is 'now I need something', so now we have to put it into conceptual papers or other official documents and structures."*

Robert summarized this final aspect of leadership at the interface between formal organization and communities of practice:

> *"But certain developments have to be absorbed by superiors. I mean this benefit that is caused by communities has to be processed. It really needs to be absorbed or, in bureaucratic terms, a process needs to be created. This also increases the motivation and the permeability of the whole system. However, it also means that superiors need to engage more because when they notice such dynamics, they have to act accordingly."*

The above quote not only points out the additional challenges and efforts for formal leadership, it also exemplifies another essential feature of this leadership relation. By supporting and transforming the emergent resources, formal leadership also helps to energize and motivate further community activities. For example, Kevin recalled how community members of the CAC were able to shift their activities towards other ends:

> *"For example, another comrade is now working on establishing an additional training course within the area of gender studies and how this affects our operations. Basically, the whole thing is always changing as the community identifies further problems and discusses them within the network, finds a solution and integrates the solution into the system."*

As Kevin pointed out, based on the transformation of the Foreign Area Specialist course, several members of the Cultural Advisory Community were able to adjust and develop their activities further as new challenges occurred.

Overall, formal leaders help to transform some of the new resources from community activities into formal structures and, thereby, support the long-term retention and dissemination of the community's understanding on how to cope

with an altered and complex environment. Additionally, members are motivated to adjust and refine their activities further once resources are transformed.

5.3.5 Summary of Section

After presenting the dynamics between CoPs and formal leadership relying on informants' codes, I will again explain these findings from a theoretical perspective—mainly complexity leadership theory—and, in doing so, introduce the last parts of the grounded model (Figure 5.6).

In the findings section, 5.1.3, I explicated the emergence of novelty as self-organized resource generation unfolding within communities of practice. More specifically, I described how members of the frontlines in three different areas generated, adopted, and recombined specialized as well as cultural resources without a formal order, a strategic plan, or direct managerial supervision in order to adapt to altered environments. Based on the current section's findings, I can show how this process is deeply intertwined with formal leadership.

The current findings illustrate that leadership for communities of practice unfolds in a web of multiple dynamically evolving relationships between several community members and their formal superiors. Thereby, I recognize leadership for communities of practice not as a set of particular traits or behaviors of a single individual but, rather, theorize leadership as a relational phenomenon that materializes in interactions among people acting in a specific organizing context (Fairhurst & Uhl-Bien, 2012; Raelin, 2011a; Uhl-Bien, 2006). Such a relational view puts social interactions at the core of the understanding of leadership by noting that social influence occurs in social interaction processes (Fairhurst & Uhl-Bien, 2012; Uhl-Bien, 2006). It thereby deliberately focuses on the "space between" actors and the social processes unfolding in this space (Bradbury & Lichtenstein, 2000).

This study shows how influence on the communities' activities dynamically evolves and changes over time in these social interactions between members and superiors. Further, I theorize leadership for CoPs also as a resourcing dynamic that unfolds between different organizational levels. More specifically, leadership channels assets to communities, negotiates new developments and resources, and lastly absorbs and transforms emergent resources into official responses.

First, this process starts with formal superiors who create enabling structures for community emergence in their respective units and departments (8. Figure 5.6). Complexity leadership researchers refer to this as the creation of conditions for emergence (Uhl-Bien et al., 2007; Uhl-Bien & Marion, 2009).

Formal leaders allow for informal, unscripted activities by granting their subordinates autonomy and by not interfering in practice (Marion & Uhl-Bien, 2001; Regine & Lewin, 2000). This, in turn, enables members on the frontlines to collectively make sense of their environments and develop adaptive responses away from rigid hierarchical supervision and without predetermined outcomes (Lichtenstein & Plowman, 2009; Schreiber & Carley, 2006; Uhl-Bien et al., 2007). Theoretically speaking, members of evolving communities are enabled to adjust their shared schemas (Anderson, 1999; Gell-Mann, 1994), in the sense that they collectively negotiate shared perceptions about how they view the changing world and what possible future resources might look like. They are thus enabled to autonomously construct new ideas on how to effectively respond to an altered environment (Plowman et al., 2007b).

The study's findings further suggest that autonomy and freedom of CoPs are facilitated through members who engage in continuous issue-selling (Dutton et al., 2001) towards their superiors and thereby develop trusting relationships with them which allows for more autonomous modes of organizing. This finding also illustrates the inherently reciprocal and relational nature of the leader-member dynamic (Uhl-Bien, 2006).

Second, complexity leadership theorists suggest that formal leadership is responsible for providing and channeling resources needed for bottom-up emergence (Lichtenstein & Plowman, 2009; Uhl-Bien et al., 2007). Likewise, the findings show formal leadership that reinforces the community-based resource generation by allocating additional assets to CoPs (9. Figure 5.6).

This finding, however, is in need of a more detailed explanation as I—up to this point—described the community activities as endogenous resourcing (Feldman, 2004) which implies the generation of assets without further inputs. In order to construct and refine the specialized resources such as the TDL management workshop or the TDL handbook in practice, communities require tangible assets such as budgets and time. Research on complexity notes in this context that in order to maintain the state of self-organization systems have to import energy (Prigogine & Stengers, 1984). Thus, by infusing additional assets formal leadership energizes the self-organized resourcing activities in CoPs, meaning that community members are now enabled to enact their shared perceptions about possible resources in practice. Consequently, the communities' resourcing activities are not solely endogenous but, rather, emerge unplanned on the frontlines but then are amplified through positive feedback loops with formal leaders (Chiles et al., 2004; Dooley, Tsoukas, Garud, Gehman, & Kumaraswamy, 2011). Formal leaders are thus said to function as catalysts for the process of emergence as they equip

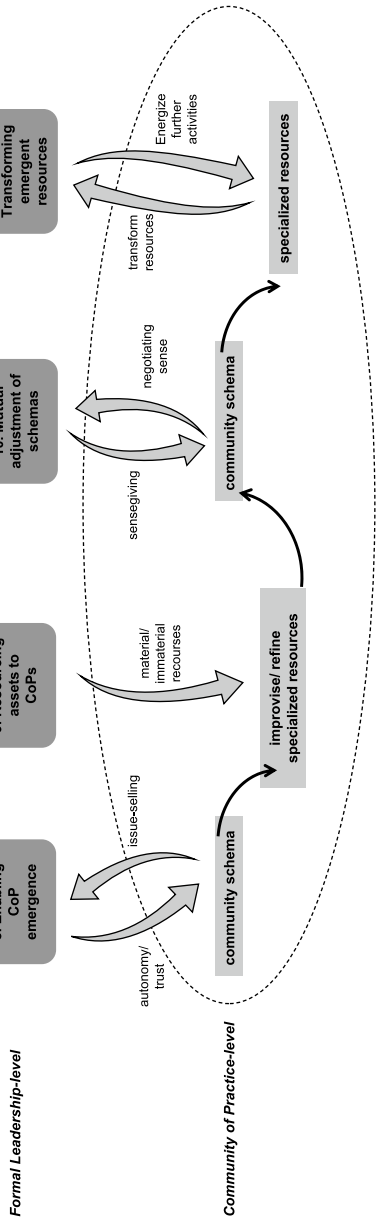


Figure 5.6 Grounded model of findings part 3

CoPs with further resources (Marion & Uhl-Bien, 2001; Marion & Uhl-Bien, 2003; Uhl-Bien et al., 2007).

Leadership also makes sure that critical immaterial resources such as legitimacy and appreciation follow those emergent ideas. Immaterial resources help to fuel the agentic work behaviors from which, in turn, further resources can be generated (Spreitzer et al., 2005). Legitimacy in this context refers to the perception that organizational activities are desirable and appropriate (Deephouse & Suchman, 2008). For instance, Dutton et al. (2006b) note that legitimacy as a social resource facilitates the compassionate actions of people in response to other's pain. Similarly, research on thriving at work notes that organizational members who feel valued and respected are more likely to energize resource creation in the doing of work and act agentically (Spreitzer et al., 2005). Hence, I conclude that formal leadership helps to unlock the agentic capabilities of community members by furnishing them with critical immaterial resources.

Third, the leader-member relations are characterized through a mutual influence of actors underlying schemas (10. Figure 5.6). In other words, formal leaders and community members influence each other mutually concerning how they see and interpret their ambient world. On the one hand, formal leaders engage in sensegiving (Gioia & Chittipeddi, 1991), in the sense that they communicate vision narratives about future developments in the respective practice areas or narratives about profoundly ingrained core values of soldiering. Thereby, leaders provide sense to community members about the unfolding changes via the use of language and communication (Lichtenstein & Plowman, 2009; Marion & Uhl-Bien, 2001; Plowman et al., 2007b). Complexity leadership research also notes that such narratives need to be broad enough that unexpected activities can still emerge from self-organization instead of being constrained and controlled by precise objectives (Marion & Uhl-Bien, 2001).

Additionally, leaders who communicate organizational core values and central purposes of military service reinforce community members' learned cultural schemas that become instantiated in the hybrid community cultures. Formal leadership thus accentuates particular macro-level properties—recognizable, stable, and significant properties of the organization such as taken-for-granted beliefs—that, in turn, influence the interactions among members on lower levels (Hazy & Uhl-Bien, 2015). Complexity theorists refer to this form of influence as entrainment (Hazy & Uhl-Bien, 2012; Hazy & Uhl-Bien, 2015) which enables stability and unity.

Intriguingly, on the other hand, members and leaders also collectively make sense of specialized resources, such as a new training course and, therefore, mutually affect each other which, in turn, leads to adjusted schemas. Raelin

(2011a) refers to this as shared sensemaking in leadership relations. Leadership in this perspective becomes a more co-constituted process of negotiating meaning across different organizational levels, in which actors independent of hierarchical position and status mutually affect each other's perceptions (Raelin, 2011b). Leadership, therefore, is no longer viewed as constituting a relationship from leader to followers based on formal authority but, rather, a social interaction process between mutual inquirers who share and constitute intersubjective meaning (Marion, 1999; Marion & Uhl-Bien, 2001; Raelin, 2011a; Raelin, 2016). In other words, leadership may as well develop from community members who engage in issue-selling with formal superiors and, in doing so, profoundly affect formal leaders' underlying schemas.

Fourth and finally, the leadership relation between members and formal superiors involves the transformation of new resources from community ideas to persisting formal organizational structures. Uhl-Bien et al. (2007) refer to this based on Dougherty & Hardy (1996) as the management of the innovation-to-organization interface. That is, ideas emanating from informal praxis in the community need to be transformed into formal structures by endowing them with official resources. The current findings illustrate how formal leadership in this stage of emergence either supports the informally emerging ideas in the role of promoters and sponsors as they champion the community induced projects to higher organizational levels (Uhl-Bien et al., 2007; Uhl-Bien & Arena, 2018; Uhl-Bien & Marion, 2009) or, alternatively, leaders pull new resources into the formal organization through processes of formalization and reintegration as they, for example, endow them with substantial assets such as more personnel or legitimize them through official ratification (Uhl-Bien et al., 2007; Uhl-Bien & Marion, 2009). What I have coined transforming emergent resources (11. Figure 5.6), thus, helps to stabilize the new emergent in the form of a renewed resource configuration, meaning that through integration and formalization the organization has adapted to a changing environment in terms of being able to cope with a new or altered situation more effectively.

Overall, the dynamically evolving leader-member relations on the interface between communities of practice and formal leadership entail the creation of enabling conditions for resourcing, the channeling of assets to CoPs, the mutual adjustment of actors' schemas, and the transformation of emerging resources from CoPs to the formal organization.

Grounded Model of CoPs' Embeddedness

6

Stability and change, routine and novelty are interwoven

Tsoukas 2017

In the previous sections, I provided a thick description of the emergence and embeddedness of communities of practice situated in the German armed forces using informants' own experiences, available archival data, and impressions from observations. Although I gave a theoretical explanation after each of the three findings sections, I would like to provide a comprehensive theoretical account that explicates the embeddedness of CoPs within formal, hierarchical organizations based on the study's findings. In this section, therefore, I present a comprehensive, grounded model that brings together the insights mentioned above to theorize how the tension between communities of practice and the formal organizational context occurs and is sustained for organizational adaptability (Figure 6.1).

I will outline this model in two parts: a first part that concentrates on the processes and dynamics on the bottom half of Figure 6.1, i.e., in particular, the process of self-organized resourcing, and a second part that focuses on the top half of Figure 6.1 and theorizes the interactions between communities and formal leadership.

B. Schulte, *The Organizational Embeddedness of Communities of Practice*, Forschungs-/Entwicklungs-/Innovations-Management,
https://doi.org/10.1007/978-3-658-31954-0_6

6.1 Self-organized Resourcing in Communities of Practice

In theorizing the model of a CoPs' embeddedness I will draw—as throughout the previous sections—on both practice-oriented approaches to resources (Feldman, 2004; Feldman & Orlikowski, 2011; Feldman & Worline, 2012; Feldman & Worline, 2016) as well as on the growing body of research that conceptualizes change and adaptation in organizations as emergent phenomena emanating from unpredictable and self-organized interactions of micro-level actors (Anderson, 1999; Chiles et al., 2004; Marion, 1999; McKelvey, 2000; Stacey, 1995).

As mentioned before, complexity theory draws our attention to the dynamics of complex adaptive systems (CAS). In particular, it suggests that novelty and innovations arise from the networked interaction among lower-level actors within a CAS (Anderson, 1999; Chiles et al., 2004; Lichtenstein & Plowman, 2009). In light of this, a growing body of research applies complexity reasoning to organization science, recognizing organizations or organizational subgroups as CAS that can display complex behavior (Boisot & Child, 1999; Brown & Eisenhardt, 1997; Eisenhardt, 2002; Eisenhardt & Tabrizi, 1995). Moreover, several scholars advocate for new approaches to organizational leadership that aim at harnessing this potential for organizational adaptation and innovation (Marion & Uhl-Bien, 2001; Uhl-Bien et al., 2007; Uhl-Bien & Marion, 2008). In particular, complexity leadership theory (CLT) recognizes the tensions that arise between self-organized and bureaucratic forms of organizing and offers insights into how leadership functions in this swirl of emergent, perpetual change (Lichtenstein et al., 2006; Smith & Graetz, 2006; Uhl-Bien et al., 2007; Uhl-Bien & Marion, 2009).

Complexity theory posits that CAS dynamics of emergent self-organization arise in far-from-equilibrium states of adaptive pressures, instabilities, or perturbations. Stacey (1995) refers to this as disturbing elements that push a system towards chaos. In such situations of flux, interconnected and informally networked agents of a CAS start grappling with and making sense of these challenges (Anderson, 1999; Gell-Mann, 1994; Kauffman, 1993). As Stacey describes it: *"The transformational process is one of internal, spontaneous self-organization amongst agents of a system, provoked by instabilities, and potentially leading to emergent order"* (1995, p. 478). In a similar vein, the findings illustrate members on the frontlines who sensed profound alterations, induced by an increasing environmental complexity that had a lasting effect on how they were able to practice. More specifically, these frontline workers identified that either given resources were insufficient to react to the new situations adequately or that resources were scarce and, therefore, hampered effective practicing (1. and 2. in Figure 6.1).

Simultaneously, individuals perceive not only external, environmental pressures but also sense internal organizational constraints from which disturbance occurs. In the cases described above, individuals sense practices such as legal safeguarding, political communication, or too strict supervision and micromanagement prevalent in the formal organizational hierarchy as contrary to once learned and internalized beliefs on soldiering (4. and 5. Figure 6.1). That is, they experience bureaucratic organizing at dissonance with their learned cultural schemas. Although they learned and internalized behavioral norms of hierarchy and formalism in the military, they perceive these salient practices of formal organizing as deficient for coping with the dynamic developments in their practice. Hales (2002) notes that practices such as micro-managing and hedging are natural symptoms of too rigid formal, bureaucratic systems. They are reflections of formal organizations' focus on stability, departmentalization, clear responsibilities, robust control systems, and alignment of individual and collective behavior to organizational goals. In this sense, one can attest that individuals feel constraint in their adaptive agency by these practices that are often constituted by higher leaders and authorities.

Taken together, individuals on the frontlines sense external pressures to adapt their work practices besides experiencing internal cultural constraints that hamper quick and effective responses to these new challenges. In complexity theory terms, agents identify stimuli from their surroundings which challenge their underlying knowledge structures, meaning new occurrences in day to day organizational life do not fit well with agents' schemas (Anderson, 1999; Gell-Mann, 1994; Lichtenstein et al., 2006).

Up to this point, I established that frontline members sense pressures and constraints that challenge their underlying schemas. The findings, furthermore, show that community members generate new specialized resources as well as cultural resources based on the construction of a commonly shared schema, e.g., a newly constructed shared interpretative framework among community members (3. 6. 7. in Figure 6.1). In this sense, one can understand the internal community dynamics of self-organization from a resourcing lens as the iterative, reciprocal, and ongoing swirl of schema construction and enactment (Feldman & Orlikowski, 2011; Weick, 1988).

A sensemaking perspective can inform us about the processes of meaning construction from which new schemas can evolve (Maitlis & Christianson, 2014; Sandberg & Tsoukas, 2015; Weick et al., 2005). Sensemaking refers to the interpretative processes in which individuals or groups engage as they attempt to interpret novel and ambiguous situations (Stigliani & Ravasi, 2012). These processes are triggered by discrepancies between current and expected states of the world, meaning new information or circumstances cannot be readily interpreted with available mental structures (Weick, 1988; Weick, 1993). According to sensemaking theory, these disruptions of the ordinary initiate conscious attempts of individuals to interpret unexpected occurrences to bring order into ambiguous realities, that is to "make sense" of what has occurred (Maitlis & Christianson, 2014; Weick, 1995). Likewise, this study's findings illustrate individuals who begin to envision responses to their practical problems. They, thus, start to make sense of the new situations characterized by increased environmental complexity and a perceived limited resource endowment. Following these first attempts are further sensemaking instances as members negotiate how first improvised solutions should be refined and further developed.

In other words, through ongoing community interactions, members construct shared perceptions on future resources, their properties, and configurations. That is, they establish shared schemas comprising how they understand their efforts and initiatives. Consider, for example, how CAC members made sense of the Foreign Area Specialist Course after first improvised seminars or how TDLC members discussed the TDL handbook. Members continuously enact these schemas as they further engage with each other and refine their meetings, conferences, or handbooks in practice. Enactment reflects the process of people beginning to collectively act in order to make sense of ambiguous inputs (Weick, 1988). As Weick noted, individuals: *"actively put things out there that they then perceive and negotiate about perceiving"* (1979, p. 165). Enactment thus explains that through individuals' actions events and mental structures are brought into existence and are set in motion (Weick, 1988): *"It is this initial implanting of reality that is preserved by the word enactment"* (1979, p. 165). To put it differently, the shared perceptions about future desired states become realized within the informal praxis of community members. Scholars working with a resourcing lens describe this enacting of a specific schema in practice with the term resourcing: the schema becomes resourced in practice (Feldman, 2004; Feldman & Orlikowski, 2011; Feldman & Worline, 2012).

This self-organized resource generation, however, does not unfold in a sociocultural vacuum detached from its organizational context; instead, the findings obtained in this study show how these practices are deeply embedded in the

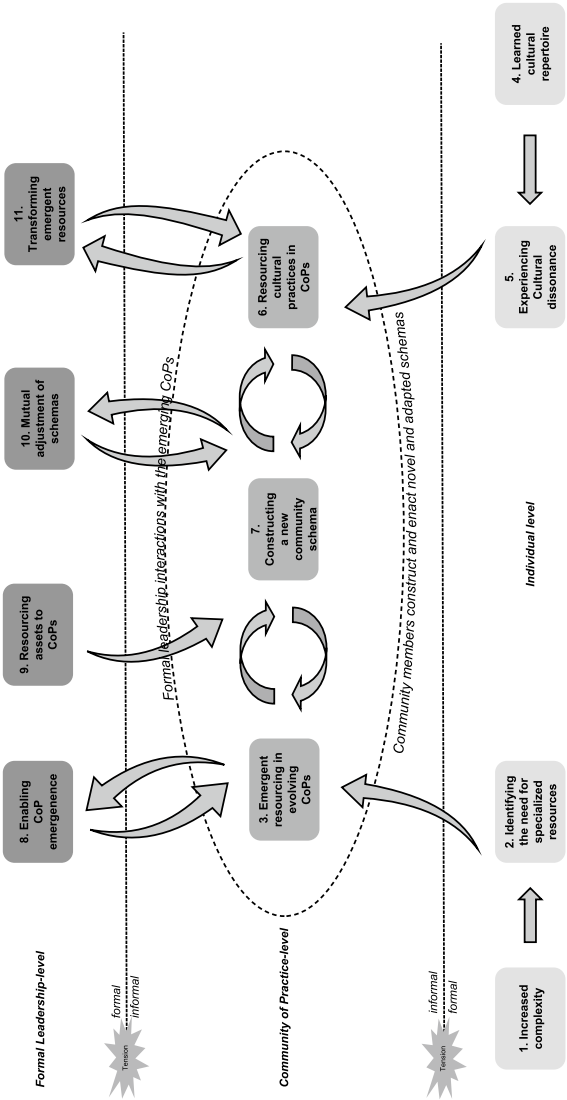


Figure 6.1 Grounded model of the embeddedness of communities of practice in formal organizational hierarchy

ambient organizational culture via cultural resourcing mechanisms. By viewing culture as a resource I built on Swidler's (1986; 2001a) culture conception that views culture as *"a flexible set of tools [resources] that can be actively and strategically created and deployed as actors struggle to make sense of the world"* (Lounsbury & Glynn, 2001, p. 549).

The cultural resourcing process starts with members experiencing what I coined cultural dissonance, meaning the perceived discrepancies between learned repertoire (cultural schemas) and observed, lived praxis. In order to navigate the dissonance, community members enact parts of their cultural repertoire in their communities. The learned cultural schemas such as professional identities and comradery become resourced in informal social praxis. Thus, the cultural repertoire of the organization is continued within the evolving communities as members draw on deeply internalized norms and beliefs and actualize them in local interactions. The local practices of the community thus depict the material enactment of the broader trans-local culture (Giorgi et al., 2015; Smets et al., 2012).

From this finding, one could assume relative cultural stability between local CoPs and the broader socio-cultural structure of the formal organizational hierarchy as core beliefs remain consistent. As members enact parts of the learned repertoire they also simultaneously adapt the culture to their local contexts and practical requirements and, in doing so, construct their own hybrid community cultures. Tsoukas & Chia (2002) argue that such conditions of a stable core but a changing periphery are inherent to organization cultures because as organization members reflectively adapt core beliefs to their local contexts they inevitably modify and change them. Likewise, Hatch (1993) notes that it is through situated sensemaking that organization members reflect those norms and beliefs of a learned repertoire and revise them in their social practice.

Consequently, the practice in the communities is both recursive and adaptive (Jarzabkowski, 2004). It is recursive as it instantiates parts of the broader socio-cultural structure of the FAF in the community but, at the same time, it is also adaptive because members locally adapt the learned cultural resources/schemas. To put it differently, the findings illustrate that the broader socio-cultural structure has a direct bearing on the local informal, self-organized practice within the community (Contu & Willmott, 2003; Gherardi & Perrotta, 2011). Yet, practice in the community is not completely culturally determined, and members are not "structural dopes", instead they are agentic in generating situated hybrid cultures.

I conclude from these observations that the resourcing of community cultures can be described as a necessary condition for self-organization in CoPs. This means that members skillfully create their own hybrid cultures by resourcing and translating cultural schemas in practice, which, generates a space of mutual trust,

professionalism, shared identities, and open communication. It is this space that, in turn, allows them to self-organize in quasi-hierarchy-free contexts and produce adaptive responses.

The outlined cultural resourcing activities are again inherently connected to the developing community schema (as graphically shown by the arrows between 6. and 7. in Figure 6.1). In fact, through this cultural resourcing a novel and specific community schema continuously evolves and gets reproduced. Consider, for example, the identity formation practices I outlined earlier. Members shape a shared identity around professionalism by producing community signs and symbols such as the chief blaster tattoo. Through such symbols, members enact a specific community meaning on belongingness and comradery in practice (Hatch, 1993). Expressed differently, the part of the community schema that comprises knowledge about the community, mainly knowledge about its central purpose, aspirations, and how members view themselves as a group gets produced and reproduced through symbolic activities (Orlikowski, 2002; Wenger, 1998).

From this rather lengthy discussion on the internal community dynamics of members' resourcing activities, I conclude several central insights. First, from the observation that community members adapt their schemas in light of environmental change I suggest that communities display the dynamics of complex adaptive systems where interdependent agents adapt their schemas to each other through non-linear interactions (Anderson, 1999; Gell-Mann, 1994; Plowman et al., 2007b). Second, I propose that this process of emergence of novelty entails a process of self-organized resource generation that unfolds as members resource their new and adapted schemas (Feldman, 2004; Feldman & Worline, 2012). Self-organization in CoPs, thus, is the ongoing cycle of schema construction and enactment energized by members who agentically navigate and work through adaptive pressures and cultural constraints. Third, through the cultural mechanism of local enactment of a once learned cultural repertoire communities are culturally embedded in their trans-local organizational ambiance.

6.2 Sustaining the Tension: Leadership and CoPs

After explaining these dynamics of community emergence, I turn to how this implies the central tension between self-organized CoPs and formal organizational context, and how this tension is sustained for adaptability through leadership.

Community members' efforts start out as fundamentally informal because individuals leave formal lines of communication and start interacting with one another across formal boundaries and outside of their appointed positions to generate

adaptive responses. In other words, these activities are not foreseen by formal organizational design and official task descriptions. The practice in the communities is thus noncanonical and adaptive (Brown & Duguid, 1991; Jarzabkowski, 2004). Consequently, the tension between informal and formal parts of the organization occurs as individuals collectively start to make sense and interact with each other without a central authority, direct supervision, and a predefined plan for action in situations of adaptive pressures. The more and frequently members now engage in these forming communities, the tension is amplified: community activities challenge the status quo as they advance novel ideas, thus, pulling the organization more towards disorder (Heckscher, 1994; Stacey, 1995), whereas, the formal organizational hierarchy is still designed to impede such efforts as it focuses on order and predictability (Heckscher, 1994; Uhl-Bien & Arena, 2017).

Consequently, I would like to elaborate on the nature of this tension in more detail. The tension between the desire for structure and stability and the need for change and creative chaos that lies at the core of adaptability has been subject of numerous publications in management theory (Leana & Barry, 2000; Nag, Corley, & Gioia, 2003; Uhl-Bien & Arena, 2018; Uhl-Bien & Marion, 2009). For instance, Burns & Stalker (1961) note that organizations have to leverage either mechanistic (well-defined management systems) or more organic forms of organizing (informal structures) dependent on environmental contingencies (Lawrence & Lorsch, 1967). The literature on organizational ambidexterity inquires on a similar tension between an organization's capacity to explore new ideas and innovations while, at the same, time remaining profitable and efficient (Duncan, 1976; Tushman & O'Reilly, 1996). The fundamental tension in this view is the simultaneous "need to innovate" and the "need to produce" (Tushman & O'Reilly, 1996) that require different learning strategies of either exploration of new ideas or exploitation of existing businesses (March, 1991). Moreover, complexity theory recognizes the core tensions between self-organized CAS that are entangled with bureaucratic and hierarchical forms of organizing (Uhl-Bien et al., 2007; Uhl-Bien & Arena, 2017; Uhl-Bien & Marion, 2009). The common element in all these studies is that stability and order are associated with formal managerial systems and hierarchical structures while informal and organic modes of organizing accommodate innovation, learning, and adaptability.

The often implicit assumption underlying these contributions is that these two modes of organizing are viewed as incommensurable with each other and conflicting, meaning that efficiently producing results (i.e., exploitation) drives out and a firm's innovative potential (i.e., exploration) (Farjoun, 2010). In light of this, contingency theories suggests a static design decision between either organic organizational forms in situations of turmoil, novelty and complexity or formal,

mechanistic structures and tight integration of routine procedures in stable conditions (Burns & Stalker, 1961; Lawrence & Lorsch, 1967). Likewise, the literature on ambidexterity suggests the structural separation of tasks focused on exploration from those focused on exploitation (O'Reilly & Tushman, 2013; Tushman & O'Reilly, 1996).

Looking at this tension through the prism of practice and the findings of studied CoPs might offer a nuanced understanding of interrelation between stability and change as an inevitable feature of organizational life (Leana & Barry, 2000). First, the current study's findings indicate that this tension between self-organized CoPs and their broader context is a pervasive occurrence. That is, the emergence of such communities of practice emanating from frontline members who grapple with their surroundings and try to make sense of them depicts a natural and enduring phenomenon within dynamic environments for organizing. These observations imply—much similar to what complexity theory suggests—that environmental complexity in the form of unpredictable change and unmanageable interdependence is an immanent feature of today's world and, thus, an omnipresent contingency that necessitates new ways of thinking about the processes of organizing (Stacey, 1995; Stacey, 1996). In fact, the findings have illustrated two practices—military blasting and data links—that have been relatively stable over extended periods but now face an increasingly dynamic and complex environment.

Second, the practice in the observed communities is both a source of adaptability as well as stability. Adaptability occurs as part of the routine, recurrent activities of everyday organizing during which community members continuously and intelligently make sense of their surroundings and their practice. This suggests that in a complex world making sense of situations, tasks, and environments is immanent as schemas are continuously challenged by new information. As James March once noted: *"Change takes place because most of the time most people in an organization do about what they are supposed to do: that is, they are intelligently attentive to their environments and their jobs"* (1981, p. 564). In light of this, adaptability cannot be separated from every day, recurrent practice but instead is rooted within it, as it is here that CoPs evolve in which members develop adaptive responses to identified threats and challenges (Brown & Duguid, 2001). Moreover, it is through this adaptive work of community members who improvise and develop new resources that efficient and reliable task-fulfillment is made possible. In other words, the CoPs we observed needed to adapt their practice in order to reliably practice again in light of changing situations. That is, the CoPs as a critical source for adaptability enable effective and recurrent practice in the first place through their adjustments. Hence, stability and exploitation on the one hand

and change and exploration, on the other, are simultaneous occurrences in practice and are complementary instead of being exclusive (Andriopoulos & Lewis, 2009; Farjoun, 2010). The simultaneous occurrence of both stability and change is also the case in the relation between the CoPs and the broader socio-cultural structure. As mentioned above, culture is locally changed as well as reproduced and perpetuated in self-organized practice.

I conclude from the observations that within complex environments organizational change and adaptation driven by communities of practice occurs in a continuous, ever-unfolding manner (Orlikowski, 1996; Tsoukas & Chia, 2002). The studied organization, thus, is permeated with a pervasive tension caused by multiple communities that, like swarms, intelligently react to new stimuli and information and, in doing so, create and renew resources and adapt existing structures (Brown & Duguid, 2001). Thus, the findings of this study affirm Jarzabkowski's deliberations that: "*the localized communities and contexts within a firm are extremely important in the recursive or adaptive adoption of a practice*" (2004, p. 548).

In light of the increased environmental complexity and persisting tension, a critical capability resides in organizational leadership that finds the right way to cope with these self-organized communities of practice and taps into this potential for adaptability (Hazy, 2011). In particular, complexity leadership theory (CLT) views leadership as establishing linkages to such self-organized elements (Marion & Uhl-Bien, 2001; Uhl-Bien & Marion, 2008). As mentioned earlier in the theoretical background section, CLT recognizes the tension between administrative leadership (i.e., the leadership of the formal managerial system) and adaptive leadership evolving within the CAS dynamics of self-organization (i.e., the adaptive function). In between these poles enabling leadership takes place that sustains the tension between them (Uhl-Bien et al., 2007; Uhl-Bien & Arena, 2018; Uhl-Bien & Marion, 2009).

Research on CLT more specifically proposes that enabling leadership is critical for loosening and tightening the dynamics of complex adaptive systems to allow for emergence (i.e., adaptability) to unfold and be utilized (Havermans et al., 2015; Uhl-Bien & Arena, 2017; Uhl-Bien & Arena, 2018). Loosening describes enabling leadership that opens up spaces that allow organization members to advance new ideas, innovation, and learning (i.e., exploration, March, 1991) in the contexts of formal organizational hierarchies. Uhl-Bien & Arena (2018) posit that enabling leaders open up what they refer to as adaptive space, a space that occurs on the interface between the informal self-organized and the formal system of the organization. Through loosening up adaptive space, the adaptive

function of the organization is enabled, i.e., the CAS dynamics of emergent self-organization occur from which adaptive responses emerge (Uhl-Bien et al., 2007; Uhl-Bien & Marion, 2009). On the other hand, leadership also tightens the dynamics of CAS, in the sense that it exploits the innovations generated through self-organization by converting them into outcomes that benefit the firm (Hazy & Uhl-Bien, 2012; Schreiber & Carley, 2006; Uhl-Bien et al., 2007). That is, through tightening or closing mechanisms leadership ensures that the CAS dynamics are not completely autonomous but remain coupled to the formal managerial system (Uhl-Bien & Arena, 2017).

The findings of the current study illustrate similar loosening and tightening practices inherent in the leader-member relations that, together, sustain a CoP's embeddedness in its managerial-shaped context (8. 9. 10. 11. in Figure 6.1). To be more specific, leadership practices such as granting autonomy and establishing trusting relationships with community members (8. in Figure 6.1) loosen up spaces or quasi-autonomous contexts in situations of adaptive challenges and pressures. As becomes evident, this form of leadership is not to be mistaken with a direct influence (Uhl-Bien et al., 2007) but is directed at the respective context around a particular practice. Through free space and autonomy frontline members are permitted to go outside of their formal positions as they start interacting with each other and, in doing so, build new relationships and connections that even go beyond the focal organization. That is, the communities as relatively autonomous contexts begin to evolve around the practice. As a result, the number of people developing an understanding of the new situation is increased through informal interactions among members. Since such community interactions among individuals generate new knowledge, new understandings, and new ideas (i.e., a new schema on how to interpret and cope with the environmental dynamics) leadership that enables these interconnections is an essential element in the design for self-organization and exploration (Hazy & Uhl-Bien, 2015; Surie & Hazy, 2006).

Moreover, granting autonomy enables community members to make sense of the new situation and construct new meanings around it on their own in self-organized practice without a predefined solution or perspective being forced on them. Leadership thus allows new and multiple ways of thinking about a problem (Havermans et al., 2015). In other words, loosening leadership practices such as opening up free space prevents the premature convergence towards a single organizational response to the new situation by promoting autonomous experimentation and improvisation (i.e., exploration) (Hazy & Uhl-Bien, 2012). Complexity theorists describe this also as absorbing the environmental complexity with an increased internal (organizational) complexity, in the sense that a system

holds multiple and sometimes conflicting notions (representations) of the environmental variety and retains a wide range of behavioral responses in its repertoire to it (Ashmos et al., 2000; Boal & Schultz, 2007; Boisot & Child, 1999).

Another enabling leadership practice facilitating continued exploration in the CoPs is the channeling of material and immaterial resources to them (9. in Figure 6.1). These additional assets enable community members to take action and enact their constructed schemas in ongoing community praxis. That is, additional assets fuel the actual resourcing within the communities as members are enabled to meet and collectively improvise and refine their initiatives. The provided material, as well as immaterial resources, energize the community schema because the more resources members obtain that are relevant for the new schema they are trying to enact, the more they feel capable of actually enacting it (Quinn, Spreitzer, & Lam, 2012). In CLT terms this form of enabling leadership loosens and catalyzes the self-organized dynamics within the CoP as it directly infuses energy into them, allowing them to scale and gain further traction.

On the other hand, the current study's findings also illustrate aspects of the leadership relations between formal superiors and community members that "tighten" the communities' activities, in the sense that they embed the self-organized dynamics emanating from situated practice more to the managerial context in which they unfold. That is, to prevent uncontrolled chaos the interactions on the frontlines need to be regulated and guided in some way as otherwise the organization would drift off into complete chaos and flux (Surie & Hazy, 2006; Uhl-Bien et al., 2007). Complexity researchers, in some instances, also refer to such mechanisms as complexity reduction, describing the convergence towards a specific and specialized response in coping with an environmental stimuli through mostly exploitative activities (Boal & Schultz, 2007; Boisot & Child, 1999; Boisot & McKelvey, 2010).

Within the described cases, the self-organized practice within the communities is embedded in its managerial context through the mutual adjustment of leaders and community members' underlying mental schemas (10. in Figure 6.1). As mentioned before, the mutual adjustment involves formal leaders' sensegiving as well as the joint negotiation of sense between members and superiors. Previous studies have already shown that sensemaking is central to organizational leadership (Gioia & Chittipeddi, 1991; Maitlis, 2005; Maitlis & Lawrence, 2007). Likewise, the obtained findings illustrate how formal leaders influence community members' sensemaking and interpretation of environmental changes by giving meaning to the unfolding events through vision narratives (Boal & Schultz, 2007; Plowman et al., 2007b). This given sense is taken into account by members in their activities as they now "imagine" how they should act in accordance with

the provided vision. As a result, the possible range and variety of community responses to the environmental change are narrowed down. Note, however, that this form of sensegiving is not to be misinterpreted with the strict alignment of community activities through leadership but, rather, leadership provides a more general guidance (Marion & Uhl-Bien, 2001).

In addition, the findings also show, in line with prior work on sensemaking, that members not only receive sense as passive sense takers but, rather, make sense on their own (Gioia & Chittipeddi, 1991; Maitlis & Christianson, 2014) and negotiate sense about the community's endeavors together with their formal leaders. As a result, from such collective negotiations, the community activities converge towards one mutually agreed upon response of how the organization should react to the new situation. In other words, the developed community schema about how to interpret and react to the environmental change stabilizes.

Lastly, leadership supports the transformation of emergent resources into formal processes and structures and, in so doing, ensures the efficient utilization of community-induced ideas and projects within everyday duty (10. in Figure 6.1). In other words, this leadership practice transforms community solutions from informal into formal practice. From a complexity perspective the variety of internal representations to the adaptive challenge is, therefore, ultimately reduced to a single solution that becomes formalized and integrated in official processes (Boisot & Child, 1999). Consider, for example, the reach-back procedure in the TDL practice that was finally formalized and supported with an official post and task descriptions at a Navy unit, thus becoming a persistent part of the formal organizational hierarchy.

Formal leadership that helps to implement and transform community-generated resources into organizational assets stimulates exploitative practice in the community. That is, once a community solution is transformed and part of the formal organization, deep search processes, or extensive meaning negotiations within the community are no longer required regarding that specific resource. Further, front-line members are now enabled to engage in their practice more efficiently. Again returning to the TDL practice, the reach-back procedure allows TDL operators a quick and efficient way to handle failure messages on board, thus enabling more efficient overall operation.

However, the current findings also show that by transforming the community induced initiatives, leadership also enables further exploration in communities as members can turn their attention to other problems and challenges. They may also feel motivated to explore further as they experience that their efforts lead to fruitful outcomes. Hence, a focus on the exploitation of community induced innovations can also spur future explorative activities.

Taken together, it can be noted that formal leadership sustains the inherent tension between communities of practice and the context of formal organizational hierarchy by enacting both loosening and tightening practices. These different leadership practices enable adaptive, explorative practice within the communities by providing autonomy and energy. Simultaneously, leadership also supports the recurrent and efficient execution of everyday duties by transforming community solutions. To put it differently, formal leadership dynamically balances autonomy with "soft" control. The CoPs, therefore, are embedded into their formal organizational context via leadership.

Concluding, I would like to elaborate in more detail on the embeddedness of CoPs in formal organizational hierarchy. Embeddedness of CoPs within the context of formal organization hierarchy functions via the two studied mechanisms of culture and leadership. First, the processes of cultural resourcing ensure that core organizational beliefs are part of the local community cultures and that members orient their practice towards the organization's core values. Second, leadership embeds CoPs via loosening and tightening practices that enable both exploration and exploitation in practice.

Embeddedness is characterized by the pervasive and ever-present duality of change and stability as simultaneous occurrences (Tsoukas & Chia, 2002). This duality describes that self-organized practice results in both cultural change, induced through the local situated adaptation of cultural schemas, and in stability of broader socio-cultural structures as it recurrently reproduces and instantiates them. On the other hand, members explore new adaptive responses by generating new specialized resources that, when they become transformed into formal structures, eventually enable more efficient and stable practice. This in turn is enabled through leader-member realtions in which both loosening—change inducing—as well as tightening—stabilizing—practices are enacted. Given this, I theorize CoPs as critical spaces for both adaptive, changing as well as recursive, stable practice (Jarzabkowski, 2004).

Embeddedness further means that the observed communities of practice are neither entirely informal nor are they thoroughly institutionalized in the form of classical cross-departmental project teams. Instead, they operate in the space between the fully formalized and informal realms of the organization. That is, they reside in the space within the tension between formal organization hierarchy and informal autonomous interaction. They have the necessary autonomy and space to evolve from informal and self-organized practice but are also sufficiently coupled to the formal context to permit community generated innovations to be transformed and integrated into the organization (Marion & Uhl-Bien, 2003; Uhl-Bien & Marion, 2009). The pervasive tension between emergent CoPs and the

context of formal organization hierarchy, therefore, is not resolved or removed but, rather, engaged with and sustainably managed, which creates the space for embeddedness (Uhl-Bien et al., 2007; Uhl-Bien & Marion, 2009).

Marion & Uhl-Bien (2001) describe such conditions as moderately coupled systems that are sufficiently loose to enable innovation and sufficiently tight to permit innovations to scale. Further, Uhl-Bien et al. (2007) introduce the term entanglement that describes the interwoven nature of informal, adaptive elements with formal elements in complex organizations, whereas, Uhl-Bien & Arena (2018) refer to the interface between entrepreneurial activity (i.e., informal space) and operational core (i.e., formal system) as "adaptive space" that generates adaptability. In a similar vein, Boisot & McKelvey (2010) note that in between the ordered and chaotic lies the complex regime, which is neither lacking complete structure nor is it fully over structured. Common in all the above descriptions is that the in-between space associates with what Lewin & Volberda (1999) term "new organizational forms" such as networks, virtual cooperation, or communities in which innovation, learning, and adaptability occur.

Likewise, the notion of embeddedness developed in this dissertation, describes CoPs that work in this "region of complexity" (Maguire & McKelvey, 1999) or at the "edge of chaos" (McKelvey, 1999), meaning they arise from self-organization but become connected to their formal ambiance which prevents drift into complete chaos. They allow frontline members to interact in ways that generate emergence of novelty, yet they also ensure that this novelty becomes reintegrated into formal structures.

Overall, the dynamic interaction between emerging CoPs and leadership, together with cultural resourcing, create and shape the embeddedness of communities of practice, which integrates the need to innovate new resources with the need to implement and efficiently operate such resources. Embedded CoPs, therefore, accommodate the potential for organizational adaptability.

Discussion

7

Most organizational scholars are not going to generate a new theory from scratch. Instead, they generally work on improving what already exists.

Whetten 1989

I began this study with the aim to understand how self-organized and emergent communities of practice relate to their trans-local context of formal organization hierarchy. To theorize on embeddedness, I had to understand how communities of practice emerge in such contexts, how they culturally relate to it, and how leadership interacts with them. In order to do so, I utilized an interpretative research approach to build process theory based on the in-depth description of three communities of practice within the German Federal Armed Forces. In conjunction with insights from practice-oriented approaches and complexity theory, this enabled me to build a data-grounded, cross-level, comprehensive model that explicates how communities of practice emerge as a collective, frontline response to environmental complexity, generate emergence (specialized resources), and how they are embedded in their formal, hierarchical ambiance through cultural and leadership mechanisms. Probably, the study's most essential contribution lays in this framework that—to my knowledge—is the first model that thoroughly theorizes the interrelations between CoPs and managerial shaped context grounded on in-depth empirical observations. In doing so, it offers a nuanced understanding of the fundamental tension between CoPs and formal organizational context as a pervasive duality and natural occurrence in complex organizations and also shows how it can be sustained and "managed" to allow for adaptability.

B. Schulte, *The Organizational Embeddedness of Communities of Practice*, Forschungs-/Entwicklungs-/Innovations-Management,
https://doi.org/10.1007/978-3-658-31954-0_7

Below, I will describe in more detail how my findings contribute to the study's main literature streams. First, I will outline how I believe my findings extend our scholarly understanding of communities of practice and how organizations should cope with them. Second, I will discuss how my reasoning adds to the complexity theory literature stream. Third, I elaborate on how this study may also contribute to our understanding of cultural dynamics within complex organizations. Additionally, I will highlight the main practical implications deduced from my observations. I conclude by discussing the main limitations of the current study and future research opportunities.

7.1 Implications for Research on Communities of Practice

The findings of the current study add to the literature on intrafirm communities of practice in several significant ways. Although, the main contribution of this research is the illustration of how the local context of a CoP interrelates with the broader trans-local context of formal organizational hierarchy (i.e., what I coined embeddedness), I would like to structure this discussion along the CoP construct's main dimensions as I believe my findings can speak to all of them (see also Figure 7.1).

Thus, I like to start with how the current study adds to the understanding of the overall nature of communities. Earlier, I showed how CoPs are either understood as a theoretical lens that explains social learning processes situated in local practices (Corradi et al., 2010; Gherardi et al., 1998; Lave & Wenger, 1991) or more as entitative groupings that are either emergent (Brown & Duguid, 1991; Wenger, 1998) or instrumentally designed by management (Borzillo, 2009; Dubé et al., 2005; Wenger et al., 2002). These different ontologies (process vs. entity view) are also grounded in different theoretical foundations of either practice-oriented theories (Bourdieu, 1990; Giddens, 1984) or, more recently, within a knowledge-based view of the firm (Grant, 1996; Kogut & Zander, 1992; Kogut & Zander, 1996). That is, research on CoPs is either based on entity-based theorizing or process-based theorizing (Wenzel & Koch, 2018).

Although I mainly follow Brown & Duguid (1991) in this dissertation as I explore CoPs as emergent groupings in a managerial shaped context, I tend to agree with scholars, who understand CoPs from a process ontology (Lave & Wenger, 1991; Pyrko et al., 2017). That is, I am particularly interested in the processes that underlie the emergence of CoPs. Based on the current study's findings I, therefore, conceptualize communities as the processes of self-organized

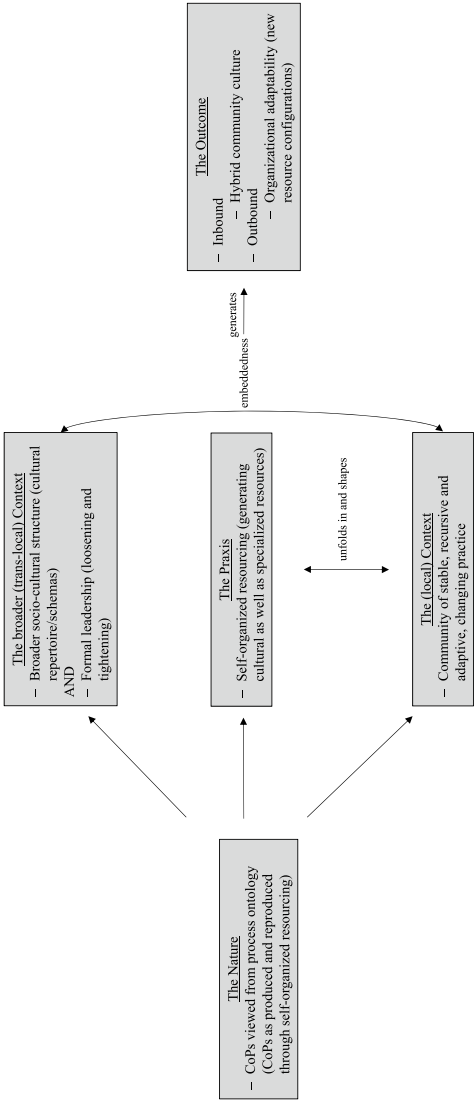


Figure 7.1 Revised framework of the community of practice construct

resource generation unfolding in practice. It is this process that generates and continuously reproduces the social as well as the cognitive structure (the community schema) among organization members, that is, the CoP (Lindkvist, 2005). This process is ontologically prior to the actual, reified group one could refer to as a community.

In viewing CoPs from a process perspective, we gain a more realistic picture because the areas that we were able to investigate were always in a stage of becoming. In the sense that the communities were never in a state of stability, instead, initiatives and programs were continually being pushed ahead as the community schema about how to interpret and react to the environmental dynamics was continuously adapted and renegotiated among members. Moreover, membership to these CoPs was never fixed but, instead, always changing as new relationships in the overall practice were continuously forged. Also, the interrelation between the evolving communities and their organizational context was at no point formally determined but, rather, was always dynamically co-constructed as members interacted with their superiors.

Given this, applying a process perspective on CoPs thus underlines the emergent and spontaneous character of communities (Brown & Duguid, 1991) and questions notions that overemphasize managerial design activities and interventionist strategies in instrumentally creating CoPs (Borzillo, 2009; Corso, Giacobbe, & Martini, 2009; Garavan et al., 2007; Iaquinto, Ison, & Faggian, 2011; Nesheim et al., 2011; Probst & Borzillo, 2008).

I theorize this process using insights on complex adaptive systems as well as practice-oriented approaches on resourcing. Both theoretical perspectives align well with an overall process perspective on CoPs. In particular, complexity theory focuses our attention on the generative processes that underlay organizational innovation and adaptation (Dooley et al., 2011; Dooley & van de Ven, 1999) and, therefore, helps to understand CoPs again more from a process ontology instead of viewing them as fixed entities (Pyrko et al., 2017).

In particular, both perspectives employed together help to theorize the process of resource emergence through self-organized practice. That is, on the one hand the studied CoPs display the dynamics of emergent self-organization of CAS (Chiles et al., 2004) as new order (i.e., new resource configurations) arises through the self-organized interactions of community members. On the other hand, a resourcing lens (Feldman, 2004; Feldman & Worline, 2012) helps to explicate how schemas become resourced in self-organized practice.

By drawing on these perspectives in theorizing on embeddedness, I ground CoP research again more in process-oriented theories. In so doing, the process ontology on CoPs is in line with equally process-focused epistemologies

of practice and complexity theories. Thompson (2011) refers to this as epistemic-ontological alignment, which has been missing in recent CoP research through ontological drifts, primarily through the reification of the CoP construct (Nicolini, 2012; Pyrko et al., 2017).

Turning to the actual praxis within communities of practice, prior research from a knowledge management perspective emphasizes knowledge sharing behavior such as posting and answering questions as the main activities of community members (Bogenrieder & Nooteboom, 2004), whereas, the earlier practice-oriented studies on CoPs always put the construction of intersubjective meaning via the social processes of sensemaking, interpretation, and negotiation of meaning at the heart of communal interactions (Bechky, 2003; Boland & Tenkasi, 1995; Brown & Duguid, 1991; Lave & Wenger, 1991; Wenger, 1998).

The current findings add to existing work by conceptualizing the actions of community members as self-organized resourcing (Feldman, 2004; Feldman & Worline, 2012; Feldman & Worline, 2016). As I mentioned earlier, resourcing describes the relationship between assets and actions and the recursive relationship between a resource in use and a schema (or interpretative framework). Accordingly, resources comprise of anything that helps to enact a specific schema in practice and, moreover, potential resources only become resources as they are indeed put into action to energize a specific framework (Feldman & Worline, 2012).

By conceptualizing the action of community members as self-organized resourcing, the current study highlights agency of lower-level actors, an aspect central to earlier CoP notions (Cox, 2005), that recent community of practice research has increasingly neglected (Contu & Willmott, 2000; Contu & Willmott, 2003). In particular, community members display high degrees of agency as they enact and adapt learned cultural schemas such as identities, norms about comradery, and bureaucratic rule adherence within their informal praxis and, in so doing, produce and reproduce the cultural features of organizational life. Besides this cultural resourcing, members also engage in shaping what I have termed specialized resources such as training courses, conferences, manuals, and handbooks. Community members thus show a substantial influence on their organizational surroundings, although they are primarily located on lower hierarchical levels and, therefore, are typically assumed as not having much access to resources (i.e., not having much power) (Hazy & Uhl-Bien, 2015; Schneider et al., 2020). Surprisingly, these individuals are capable of creating and molding resources in practice. The activities of frontline members, thus, is consequential for renewing and producing the resource base of the organization. Self-organized resourcing dynamics in CoPs, therefore, contribute to the development of an organization's

internal capabilities through the generation of new resources (Dutton et al., 2006b; Feldman & Worline, 2012).

Explaining community activities via resourcing dynamics also again recognizes intersubjective meaning construction as a central activity in communities (Brown & Duguid, 1991; Lindkvist, 2005; Wenger, 1998). Frontline members negotiate meaning about what kind of resources are needed and then translate these schemas into action by improvising first responses which, in turn, leads to further sensemaking and constant adjustment of the schema in practice. As a consequence, activities of community members evolve in reciprocal cycles of meaning construction and action. This finding also aligns well with recent research on "thinking together" in communities of practice which describes a similar trans-personal process. For Pyrko et al. (2017) thinking together is constitutive for a CoP and entails practitioners' regular indwelling about practical, real-life problems in which they mutually draw on each other's actions and performances in practice. In thinking together, people interact with each other based on their understanding of practical problems and their understanding of the history and tradition relevant to a given practice, i.e., based on their shared schemas containing cultural and practical knowledge structures that are continually resourced in practice.

Overall, this dissertations adds to our understanding of the praxis in CoPs in highlighting the resourcing activities within them. In doing so, the current study is the first, to my knowledge, that locates resource generation in communities of practice and, in so doing, explicates CoPs as a space in which resources are created and molded as members perceive their resource endowment as limited. This conceptualization of CoPs is also akin to what Wiedner, Barrett, & Oborn (2017) call resourcing space, a space that allows people to mutually adjust and effectively utilize potential resources to change their practices. From this perspective one could understand CoPs also as a meta-resource (Schulte, Andresen, & Koller, 2020), describing the organizational capacity to process, generate, and renew an organization's resource endowment in practice. Note that such a meta-resource is not be mistaken with a reified, tangible thing but, rather, refers to the potential of resourcing processes occurring in self-organized practice. This finding extends prior research that perceives CoPs as an often untapped resource for knowledge creation (Chua, 2006).

Arguably, the current study's most significant contribution to research on CoPs, however, is that the grounded model uncovers how this self-organized resourcing process within the local context of a community is inextricably embedded and coupled to the context of the broader formal organizational hierarchy (see

also Figure 7.1). More specifically, it elucidates how cultural and leadership mechanisms, together, generate what I have coined embeddedness.

As noted earlier, extant research following a practice-oriented view on learning recognizes other tangential communities and studies how learning occurs in the spaces between CoPs (Bechky, 2003; Boland & Tenkasi, 1995; Gherardi & Nicolini, 2002a; Heizmann, 2011). These studies, however, tend to take a micro view and rarely consider the relation between situated practice and broader macro structures (Gherardi & Perrotta, 2011; Yakhlef, 2008).

In contrast, in a managerialist view on communities of practice researchers stress the importance of culture as determinant for the success of instrumental community initiatives (Ardichvili, Maurer, Li, Wentling, & Stuedemann, 2006; Bourhis & Dubé, 2010; Dubé et al., 2005; Retna & Ng, 2011; Smith & McKeen, 2003). For instance, it is noted that an organization's culture can be a major barrier that inhibits knowledge sharing activities and can cause the failure of community launches (Harvey et al., 2013; McDermott & O'Dell, 2001). Therefore, an organization's top management should be responsible for shaping a knowledge sharing culture consisting of mutual trust, open collaboration, and an error culture (Bourhis & Dubé, 2010; Retna & Ng, 2011).

The current study's findings offer a nuanced illustration of the dynamic between the local contexts with the broader organizational culture of formal hierarchy. In particular, the findings presented above show how deeply ingrained beliefs are reproduced within practice as members resource the learned cultural repertoire within a new, emergent local context. This finding of community members who enact cultural knowledge structures such as rule adherence and obedience they once learned resembles the argument from Contu & Willmott (2006), who state that the Xerox repair technicians[1] essentially reproduce the broader institutional logics of capital relations within their noncanonical practice. They argue that the technicians construct their identities around heroism while they improvise quick fixes and workarounds to machine failures, thereby, actively refusing to accept their place in the bureaucracy. Simultaneously, however, their practices of "keeping the machines running" and "getting the job done" are conservative as they are ultimately functional to the overall goals of cost-effectiveness, customer satisfaction, and profitability. Meaning what initially has a countercultural feel to it is, in fact, a manifestation and perpetuation of the subordinate relationship of the repair technicians within the capitalist organization (Contu & Willmott, 2006). On a related note, other scholars suggests that

[1]Referring to Julian Orr's (1996) ethnography of Xerox photocopier repair technicians, which is also the ground work for Brown and Duguid's community perspective.

hierarchical cultures, in general, might be too pervasive and dominant for organization members to adjust their schemas to more autonomous forms of organizing in communities of practice (Harvey et al., 2013; Kerno, 2008).

Although, my findings are similar to these argumentations in the sense that they also illustrate how the broader, macro culture of bureaucracy and hierarchy continues within the local context of a community's practices, they also differ in the respect that the individuals we observed not only reproduced their cultural repertoire but also contextually adapted it to their specific needs in order to counter what they experienced as constraints and dysfunctionalities.

In outlining how frontline soldiers mold what I have termed hybrid cultures consisting of traditional as well as adapted cultural resources, this study affirms and expands the interpretation of communities of practice as culture-producing social groups (Brown & Duguid, 2001; Cook & Yanow, 1993; Gherardi & Nicolini, 2000; Gherardi & Nicolini, 2002b; Hendry, 1996). Prior work on learning in practice, for instance, has shown how a culture of safe work practices is learned through participation in the practices of a community (Gherardi & Nicolini, 2000). In these conceptualizations, the culture of a community is derived from broader industrial and organizational registers about safety on construction sites and becomes activated in local practice. The CoP is thus the locus where cultural knowledge is transmitted and perpetuated (Gherardi & Nicolini, 2002b). Likewise, the current findings show how the broader organizational repertoire feeds into the local culture of a CoP. Moreover, the study unpacks cultural resourcing as the central mechanism behind this link between local practice and broader repertoires that explains the local enactment and adaptation of learned and internalized knowledge structures about professional identities, role expectations, and norms.

Given these explanations, the current findings deviate from claims that solely focus on the role of managers in creating knowledge sharing and supportive cultures for communities (Bourhis & Dubé, 2010; Dubé et al., 2005) by highlighting how members create and shape culture in practice.

My observations do not deny the critical role of organizational leadership in molding the embeddedness of CoPs in the context of formal organizational hierarchy. Instead, this study offers a grounded, interpretative model that uncovers how the self-organized practices of a community interweave with organizational leadership practices and, in doing so, moves beyond simplistic and generic lists of management recommendations (Bolisani & Scarso, 2014).

Traditional leadership images are primarily grounded in a bureaucratic framework of firms and organizations. As Uhl-Bien et al. (2007) note, much of past leadership theory evolved around the idea that organizational goals are rationally conceived, and leadership practices are designed to achieve these goals.

Consequently, traditional leadership notions center around how formal leadership can motivate followers or subordinates towards task fulfillment (House, 1971), induce them to produce efficiently and effectively (Zaccaro & Klimoski, 2001) and inspire them to align their behaviors with organizational goals (Bass, 1985). These approaches describe leadership as founded on the position in the formal organizational hierarchy and assume that leaders as central authorities design and control subordinates' behavior for the organization to arrive in a knowable and foreseeable future.

Much of the extant writings on community management originating from a knowledge management school of thought seem to reproduce these traditional images of top-down leadership (Peltonen & Lämsä, 2004; Thomas, 2017). Although these accounts regularly note that new leadership forms are needed to manage organic entities such as CoPs (Cothrel & Williams, 1999; Kodama, 2002), they tend to unwittingly fall victim to these old paradigms of alignment and control. For instance, several studies suggest imposing specific knowledge objectives on designed CoPs (Bardon & Borzillo, 2016; McDermott & Archibald, 2010; Probst & Borzillo, 2008). Others recommend bureaucratic supervision of community activities via governance committees (Probst & Borzillo, 2008) and formal sponsors (Borzillo, 2009). While Kirkman et al. (2011) offer an insightful account on external community-oriented leadership, they still only regard unidirectional influence exerted top-down from formal leaders on organizational CoPs, which they perceive as formally designed and aligned with the corporate's goals.

This study's findings extend these notions of leadership for communities of practice. In particular, the narratives of the three studied cases show that leadership does not occur in a single formally designed connection between a CoP and an external leader; rather, leadership arises and changes in a net of dynamically evolving relations between community members and many formal superiors. This finding has several important implications for how we understand leadership for communities of practice (see also Schulte et al., 2020).

First, this evidence indicates that leadership for communities of practice is distributed among multiple actors, units, and departments and, therefore, resembles notions of distributed leadership that are no longer focused on single entities but, rather, acknowledge leadership as a distributed and shared phenomenon among several actors (Brown & Gioia, 2002; Gronn, 2002). Second, leadership for communities of practice is emergent, in the sense that it occurs as community members start interacting with their formal superiors while they are grappling with adaptive pressures and generate new resources from the bottom-up. Likewise, complexity leadership theory understands leadership as emergent events unfolding in the dynamic interactions of heterogeneous agents (Marion & Uhl-Bien, 2001;

Marion & Uhl-Bien, 2003). In this view *"leadership is the emergent result of interacting individuals such that behavior and resource elements of the organization come together in useful ways"* (Lichtenstein et al., 2006, p. 8). Third, this also indicates a relational component of leadership for communities of practice (Bradbury & Lichtenstein, 2000; Uhl-Bien, 2006). Relational means that leadership occurs in a web of relationships between community members and formal, appointed leaders in which mutual influencing patterns arise and change over time. Fourth, leadership for communities of practice is not described through one particular leadership behavior or style; rather it implicates dynamic shifting between practices that loosen up or tighten the CoPs' local context (Arena & Uhl-Bien, 2016; Uhl-Bien & Arena, 2017).

Taken together, the findings of the current study help to move the discussion away from traditional, top-down leadership notions towards a more nuanced understanding of leadership in light of CoPs that recognizes leadership as distributed, emergent, and relational phenomena.

Given this, extant research on community management/leadership is in disagreement over how to manage the central tension between a CoP's autonomy and its integration into formal structures (Borzillo et al., 2008; Smith & McKeen, 2003). As mentioned within the literature review section, some authors suggest management should shape enabling or seeding structures around which autonomous CoPs may spontaneously evolve (Chua, 2006; Feldman & Worline, 2016; Roberts, 2006; Thompson, 2005) while others recommend more explicit integrating mechanisms (Anand et al., 2007; Borzillo, 2009; Clegg et al., 2008; McDermott & Archibald, 2010; Meeuwesen & Berends, 2007; Probst & Borzillo, 2008). More recently, studies are beginning to suggest balancing autonomy and control in the relation between CoPs and formal organizational hierarchy (Borzillo & Kaminska-Labbé, 2011; Harvey et al., 2015).

The current study adds to this discussion by illustrating how, over time, both loosening as well as tightening practices are enacted within leader-member relations and how this enables, influences, and structures the self-organized resource generation emanating from CoPs. What I interpreted as loosening practices incorporates many aspects that have been noted before by community researchers such as creating a context that enables community activities (Kietzmann et al., 2013; Thompson, 2005) through the growth of trusting relationships between leaders and members (Büchel & Raub, 2002; Coleman Jr, 1999; Cothrel & Williams, 1999), waiver of direct supervision of community activities (Chua, 2006; Thompson, 2005), and provision of resources to CoPs (Anand et al., 2007; Chua, 2006; McDermott, 2000; Wenger et al., 2002).

My findings, furthermore, uncover unique facets of this leader-member relation. Particularly, the findings show how leader-member relations are typically formed as members engage in upward issue-selling (Dutton et al., 2001; Howard-Grenville, 2007). Through issue selling, members direct formal leaders' attention and interest to the emerging issues and problems. Counterintuitively, this also indicates that the emerging leadership relations are in parts of a rather close and intimate nature, unlike often mentioned laissez-faire styles arguing for true autonomy and a hands-off leadership (Hazy & Uhl-Bien, 2012). In other words, members acquire and claim autonomy and free space for their community activities through continuous informing, notifying, and persuading of formal leadership. Besides this, the three cases highlight the significance of immaterial resources such as appreciation and legitimization that energize self-organized resourcing activities within CoPs, whereas, prior research tends to only emphasize time and funding as crucial (material) resources for new community initiatives (Anand et al., 2007; Borzillo, 2009; Pattinson & Preece, 2014).

Extant research also notes how the integration of autonomous CoPs can be achieved through leaders' articulation of shared values and visions (Kirkman et al., 2011; Kodama, 2002; Peltonen & Lämsä, 2004). Likewise, my findings of tightening practices show how sensegiving from superiors to members through discursive activities allows for alignment of the self-organized practice. However, beyond this, the current study adds that meaning of community initiatives and resources is often negotiated between levels while formal leadership and community members mutually influence and adjust each other's interpretative frameworks.

Moreover, my findings highlight how, through this dynamic, interplay between members and formal leadership resources are transitioned into formal structures, when formal leaders absorb, channel, and promote these initiatives along official lines. Much previous research focuses on how the CoP as an entity can become transformed and formalized (Clegg et al., 2008; Dubé et al., 2005; Kirkman et al., 2011; Wenger et al., 2002), and not so much on how leadership integrates the emergent outcomes into broader structures for overall organizational benefit (Tallman & Chacar, 2011a).

In sum, this study contributes to our understanding of CoPs by uncovering how embeddedness of CoPs within the broader context of formal organizational hierarchy is created and sustained through cultural and leadership mechanisms (see Figure 7.1). In doing so, it provides nuance to our understanding of spontaneously evolving and self-organized communities of practice as spaces for organizational adaptation (Brown & Duguid, 1991; Brown & Duguid, 2001; Jarzabkowski, 2004).

7.2 Implications for Research on Complexity Leadership Theory

In this study, I employ insights from complexity theory to explain the emergence of CoPs and their embeddedness within the formal organizational hierarchy. Below, I will outline how my explanations affirm prior work on complexity theory and in which respects they might add new nuances to our understanding of CAS dynamics and leadership in organizations.

First, the current study adds to complexity theory literature in outlining communities of practice as an example for the CAS dynamics in organizations. In much of the extant research complex adaptive systems remain on an abstract level. That is, they remain mostly unspecified, in the sense that anything that networks can be studied from a CAS perspective. As mentioned earlier, the human brain, our immune system, any social group, even the whole world might be understood as a complex adaptive system (Stacey, 1996). In management and organization science whole firms and industries have been studied as exhibiting the properties and dynamics of CAS (Chiles et al., 2004; Stacey, 1995). On a closer look, however, the informal organization has been repeatedly pointed out as the sphere in which CAS dynamics emerge and scale. Stacey (1996) thus refers to the shadow network in describing the informal system of organizations in which nonlinear interactions lead to learning, and organizational change. Uhl-Bien et al. (2007), likewise, describe CAS dynamics within social systems with the term informal emergence, referring to changes that emerge from any kind of informal interaction within organizations. In a similar vein, Uhl-Bien & Marion (2009) broadly discuss informal, adaptive forces within bureaucratic organizations that function as a complex adaptive system, without specifying what kind of social groups or networks this might include.

Solely focusing on the informal organization, however, is problematic because the informal system by definition involves any emergent behavior and social interaction among organizational members and the norms and values that underlie such behaviors and interactions (McEvily, Soda, & Tortoriello, 2014). Hence, the informal organization can involve any behavior (e.g., water cooler discussions, affairs, power networks). Notwithstanding, that such informal interactions can produce emergent social change, it might not always be the desired innovation an organization seeks to adapt to environmental change.

In the current study, I explicitly focus on communities of practice and, therefore, on the part of the informal organization that develops around particular local practices. In centering on CoPs, this study highlights how CAS dynamics unfold

as individuals collectively and agentically engage in their day-to-day work practices with the aim of "getting the job done". That is to say, my findings illustrate how emergent self-organization emanates from interactions that are driven by specific practice problems and dilemmas. In doing so, this study helps to specify that CAS dynamics unfolding from the situated practice of a community of practitioners are more likely to generate fruitful outcomes regarding learning, innovation, and adaptation.

Second, my findings show how the process of emergent self-organization central to complexity theory involves self-organized resource generation. Proceeding from the dissipative structures model (Prigogine, 1997) several complexity scholars have outlined the processual stages of emergence in social systems, explaining how new, overall system properties emerge from lower-level interactions (Chiles et al., 2004; Gemmill & Smith, 1985; Goldstein, 1999; Lichtenstein, 2000; Lichtenstein, 2014; Lichtenstein & Plowman, 2009; Smith & Gemmill, 1991). While these authors do not always use the same terms, the process of emergence essentially entails the four stages of disequilibrium state, stress and experiments, amplifying actions, and stabilizing feedback (Lichtenstein, 2014; Lichtenstein & Plowman, 2009).

The current study's findings illustrate how the process of self-organized resource generation within CoPs is akin to the above stages of emergence. As I mentioned earlier, emergence occurs in far-from-equilibrium conditions that can be provoked by environmental pressures as well as internal constraints that push the organization away from equilibrium into the region of complexity (Lichtenstein & Plowman, 2009; Maguire & McKelvey, 1999). At this stage, frontline members identify a need for specialized resources as they perceive their resource endowment as insufficient to deal with the new situation. The move away from equilibrium usually causes tension and stress in the form of new approaches, novel ideas, and experiments—the second stage of emergence—as organization members search for a more efficient way to organize (Lichtenstein, 2000; MacIntosh & MacLean, 1999). At this stage the members of the observed CoPs improvise first responses and experiment with new resources. Amplifying actions refer to the nonlinear interactions among the agents of a complex adaptive system. Amplification occurs when individuals link up through networks in ways that allow for new ideas to spread and move quickly throughout the system (Lichtenstein, 2014; Lichtenstein & Plowman, 2009). That is, at this stage of emergence the new ideas, patterns, or organizing structures gain momentum and manifest themselves (Lichtenstein, 2014; Marion & Uhl-Bien, 2001). Regarding self-organized resourcing in CoPs, members at this point mobilize further

connections and invite others to join their initiatives such as exercises, workshops, or conferences. Through this practicing together the new resources are continuously expanded and become refined. Complexity scholars refer to the last stage of emergence as stabilizing feedback, meaning that the emergent order becomes anchored in the system. As a result, the system is kept from spinning out of control and increases its overall capacity to deal with the new situation (Chiles et al., 2004; Lichtenstein, 2014; Lichtenstein & Plowman, 2009). At this point in self-organized resourcing, members transfer the community generated resources into the formal organization, that is, resources become institutionalized through the interplay with formal leadership.

Following on from this, I conclude that my findings essentially affirm existent notions about the processual stages of emergence unfolding within a CAS. They furthermore also highlight how this process of emergence can entail a resource generation dynamic that passes through similar sequences.

Third, the current study's finding of community members and formal leaders who, through their dynamic interrelation, generate new resources takes several pointers from research on complexity leadership theory (Marion & Uhl-Bien, 2001; Uhl-Bien et al., 2007; Uhl-Bien & Marion, 2009). CLT is, at its core, interested in how leaders can enable, influence, and structure the above-outlined process of emergence so that emergent ideas and innovations and, therefore, adaptability can occur in organizations.

As described before, the conceptualization of complexity leadership offered by Uhl-Bien et al. (2007) identifies three leadership forms within organizations: adaptive leadership, administrative leadership, and enabling leadership. Adaptive or entrepreneurial leadership (Uhl-Bien & Arena, 2018), in this context, refers to the influencing patterns that occur in the networked interactions of the informal organizations where actors explore and advance novel ideas (i.e., exploration). Administrative or operational leadership describes leadership in the organization's formal system that produces results through efficiency and execution (i.e., exploitation) (Uhl-Bien et al., 2007; Uhl-Bien & Marion, 2009). Enabling leadership operates at the interface between informal, adaptive elements and formal operational systems and facilitates, CAS dynamics. Together, these three leadership forms are argued to produce adaptability: adaptive leadership pushes for emergent ideas in light of adaptive challenges, administrative leadership reintegrates, incorporates, and executes the emergent change into the formal system, and enabling leadership facilitates the adaptive processes (Uhl-Bien et al., 2007; Uhl-Bien & Arena, 2017; Uhl-Bien & Arena, 2018).

The current study adds to this "meta-framework" (Uhl-Bien & Arena, 2018) by empirically illustrating how enabling leadership works in the context of communities of practice and how this generates the embeddedness of CoPs. The grounded process model about the embeddedness of CoPs does not reproduce the complexity leadership framework in its entirety, yet it borrows a few pointers from it and is close to the overall logic of complexity leadership thinking. To be more specific, this study does not explicitly emphasize the adaptive and administrative leadership functions outlined by Uhl-Bien et al. (2007). Instead, I describe how, in the dynamically evolving net of relationships between formal (similar to operational or administrative) leaders and community members, the emergence and embeddedness of CoPs is enabled. Therefore, I believe that these findings are comparable to the above mentioned enabling leadership function because it similarly describes how self-organized practice is enabled, sustained, and integrated via leadership.

The current study further adds to the CLT framework by highlighting how the interface between self-organized CoPs (i.e., the adaptive function) and formal leadership (i.e., the administrative function) establishes through the mutual adjustment of schemas. In contemporary organizations administrative forms of leadership represent the norm, meaning that leaders need to shift deliberately into more enabling forms to allow for emergence as, otherwise, the administrative function would drive out exploration (Uhl-Bien & Marion, 2009). The findings presented here indicate that leaders' enabling leadership practices are initially encouraged through members' upward issue-selling activities (i.e., adaptive leadership). On the other hand, ongoing negotiations with members over the developed resources give formal leaders a sense for when exert their formal, authority power and transform the emergent outcomes and support it with official means and processes. The mutual adjustment of actors underlying schemas, therefore, seems to be critical for emergence as it mediates between administrative and enabling forms of leadership (Schulte et al., 2020).

Besides this, the current findings illustrate the essential role of resources apparent in enabling leadership and, in doing so, add to prior research on complexity leadership that recognizes the importance of resources for emergence (Hazy, 2011; Lichtenstein & Plowman, 2009; Marion & Uhl-Bien, 2001; Uhl-Bien & Arena, 2017). The cases described in this dissertation in particular elucidate the resource flows between formal leadership and communities of practice in more detail. Formal leaders enable self-organized resourcing processes by granting resources such as autonomy and trust. They further energize and catalyze these dynamics via material and immaterial resources. Moreover, leadership negotiates over the resources under construction across levels and transforms them into the formal

system. Following on from this, I suggest that the enabling leadership function in CLT might also be understood as a dynamic process of resource allocation, resource negotiation, and resource transformation at the interface between the informal entrepreneurial and the formal operational system (Schulte et al., 2020).

A final contribution to this literature stream is that the current study, in general, provides a unique and rich empirical example of complex dynamics unfolding within a highly hierarchic and formalized organization. Extant work on complexity theory, particularly on complexity leadership theory, is predominantly of a theoretical nature, while empirical accounts—with a few notable exceptions (Chiles et al., 2004; Plowman et al., 2007a)—remain scarce. Against this backdrop, the findings outlined here add to the overall complexity literature by empirically illustrating how emergence unfolds in practice, how this sparks tension, and how leader-follower relations are shaped in this context.

7.3 Implications for Research on Organizational Culture

The findings of the current study uncover cultural resourcing as a central mechanism in the interrelation between the local context of a community of practice and broader context of formal organizational hierarchy. On that basis, I would like to elaborate on how these findings might add to our understanding of cultural processes within organizations on a more general level.

First, my explanations of cultural resourcing processes contribute to the discussion on the causal link between culture and human action. Within extant research on culture, there is a long-standing debate over the relation between culture and practice. Traditional notions of organizational culture, mostly conceptualize culture as a unitary system of meanings (Geertz, 1973) that guides the thinking and behaviors of members (Schein, 1990). Such webs of meanings include norms, taken-for-granted assumptions, and core values (Cameron & Quinn, 1999; Pettigrew, 1979; Schein, 1985; van Maanen & Barley, 1984), which are learned and internalized by members through processes of organizational socialization (van Maanen & Schein, 1979). Central to these value-based conceptualizations of culture (Giorgi et al., 2015) is that an internalized system of meanings guides and constrains peoples' decisions and resulting actions. That is to say, culture provides ends and goals in the form of values and meanings towards which action is directed (Weber & Dacin, 2011). Scholars in classical work on organizational culture, therefore, perceive formal as well as informal practices as strongly influenced by the culture in which actors are situated. In this sense, practices represent manifestations of deeply held values and beliefs (Schein, 1985; Smircich, 1983). As

becomes apparent, these traditional contributions to our understanding of organizational culture tend towards a cultural determinism of practice and, therefore, follow more the camp of "societists" (Schatzki, 2005), who emphasize macro social phenomena in their explanations.

In contrast, the culture as a resource or toolkit perspective (Swidler, 1986; Swidler, 2001a; Swidler, 2001b), defines culture as "grab bag" (Kellogg, 2011, p. 483) or repertoire of cultural resources that individuals draw upon to build strategies for action. Sociologist Ann Swidler (1986) introduced this notion of culture as toolkits to explain how actors use cultural repertoires in practice; that is, unlike in value-based conceptions: *"culture is not a unified system that pushes action in a consistent direction. Rather, it is more a toolkit or repertoire from which actors select differing pieces for constructing lines of action"* (Swidler, 1986, p. 277). Individuals, thus, utilize *"heterogeneous bits of culture"* (Weber & Dacin, 2011, p. 289) to solve everyday problems (Giorgi et al., 2015; Weber, 2005). Instead of viewing culture as a set of prescriptions that constrain practice, a toolkit-based approach conceptualizes culture as a necessary condition for action (Swidler, 1986). Swidler's approach to culture is consistent with the "practice turn" (Schatzki, 2001; Whittington, 2006) in contemporary social theory that I mentioned, earlier, in the theoretical background section.

Following this perspective, the relation between culture and practice is that practices can affect culture (Giorgi et al., 2015; Swidler, 2001b). Practice can be consequential in shaping specific epistemic cultures (Brown & Duguid, 2001) and in perpetuating the cultural properties of a specific social group or field (Dacin, Munir, & Tracey, 2010; Gherardi & Nicolini, 2000; Gherardi & Nicolini, 2002b; Lave & Wenger, 1991). Furthermore, other studies highlight how small changes within everyday practices can alter and change existing cultural repertoires and dominant logics over time (Canato et al., 2013; Howard-Grenville et al., 2011; Smets et al., 2012).

Recent practice-oriented research (Canato et al., 2013; Jarzabkowski, 2004; Smets et al., 2012) advocates for utilizing a structuration perspective (Giddens, 1984; Sewell, 1992) to overcome this divide in linking culture and practices (Giorgi et al., 2015). These studies suggest a relationship of mutual constitution between practices and culture (Canato et al., 2013; Sewell, 2005; Smets et al., 2012). That is, broader cultural frameworks and repertoires inform micro-level practices, yet practices also function as a springboard for cultural change and can enrich extant cultural repertoires (Canato et al., 2013).

It is at this point that my findings contribute to our understanding of the duality of a broader cultural repertoire and local practices of a community by highlighting the process of cultural resourcing that is inherent in this interrelation.

That is, in explaining the relational dynamic between local, situated practices of a community and broader cultural repertoires via cultural resourcing I uncover one mechanism underlying the duality of culture and practice. More specifically, resourcing explains culture and practice as linked together through the processes of enactment and adaptation of cultural resources (schemas) in local practices triggered by incidents of cultural dissonance.

In line with a structuration perspective, this explanation accounts for the simultaneous occurrence of stability and change in social structures (Giddens, 1984; Sewell, 1992). Through cultural resourcing, members construct hybrid community cultures that, at the same time, bring old and new identities, behavioral expectations, and meanings together in ways that enable novel avenues for action that, heretofore, were not possible within the context of a formal organizational hierarchy. In this sense, the newly constructed community culture functions as a new resource because it enables new possibilities for collaborative action (Feldman, 2004; Howard-Grenville et al., 2011). In viewing culture this way, the current study echoes Swidler's (1986) conceptualization that recognizes culture as a set of means or capacities for navigating everyday social life. The use of culture, however, is not entirely unconstrained, as such a view might suggest. Instead, members draw on an organizational cultural repertoire that is limited to elements typical for military organizations.

In keeping with recent research on organizational culture that draws on Swidler's (1986) toolkit approach, the current study also illustrates actors' skillful use and transformation of cultural resources to achieve certain ends (Bertels, Howard-Grenville, & Pek, 2016; Harrison & Corley, 2011; Howard-Grenville et al., 2011; Kellogg, 2011; Rindova, Dalpiaz, & Ravasi, 2011; Weber, 2005). Prior work has explored how organization members use and shape culture in cases of integrating a coveted routine (Bertels et al., 2016), how an organization exchanges cultural materials with external cultures of enthusiast communities (Harrison & Corley, 2011), how trainees change scutwork practices based on the availability of rich cultural as well as political toolkits (Kellogg, 2011), and how the intentional juxtaposition of old and new cultural resources can seed fundamental cultural change (Howard-Grenville et al., 2011). The current study's findings enrich this stream of research by illustrating how less powerful organization members on the frontlines use and shape cultural resources within self-organized practice, an area in which this literature has, hitherto, not considered.

My findings, however, also indicate not to dismiss the culture as a system of meanings notion by exclusively focusing on the performative aspects of culture. As the informant's quotes of this study have exemplified, soldierly norms,

beliefs, and identities—a system of shared meanings—are learned and internalized through organizational socialization (Schein, 1985; van Maanen & Schein, 1979). Thus, it seems reasonable to conceive organizational culture as a repertoire consisting of a system of beliefs, norms, values, and meanings with different degrees of internalization (Canato et al., 2013) that takes the form of schematic knowledge that is at least to a certain degree shared among organization members (DiMaggio, 1997).

In accord with Sewell (2005), I reason that it seems odd to interpret this notion as incompatible with a more performative view on culture as resources or repertoires. Contrary, one has to think of the use of cultural resources and the underlying system of meanings as complementary aspects of the same phenomena (Giorgi et al., 2015; Patterson, 2014). Engaging in social practice means utilizing a cultural resource in order to achieve a specific end (Swidler, 2001b). However, the accomplishment of the desired goal can only be expected, because the applied resource has a predetermined and collectively shared meaning in a system to other resources (Sewell, 1992). Thus, cultural resources require a system of meanings. On the other hand, the system of meanings remains in a state of potentiality and only receives validity if it is enacted in practice. Otherwise, it would fade over time (Sewell, 2005).

Consequently, I suggest that conceptualizations of organizational culture should entail both cognitive (value-based) and performative (toolkit-based) aspects. In other words, organizational culture consists of schemas that organize the learned and internalized meanings, expectations, and values, which become validated, perpetuated, and changed as they are put into action as people resource them to navigate through organizational life.

Lastly, the current study's findings also add to the discussion of when and through whom organizational culture might change. My model suggests that cultural change is something that continuously and gradually unfolds in local practices within complex organizations. In prior work, cultural change is often presumed to be episodic in nature, triggered by an initiating jolt or shock (Morrill, 2008; Swidler, 1986), or is brought forward by powerful change agents (Weick & Quinn, 1999) or outsiders such as external consultants (Argyris, 1977; Schein, 1985). For example, in Swidler's (1986) account cultural change regarding new cultural resources that allow for different strategies is advanced in "unsettled times" that are said to occur episodically in periods of upheaval. More recently, Howard-Grenville et al. (2011) suggest that cultural change can also be initiated in everyday organizational life when an organizational insider intentionally combines mundane with less typical occurrences within routine activities.

Although the current study's findings resemble this notion as they also highlight how individuals combine traditional norms with new ones, the cases of this study are different in the way that they do not involve one central actor who intentionally crafts a "liminal culture" for others (Howard-Grenville et al., 2011). Instead, what I refer to as hybrid community cultures gradually emerges through the repeated, self-organized interaction among multiple members without one central "change agent" being present. Moreover, community members did not meet intentionally to initiate cultural change programs; rather, their efforts were driven by their practical needs, which necessitated them to contextually reinterpret and adapt their learned repertoire in order to innovate new solutions collaboratively.

7.4 Implications for Managerial Practice

This work also has implications for officers and armed forces leaders as well as for managers in similar hierarchical organizations. In general, the findings, highlighting how the self-organized efforts of frontline members become embedded in the context of formal organizational hierarchy, should be of interest to strategic leaders and planners, who aspire to design their bureaucratic and hierarchical organizations more adaptively.

First, organizations such as the Federal Armed Forces are highly complex systems, in the sense that they comprise myriad interconnected elements, whose interplay cannot be grasped and governed by one central authority. The dominant logic of hierarchy, however, too often remains that tasks, missions, and initiatives are preplanned and pre-structured and are top-down instructed, supervised, and controlled. In a complex, dynamic, and unpredictable world, however, this logic is outdated. This manuscript's findings illustrate how self-organized interaction in evolving communities situated on the lower organizational levels can play a crucial role in generating adaptive responses to a complex environment. That is, the observed communities of practice transform the FAF in the respective domain from a complex system into a complex adaptive system (Stacey, 1995) because, through them, the external complexity is met with internal complexity (i.e., emergence). Thus, a critical insight for practitioners is to recognize this adaptive potential inherent in CoPs and depart from the common logic that change must be top-down administered.

Second, the current study's findings move beyond this general statement as they show how CoPs interrelate with their formal surroundings, highlighting how the tension between these contradictory forces can be engaged. Especially, cultural resourcing facilitates a CoPs' embeddedness. These cultural processes indicate

that organizations should assess their cultural repertoires about the resources available in them and observe how those resources are brought to use in social practice. Too often it seems to be the case that cultural statements about the organizations' visions, core values, and norms are composed by top-management assuming overall cultural unity (Brown & Duguid, 2001) with little knowledge about how organizational members practice these norms and values. The role of senior managers should be to retain new cultural resources (e.g., rank-free cooperation) originating from CoPs and recompose them with the existent cultural repertoire. In doing so, they would acknowledge and legitimize these activities as desirable behaviors.

With regard to the German military, the finding of community members who first and foremost construct professional identities indicates that there is no single formally prescribed soldierly identity. Within the FAF the debate on what constitutes the "right" soldierly self-image has a long tradition. This identity conflict proceeds between two opposing groups. One group views themselves predominantly as fighters and emphasizes traditional military virtues such as bravery, tactical competence, and discipline (value-based identity). In contrast, others call for a soldierly self-image that combines identities from diplomats, humanitarian aid workers, bureaucratic managers, combat leaders, and fighters (task-based identity) (Glatz, 2016; Tomforde, 2015; Warburg, 2010; Weigt, 2014). In cases described in this dissertation, employees collectively shape their identities in and around their practices. These identities are hybrid and multifunctional. That is, at their core, they involve traditional soldierly values such as a high sense of duty as wells as a strong commitment and loyalty towards the FAF's purpose and mission (value-based). These general virtues, however, are combined with professionalism, a high task-orientation, and passion for the respective practice area (task-based). Thus, these identities go beyond simple, traditional self-understandings of soldiers as pure fighters. Political as well as military leaders would do well to open up discussions about soldierly identity in order to facilitate the construction of such, more differentiated, self-images.

Third, the findings illustrated above give a detailed account of how leadership operates at the interface between the self-organized CoP and managerial system. In particular, they outline how formal leaders can and must get involved with communities of practice without undermining their emergent and self-organized nature. Implications for practitioners in leadership positions are, therefore, manifold: establish close and mutually trusting relationships to your followers, encourage followers to engage adaptive challenges, allow actions in grey areas, listen to your followers and accept when they are in the lead on emergent issues. Additionally, leaders should recognize and legitimize novel avenues

their followers discover, try to give sense to new developments, remind followers of the organization's core values and overall vision, be open to followers' ideas and suggestions, grapple with followers on emerging issues, and promote and champion followers' initiatives along the chain of command. The bottom line of such a leadership perspective is that such enabling practices implicate much less top-down control but also call for leaders to be highly involved and not passive bystanders (Schulte et al., 2020).

The central message to organizational leaders, here, is to accept the tensions between informally emerging communities and the formal managerial system in their organizations as a natural and potentially constructive occurrence, instead of falling back into patterns of control and alignment.

Within the German military, surprisingly, some of these recommendations are already mentioned in the FAF's manual for civic duty and leadership development and are core elements in German mission-type tactics. Besides that, senior military leaders repeatedly mention the need for such novel leadership practices (Weigt, 2014). However, leadership relations that involve these features represent, somewhat more, the exception and not the norm within the FAF. Instead, in many places leadership and regular organizing practices of "legal safeguarding" and "micro-management" were experienced as dysfunctional for flexible adaptation. Consequently, military leaders should actively try to return to mission-type tactics in their everyday practice.

On a more general level, military leadership philosophies should include what CLT coins enabling leadership. Traditionally, military leadership emphasizes efficiency, motivation, and cohesion in military task fulfillment, that is, it focuses on performance. Consequently, training programs predominantly involve teaching leadership practices in either tactical combat situations or command and control processes in traditional staff work. While these aspects are apparently important, training programs should be extended to capture the, in parts, diverging aspects of the leadership notion developed in this dissertation. Leadership for communities of practice is more emergent than preplanned, demanding an excellent sense from leaders to recognize when followers engage in self-organized activities. It is less hands-on than traditional military leadership and requires leaders to take a step back at times. It is more distributed among actors than traditional leadership which, in the military, involves the principle of unity and singularity of command. Finally, this form of leadership requires finding consensus instead of issuing orders from top to bottom.

From my own experiences as an officer in the FAF, I recall that such qualities are seldom educated and rewarded. Instead, prevalent leadership images tend to favor the strong-willed, decisive, and charismatic troop commander.

Notwithstanding that such leadership qualities remain essential in military organizations—especially in combat training and missions—other situations such as normal peacetime service and other environments such as training facilities, staff members, and departments, call for nuanced leadership concepts (Kark et al., 2016). Thus, future leaders should be trained more in how to navigate the intricacies and contingencies of entirely different leadership situations they will face during their careers.

7.5 Beyond the Military Organization and Further Research

On a final note, I would like to discuss some of the study's limitations and highlight possible avenues for further research. One of the central critiques of qualitative research is regularly its limited generalizability. The ultimate purpose of an interpretative research approach taken in this dissertation, however, is not to develop generalizable theory, but to provide a detailed account about a specific phenomenon, specific event, or process from the perspective of those who have experienced it (Gioia, 2003; Harrison & Corley, 2011). This is not to say that the emergent theory—the grounded model—produced through the researchers' interpretation of informants' claims and experiences is not transferable into other contexts (Lincoln & Guba, 1985). A condition for transferability, however, is that possible cases for transference share key characteristics with the context under study (Harrison & Corley, 2011). Thus, even though the model about the embeddedness of CoPs emerged from our study of the German armed forces, I believe that it is translatable to other organizational contexts outside the military.

Although several researchers and commentators have written about the decline and dysfunctionalities of mechanistic, bureaucratic organizations (Burns & Stalker, 1961; Mintzberg, 1979) and have praised the emergence of new organizational forms (Lewin & Volberda, 1999), the vast majority of contemporary business organizations—in particular large, multi-business corporations—still remain structured around these principles (Hales, 2002; Uhl-Bien & Marion, 2009). That is, they are also vertically stratified in managerial functions, are functionally compartmentalized into distinct areas, and they are coordinated and controlled by centrally imposed formal rules. It is this context, where the dynamics of CoPs and the mechanisms of embeddedness should be of relevance and applicable.

One military particularity that might limit this transferability into other contexts is the deeply ingrained belief of serving the organizational purpose salient

among informants of this study. This sense of duty might be specific to the military or similar public or non-profit organizations that possess social missions that are more easy to identify with (Dixon, Weeks, Boland, & Perelli, 2016). However, other business organizations are also interested in developing a shared sense of duty among their employees, by encouraging citizenships behaviors that go beyond the initial call of duty and strive towards higher purposes (Tinoco & Arnaud, 2013).

Besides applying to other, yet, similar situations the grounded model of this study also gives a few pointers for future research opportunities.

First, as I highlight the potential of CoPs for organizational adaptability unfolding in the practices of lower-level practitioners, research from an open strategy perspective (Hautz, Seidl, & Whittington, 2017; Whittington, 2019; Whittington, Cailluet, & Yakis-Douglas, 2011) might further build on these insights. The emerging paradigm of open strategy develops mostly from research in the strategy as practice tradition (Jarzabkowski, 2005; Jarzabkowski et al., 2007; Jarzabkowski & Spee, 2009; Whittington et al., 2003b) and calls for opening up the strategy process through new practices of strategy-making that span organizational level and boundaries (Whittington et al., 2011). The main premise of open strategy research is that involving more actors into strategy making leads to better outcomes. Open strategy in this view involves a bundle of strategy practices that enable greater transparency and inclusion regarding a wide range of internal as well as external actors outside managerial elites. Transparency alludes to the visibility of strategic information for external and internal audiences, while inclusion refers to internal and external consultation regarding strategic issues (Hautz et al., 2017). Research exploring these dimensions of open strategy has highlighted that information technology such as social media applications and wiki technologies promote not only transparency by increasing the visibility of strategic conversations but also can facilitate greater inclusion by involving internal and external participants in open strategy via online crowds and communities (Dobusch & Kapeller, 2018; Stieger, Matzler, Chatterjee, & Ladstaetter-Fussenegger, 2012). For instances authors have studied internal crowd-sourcing initiatives involving thousands participants from all over the organization (Bjelland & Wood, 2008) and the role of open strategy practices in online communities such as Creative Commons copyright experts (Dobusch & Kapeller, 2018). As becomes evident these studies focus on information technology mediated practices of open strategy. In contrast, the CoPs studied above emerged from everyday work activities of organization members on the frontlines.

Although not all of the communities of practice introduced in this study displayed strategic relevance for the armed forces, issues such as the recognition

of intercultural aspects in mission planning and execution or the capability for network-centric warfare had and still have a significant effect on how the FAF is able to achieve its strategic goals. They thus provide vivid examples of how strategic issues emerge from the lower organizational levels where practitioners identify environmental challenges and threats and develop adaptive responses in evolving communities. The findings of the current study thus may depict a first step in exploring the role of CoPs in open strategy making processes.

Enabled and embedded via leadership these CoPs can facilitate open strategy along the inclusion dimension (Hautz et al., 2017) as they not only allow the participation of frontline practitioners in strategy making processes they also automatically incorporate external actors' perspectives and insights because these CoPs are embedded in wider networks of practice (Brown & Duguid, 2001) or practice landscapes (Pyrko et al., 2019).

On a related note, more and more research lately explores the dynamics of organizational spaces for organizational and strategic change or adaptability in general (Kellogg, 2009; Uhl-Bien & Arena, 2018; Wiedner et al., 2017).[2] Space concepts for example involve relational spaces (Kellogg, 2009), free spaces (Rao & Dutta, 2012), or discursive spaces (Hardy & Maguire, 2010). Moreover, Wiedner et al. (2017) in drawing on resourcing theory (Feldman, 2004; Feldman & Worline, 2012) introduce the concept of "resourcing space" as the space in which actors are enabled to change their practices. While originating from complexity theory Uhl-Bien & Arena (2017; 2018) outline the concept of "adaptive space" defining the space on the interface between the entrepreneurial and the operational systems of an organization, which accommodates adaptability and is created and sustained via enabling leadership. Although stemming from different traditions, these concepts describe social spaces in which actors from different organizational levels come together and advance change. The described CoPs in this dissertation resemble to the dynamics of these spaces as they also describe contexts in which organization members drive change and adaptation through self-organized resourcing. Also, these local contexts are opened up and closed through leadership practices that steer the resource flows from and towards these spaces.

Taking these findings into consideration, we can see at least two opportunities for future research. First, researchers may delve deeper into the practices that shape and sustain spaces in which CoPs can participate in open strategy making processes to drive strategic change and adaptation. This would involve clarifying on which organizational levels different leadership practices are enacted and how they, in concert, enable and sustain a CoPs embeddedness. Studying on which

[2]For a review of work on organizational spaces see also Weinfurtner and Seidl (2019).

levels specific practices occur would also give us a more detailed picture of the distributed nature of enabling leadership among several actors on multiple levels. Second, as we can see that the CoPs studied in this dissertation show features of resourcing as well as of adaptive and relational spaces future work on CoPs may draw on these space concepts to explore the dynamics of CoPs as well as integrate and synthesize these various space notions.

Moreover the findings of the current study have highlighted the different resource flows from and towards communities of practice. Resources have, for decades been a cornerstone to our understanding of firms and strategic management in particular. For instance, resources are viewed as the primary productive building blocks that make up the firm (Penrose, 1959), as critical assets that reduce uncertainty and environmental dependence (Pfeffer & Salancik, 1978), as sources of sustained competitive advantage (Barney, 1991; Wernerfelt, 1984), or most recently in the dynamic capability view as the assets that need to be reconfigured into new resource combinations in order to adapt to environmental threats or opportunities (Eisenhardt & Martin, 2000; Teece, Pisano, & Shuen, 1997). Dynamic capability perspectives, in particular, search for explanations for the dynamic renewal and reconfiguration of an organization's resource base in high-velocity environments. A central managerial task in this perspective is to gather and allocate resources, and thereby, reconfigure an organization's resources endowment to respond to environmental dynamism (Adner & Helfat, 2003; Helfat & Martin, 2014; Helfat & Peteraf, 2015; Teece, 2007; Teece, 2014). The different modes of how to manage resources involve leveraging, creating, accessing, and releasing a firm's resources (Danneels, 2011; Eisenhardt & Martin, 2000). Yet, how resources itself are altered and transformed by decision-makers remains largely unattended in the field of strategy (Danneels, 2011; Kannan-Narasimhan & Lawrence, 2018; Sirmon, Hitt, & Ireland, 2007). This is because resources in the dynamic capability view are mostly viewed as fixed and stable entities that have innate properties and qualities. Depending on these properties resources are valuable, rare, inimitable, and non-substitutable (Barney, 1991). When viewed from this perspective, static resources, however, can only be utilized for specific preconceived and defined applications, neglecting alternative ways of how actors might use them (Feldman & Worline, 2012; Kannan-Narasimhan & Lawrence, 2018).

Drawing on a practice-oriented resource understanding (Feldman, 2004; Feldman & Worline, 2016), the current study highlights how frontline employees collaboratively in their communities transform resources and creatively create new ones. Given this, I suggest to understand CoPs as a meta-resource that accommodate the potential to renew and reconfigure other resources in practice. This finding of CoPs as a meta-resource may lay the groundwork for future research

from strategy as practice perspective (Jarzabkowski, 2005; Jarzabkowski & Spee, 2009; Whittington et al., 2003b; Whittington, 2006) that more thoroughly theorizes how CoPs function as a micro-foundation of dynamic capabilities (Felin & Foss, 2005; Felin, Foss, Heimeriks, & Madsen, 2012; Felin, Foss, & Ployhart, 2015).

Also, the resource-based and dynamic capability literature with a few exceptions (Augier & Teece, 2009; Teece, 2014) remains rather vague concerning the role leadership plays in building, integrating, and reconfiguring resources. In moving beyond the scope on CoPs, scholars may proceed from the current findings and elaborate on developing a more generalizable theory that explains the who, how, what, and why of leadership for endogenous resource generation.

Concluding Remarks

8

The only true wisdom is in knowing you know nothing.

Socrates

The issue of designing contemporary organizations for adaptability in today's dynamic world is arguably one of the most significant challenges managers face nowadays because it requires formal systems focused on productivity as well as informal elements that organically explore and innovate. On that premise, the purpose of this study was to investigate how the tension between informal and self-organized communities of practice and formal organizational hierarchy can be managed. That is, my aim was to understand the dynamics of how CoPs emerge and become embedded within formal organizations to allow for local learning and adaptation, but also to ensure sufficient integration and dissemination of community-generated ideas, initiatives, and knowledge.

Based on the in-depth investigation of three CoPs within the German Federal Armed Forces, coupled with an interpretative research approach, I was able to build a grounded theory foregrounding the inherent duality of the tension between CoPs and its broader organizational context. That is, the findings unpack how the interrelation between local CoPs and formal organizational hierarchy is characterized by the simultaneous occurrence of cultural stability and change, loosening and tightening leadership practices, and explorative activities and efficient practice. It thus illustrates and theorizes the processes and mechanisms unfolding on the interface between communities and formal organizational hierarchy.

B. Schulte, *The Organizational Embeddedness of Communities of Practice*, Forschungs-/Entwicklungs-/Innovations-Management,
https://doi.org/10.1007/978-3-658-31954-0_8

The grounded model about the embeddedness of CoPs presented in Figure 6.1, in particular, offers a practice-oriented as well as complexity theory-driven explanation of community emergence as the collective response to environmental dynamics during which novel resources are molded and expanded in practice. Additionally, it outlines the processes of cultural resourcing that can explain how the practices of a CoP interrelate with broader socio-cultural structures. Lastly, the model elucidates how self-organized resource generation in CoPs intereweaves with formal leadership and, in doing so, offers a novel conceptualization of how we understand leadership for communities of practice.

In conclusion, the current study provides a detailed picture about the interrelation of local communities of practice with their broader organizational surroundings, thereby, filling a blind spot in the literature that in the past has caused many contradictory notions and misleading recommendations on how to manage and instrumentally setup communities of practice. Although the current study will most certainly not revolutionize research on CoPs and organizational adaptability, my modest hope is that this dissertation can contribute to a more nuanced understanding of informal and self-organized CoPs in research as well as in managerial practice.

References

Adler, P. S., Goldoftas, B., & Levine, D. I. (1999). Flexibility versus Efficiency? A Case Study of Model Changeovers in the Toyota Production System. *Organization Science, 10*(1), 43–68.

Adner, R., & Helfat, C. E. (2003). Corporate Effects and Dynamic Managerial Capabilities. *Strategic Management Journal, 24*(10), 1011–1025.

Ahrens, T., & Chapman, C. S. (2007). Theorizing practice in management accounting research. In C. S. Chapman, A. G. Hopwood, & M. D. Shields (Eds.), *Handbook of Management Accounting Research* (pp. 99–112). Amsterdam, NL: Elsevier.

Aljuwaiber, A. (2016). Communities of practice as an initiative for knowledge sharing in business organisations: A literature review. *Journal of Knowledge Management, 20*(4), 731–748.

Ambrosini, V., Bowman, C., & Collier, N. (2009). Dynamic Capabilities: An Exploration of How Firms Renew their Resource Base. *British Journal of Management, 20*, 9–24.

Amin, A., & Roberts, J. (2008). Knowing in action: Beyond communities of practice. *Research Policy, 37*(2), 353–369.

Anand, N., Gardner, H. K., & Morris, T. (2007). Knowledge-Based Innovation: Emergence and Embedding of New Practice Areas in Management Consulting Firms. *Academy of Management Journal, 50*(2), 406–428.

Anderson, P. (1999). Perspective: Complexity Theory and Organization Science. *Organization Science, 10*(3), 216–232.

Andresen, F., Koller, H., Kreutzmann, A., & Schulte, B. (2016a). Modelling of Self-organized Structure and Culture Creation within Communities of Practice. *Academy of Management Proceedings, 2016*(1).

Andresen, F., Koller, H., Kreutzmann, A., & Schulte, B. (2016b). Self-Organized Knowledge Creation: Communities of Practice as Manifestations of Dynamic Capabilities. *Proceedings of the 17th European Conference on Knowledge Management, 2016*, 9–18.

Andresen, F., Schulte, B., & Koller, H. (2019). Capability Evolution in the Armed Forces: Agents, Practices, and Processes of Dynamic Capabilities. *Academy of Management Proceedings, 2019*(1).

B. Schulte, *The Organizational Embeddedness of Communities of Practice*, Forschungs-/Entwicklungs-/Innovations-Management,
https://doi.org/10.1007/978-3-658-31954-0

Andriopoulos, C., & Lewis, M. W. (2009). Exploitation-Exploration Tensions and Organizational Ambidexterity: Managing Paradoxes of Innovation. *Organization Science, 20*(4), 696–717.

Apelt, M. (2012). Das Militär als Organisation. In M. Apelt & V. Tacke (Eds.), *Handbuch Organisationstypen* (pp. 133–149). Wiesbaden: Springer.

Ardichvili, A., Maurer, M., Li, W., Wentling, T., & Stuedemann, R. (2006). Cultural influences on knowledge sharing through online communities of practice. *Journal of Knowledge Management, 10*(1), 94–107.

Ardichvili, A., Page, V., & Wentling, T. (2003). Motivation and barriers to participation in virtual knowledge-sharing communities of practice. *Journal of Knowledge Management, 7*(1), 64–77.

Arena, M., & Uhl-Bien, M. (2016). Complexity Leadership Theory: Shifting from Human Capital to Social Capital. *People and Strategy, 39*(2), 22–27.

Argote, L., & Ingram, P. (2000). Knowledge Transfer: A Basis for Competitive Advantage in Firms. *Organizational Behavior and Human Decision Processes, 82*(1), 150–169.

Argyris, C. (1977). Double loop learning in organizations. *Harvard Business Review, 55*(5), 115–125.

Ashby, R. W. (1961). *An Introduction to Cybernetics*. London: Chapman & Hall LTD.

Ashmos, D. P., Duchon, D., & McDaniel Jr. (2000). Organizational responses to complexity: the effect on organizational performance. *Journal of Organizational Change Management, 13*(6), 577–594.

Augier, M., & Teece, D. J. (2009). Dynamic Capabilities and the Role of Managers in Business Strategy and Economic Performance. *Organization Science, 20*(2), 410–421.

Ayas, K., & Zeniuk, N. (2001). Project-Based Learning: Building Communities of Reflective Practitioners. *Management Learning, 32*(1), 61–76.

Balogun, J., & Johnson, G. (2004). Organizational restructuring and middle manager sensemaking. *Academy of Management Journal, 47*(4), 523–549.

Bardon, T., & Borzillo, S. (2016). Communities of practice: Control or autonomy? *Journal of Business Strategy, 37*(1), 11–18.

Barnard, C. I. (1938). *The functions of the executive*. Cambridge Massachusetts: Harvard Business School Press.

Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management, 17*(1), 99–120.

Bartunek, J. M. (1984). Changing Interpretative Schemes and Organizational Restructuring – The Example of a Religious Order. *Administrative Science Quarterly, 29*, 355–372.

Bass, B. M. (1985). *Leadership and performance beyond expectations*: Collier Macmillan.

Bateman, T. S., & Organ, D. W. (1983). Job satisfaction and the good soldier: The relationship between affect and employee "citizenship". *Academy of Management Journal, 26*(4), 587–595.

Bechky, B. A. (2003). Sharing Meaning Across Occupational Communities: The Transformation of Understanding on a Production Floor. *Organization Science, 14*(3), 312–330.

Bertalanffy, L. von. (1968). *General system theory: Foundations, Development, Applications.* New York, NY: G. Braziller.

Bertels, H. M. J., Kleinschmidt, E. J., & Koen, P. A. (2011). Communities of Practice versus Organizational Climate: Which One Matters More to Dispersed Collaboration in the Front End of Innovation? *Journal of Product Innovation Management, 28*(5), 757–772.

Bertels, S., Howard-Grenville, J., & Pek, S. (2016). Cultural Molding, Shielding, and Shoring at Oilco: The Role of Culture in the Integration of Routines. *Organization Science, 27*(3), 573–593.

Birkinshaw, J., & Gupta, K. (2013). Clarifying the Distinctive Contribution of Ambidexterity to the Field of Organization Studies. *Academy of Management Perspectives, 27*(4), 287–298.

Bjelland, O. M., & Wood, R. C. (2008). An Inside View of IBM's "Innovation Jam". *Sloan Management Review,* 32–40.

Boal, K. B., & Schultz, P. L. (2007). Storytelling, time, and evolution: The role of strategic leadership in complex adaptive systems. *The Leadership Quarterly, 18*(4), 411–428.

Böcher, W. (1996). *Selbstorganisation, Verantwortung, Gesellschaft*. Opladen: Westdeutscher Verlag.

Bogenrieder, I., & Nooteboom, B. (2004). Learning Groups: What Types are there? A Theoretical Analysis and an Empirical Study in a Consultancy Firm. *Organization Studies, 25*(2), 287–313.

Boisot, M., & Child, J. (1999). Organizations as Adaptive Systems in Complex Environments: The Case of China. *Organization Science, 10*(3), 237–252.

Boisot, M., & McKelvey, B. (2010). Integrating Modernist and Postmodernist Perspectives on Organizations: A Complexity Bridge. *Academy of Management Review, 35*(3), 415–433.

Boland, R. J., & Tenkasi, R. V. (1995). Perspective Making and Perspective Taking in Communities of Knowing. *Organization Science, 6*(4), 350–372.

Bolisani, E., & Scarso, E. (2014). The place of communities of practice in knowledge management studies: a critical review. *Journal of Knowledge Management, 18*(2), 366–381.

Borzillo, S. (2009). Top management sponsorship to guide communities of practice. *Journal of Knowledge Management, 13*(3), 60–72.

Borzillo, S. (2010). Successfully Maintaining Participation in Virtual Communities of Practice. In Lea Stadtler, Achim Schmitt, Patricia Klarner, Thomas Straub (Ed.), *More than Bricks in the Wall: Organizational Perspectives for Sustainable Success: A tribute to Professor Dr. Gilbert Probst* (pp. 114–123). Wiesbaden: Gabler.

Borzillo, S., Aznar, S., & Schmitt, A. (2011). A journey through communities of practice: How and why members move from the periphery to the core. *European Management Journal, 29*(1), 25–42.

Borzillo, S., & Kaminska-Labbé, R. (2011). Unravelling the dynamics of knowledge creation in communities of practice though complexity theory lenses. *Knowledge Management Research & Practice, 9*(4), 353–366.

Borzillo, S., Probst, G., & Raisch, S. (2008). The Governance Paradox: Balancing Autonomy and Control in Managing Communities of Practice. *Proceedings of the Academy of Management Annual Meeting, 1*, 1–6.

Bourdieu, P. (1977). *Outline of a theory of practice*. Cambridge, UK: Cambridge University Press.

Bourdieu, P. (1990*). The logic of practice*. Stanford, CA: Stanford University Press.

Bourhis, A., & Dubé, L. (2010). 'Structuring spontaneity': investigating the impact of management practices on the success of virtual communities of practice. *Journal of Information Science, 36*(2), 175–193.

Bradbury, H., & Lichtenstein, B. M. B. (2000). Relationality in Organizational Research: Exploring The Space Between. *Organization Science, 11*(5), 551–564.

Bragd, A. (2002). *Knowing management. An ethnographic study of tinkering with a new car*. Göteborg: BAS Publisher.

Bridwell-Mitchell, E. N. (2016). Collaborative Institutional Agency: How Peer Learning in Communities of Practice Enables and Inhibits Micro-Institutional Change. *Organization Studies, 37*(2), 161–192.

Brown, J. S. (2004). Minding and Mining the Periphery. *Long Range Planning, 37*(2), 143–151.

Brown, J. S., & Duguid, P. (1991). Organizational Learning and Communities of Practice: Toward a unified view of Working, Learning, and Innovation. *Organization Science, 2*(1), 40–57.

Brown, J. S., & Duguid, P. (1998). Organizing knowledge. *California Management Review, 40*(3), 90–111.

Brown, J. S., & Duguid, P. (2001). Knowledge and Organization: A Social-Practice Perspective. *Organization Science, 12*(2), 198–213.

Brown, M. E., & Gioia, D. A. (2002). Making things click Distributive leadership in an online division of an offline organization. *The Leadership Quarterly, 13*, 397–419.

Brown, S. L., & Eisenhardt, K. M. (1997). The Art of Continuous Change: Linking Complexity Theory and Time-Paced Evolution in Relentlessly Shifting Organizations. *Administrative Science Quarterly, 42*(1), 1–34.

Büchel, B., & Raub, S. (2002). Building Knowledge-creating Value Networks. *European Management Journal, 20*(6), 587–596.

Burawoy, M. (1991). *Ethnography unbound: Power and resistance in the modern metropolis*. Berkley, CA: University of California Press.

Burgelman, R. A. (2011). Bridging history and reductionism: A key role for longitudinal qualitative research. *Journal of International Business Studies, 42*, 591–601.

Burns, T. E., & Stalker, G. M. (1961). *The management of innovation*. London: Tavistock.

Cameron, W. B. (1963). *Informal sociology: A casual introduction to sociological thinking*: Random House.

Cameron, K. S., & Quinn, R. E. (1999). *Diagnosing and changing organizational culture, based on the competing values framework*. Reading, MA: Addison-Wesley.

Canato, A., Ravasi, D., & Phillips, N. (2013). Coerced Practice Implementation in Cases of Low Cultural Fit: Cultural Change and Practice Adaptation During the Implementation of Six Sigma at 3M. *Academy of Management Journal, 56*(6), 1724–1753.

Carley, K. (1990). Content Analysis. In R. E. Asher & J. Y. Simpson (Eds.), *The Encyclopedia of Language and Linguistics* (pp. 725–730). Edinburgh, UK: Pergamon Press.

Cegarra-Navarro, J. G., & Dewhurst, F. (2007). Linking organizational learning and customer capital through an ambidexterity context: an empirical investigation in SMEs. *The International Journal of Human Resource Management, 18*(10), 1720–1735.

Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative research*. London, GB: Sage.

Chia, R. (1997). Essai: Thirty years on: From organizational structures to the organization of thought. *Organization Studies, 18*(4), 685–707.

Child, J., & McGrath, R. G. (2001). Organizations unfettered: Organizational form in an information-intensive economy. *Academy of Management Journal, 44*(6), 1135–1148.

Chiles, T. H., Meyer, A. D., & Hench, T. J. (2004). Organizational Emergence: The Origin and Transformation of Branson, Missouri's Musical Theaters. *Organization Science, 15*(5), 499–519.

Chiu, C.-M., Hsu, M.-H., & Wang, E. T.G. (2006). Understanding knowledge sharing in virtual communities: An integration of social capital and social cognitive theories. *Decision Support Systems, 42*(3), 1872–1888.

Chua, A. Y. K. (2006). The rise and fall of a community of practice: A descriptive case study. *Knowledge and Process Management, 13*(2), 120–128.

Cilliers, P. (1998). *Complexity and Postmodernism: Understanding Complex Systems*. London, GB: Routledge.

Clegg, B., Scarso, E., & Bolisani, E. (2008). Communities of practice as structures for managing knowledge in networked corporations. *Journal of Manufacturing Technology Management, 19*(3), 374–390.

Coase, R. H. (1937). The Nature of the Firm. *Economica, 4*(16), 386–405.

Cohen, W. M., & Levinthal, D. A. (1990). Absorptive Capacity: A new Perspective on Learning and Innovation. *Administrative Science Quarterly, 35*, 128–152.

Cohendet, P., & Llerena, P. (2003). Routines and incentives: the role of communities in the firm. *Industrial and Corporate Change, 12*(2), 271–297.

Coleman Jr, H. J. (1999). What enables Self-Organizing Behavior in Businesses. *Emergence, 1*(1), 33–48.

Collier, J., & Esteban, R. (1999). Governance in the Participative Organisation: Freedom, Creativity and Ethics. *Journal of Business Ethics, 21*, 173–188.

Contu, A. (2014). On boundaries and difference: Communities of practice and power relations in creative work. *Management Learning, 45*(3), 289–316.

Contu, A., & Willmott, H. (2000). Knowing in Practice: A "Delicate Flower" in the Organizational Learning Field. *Organization, 7*(2), 269–276.

Contu, A., & Willmott, H. (2003). Re-Embedding Situatedness: The Importance of Power Relations in Learning Theory. *Organization Science, 14*(3), 283–296.

Contu, A., & Willmott, H. (2006). Studying Practice: Situating Talking About Machines. *Organization Studies, 27*(12), 1769–1782.

Cook, S. D. N., & Yanow, D. (1993). Culture and Organizational Learning. *Journal of Management Inquiry, 2*(4), 373–390.

Cook, S. D. N., & Brown, J. S. (1999). Bridging Epistemologies: The Generative Dance Between Organizational Knowledge and Organizational Knowing. *Organization Science, 10*(4), 381–400.

Corbin, J., & Strauss, A. (1990). Grounded Theory Research: Procedures, Canons and Evaluative Criteria. *Zeitschrift für Soziologie, 19*(6), 418–427.

Cordery, J. L., Cripps, E., Gibson, C. B., Soo, C., Kirkman, B. L., & Mathieu, J. E. (2014). The Operational Impact of Organizational Communities of Practice: A Bayesian Approach to Analyzing Organizational Change. *Journal of Management, 41*(2), 644–664.

Corley, K. G., & Gioia, D. A. (2004). Identity Ambiguity and Change in the Wake of a Corporate Spin-Off. *Administrative Science Quarterly, 49*(2), 173–208.

Corradi, G., Gherardi, S., & Verzelloni, L. (2010). Through the practice lens: Where is the bandwagon of practice-based studies heading? *Management Learning, 41*(3), 265–283.
Corso, M., Giacobbe, A., & Martini, A. (2009). Designing and managing business communities of practice. *Journal of Knowledge Management, 13*(3), 73–89.
Cothrel, J., & Williams, R. L. (1999). On-line communities: helping them form and grow. *Journal of Knowledge Management, 3*(1), 54–60.
Cox, A. (2005). What are communities of practice? A comparative review of four seminal works. *Journal of Information Science, 31*(6), 527–540.
Creplet, F., Dupouet, O., Kern, F., Mehmanpazir, B., & Munier, F. (2001). Consultants and experts in management consulting firms. *Research Policy, 30*(9), 1517–1535.
Cross, R., Laseter, T., Parker, A., & Velasquez, G. (2006). Using Social Network Analysis to Improve Communities of Practice. *California Management Review, 49*(1), 32–60.
Dahlander, L., & O'Mahony, S. (2011). Progressing to the Center: Coordinating Project Work. *Organization Science, 22*(4), 961–979.
Danneels, E. (2011). Trying to become a different type of company: dynamic capability at Smith Corona. *Strategic Management Journal, 32*(1), 1–31.
Dacin, M. T., Munir, K., & Tracey, P. (2010). Formal Dining at Cambridge Colleges: Linking Ritual Performance and Institutional Maintenance. *Academy of Management Journal, 53*(6), 1393–1418.
Daft, R. L., & Weick, K. E. (1984). Toward a Model of Organizations as Interpretation Systems. *Academy of Management Review, 9*(2), 284–291.
Deephouse, D. L., & Suchman, M. C. (2008). Legitimacy in organizational institutionalism. In R. Greenwood, C. Oliver, K. Sahlin, & R. Suddaby (Eds.), *The Sage Handbook of Organizational Institutionalism* (pp. 49–77). London: Sage Publications.
Di Stefano, G., Peteraf, M., & Verona, G. (2010). Dynamic capabilities deconstructed: A bibliographic investigation into the origins, development, and future directions of the research domain. *Industrial and Corporate Change, 19*(4), 1187–1204.
Diefenbach, T., & Sillince, J. A.A. (2011). Formal and Informal Hierarchy in Different Types of Organization. *Organization Studies, 32*(11), 1515–1537.
DiMaggio, P. (1997). Culture and Cognition. *Annual Review of Sociology, 23*, 263–287.
Dionysiou, D. D., & Tsoukas, H. (2013). Understanding the (Re)creation of Routines from within: A symbolic interactionist perspective. *Academy of Management Review, 38*(2), 181–205.
Dixon, D. P., Weeks, M., Boland, R., & Perelli, S. (2016). Making Sense When It Matters Most. *Journal of Leadership & Organizational Studies, 6*(1), 1–24.
Dobusch, L., & Kapeller, J. (2018). Open strategy-making with crowds and communities: Comparing Wikimedia and Creative Commons. *Long Range Planning, 51*(4), 561–579.
Dooley, K. J., Tsoukas, H., Garud, R., Gehman, J., & Kumaraswamy, A. (2011). Complexity Arrangements for Sustained Innovation: Lessons from 3M Corporation. *Organization Studies, 32*(6), 737–767.
Dooley, K. J., & van de Ven, A. H. (1999). Explaining Complex Organizational Dynamics. *Organization Science, 10*(3), 358–372.
Dougherty, D. (2001). Reimagining the Differentiation and Integration of Work for Sustained Product Innovation. *Organization Science, 12*(5), 612–631.

Dougherty, D. J., & Hardy, C. (1996). Sustained Product Innovation in Large, Mature Organizations: Overcoming Innovation-to-Organization Problems. *Academy of Management Journal, 39*(5), 1120–1153.

Dubé, L., Bourhis, A., & Jacob, R. (2005). The impact of structuring characteristics on the launching of virtual communities of practice. *Journal of Organizational Change Management, 18*(2).

Dubé, L., Bourhis, A., & Jacob, R. (2006). Towards a Typology of Virtual Communities of Practice. *Interdisciplinary Journal of Information, Knowledge, and Management, 1*, 69–93.

Duguid, P. (2008). Community of Practice Then and Now. In A. Amin & J. Roberts (Eds.), *Community, Economic Creativity, and Organization* (pp. 1–10). Oxford University Press.

Duncan, R. B. (1976). The ambidextrous organization. In R. H. Killman, L. R. Pondy, & D. Sleven (Eds.), *Designing dual structures for innovation* (pp. 167–188). New York: North Holland.

Dunham, L., Freeman, E. R., & Liedtka, J. (2006). Enhancing Stakeholder Practice: A Particularized Exploration of Community. *Business Ethics Quarterly, 16*(1), 23–42.

Durkheim, E. (1964). *The Rules of Sociological Method*. London, GB: Collier Macmillan.

Dutton, J. E. (2006). *Energize your workplace: How to create and sustain high-quality connections at work*: John Wiley & Sons.

Dutton, J. E., Ashford, S. J., O'Neill, R. M., & Lawrence, K. A. (2001). Moves That Matter: Issue Selling and Organizational Change. *Academy of Management Journal, 44*(4), 716–736.

Dutton, J. E., Worline, M. C., Frost, P. J., & Lilizs, J. (2006). Explaining Compassion Organizing. *Administrative Science Quarterly, 51*, 59–96.

Eisenhardt, K. M. (1989). Building Theories from Case Study Research. *Academy of Management Review, 14*(4), 532–550.

Eisenhardt, K. M. (2002). OMT distinguished scholar address. 62nd Meeting of the Academy of Management, Denver, CO.

Eisenhardt, K. M., & Graebner, M. E. (2007). Theory Building from Cases: Opportunities and Challenges. *Academy of Management Journal, 50*(1), 25–32.

Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic Capabilities: What Are They? *Strategic Management Journal, 21*(10/11), 105–1121.

Eisenhardt, K. M., & Tabrizi, B. N. (1995). Accelerating Adaptive Processes: Product Innovation in the Global Computer Industry. *Administrative Science Quarterly, 40*(1), 84–110.

Elbe, M., & Richter, G. (2012). Militär: Institution und Organisation. In N. Leonhard & I.-J. Werkner (Eds.), *Militärsoziologie – Eine Einführung* (2nd ed., pp. 244–263). Wiesbaden: Gabler.

Elkjaer, B. (2004). Organizational Learning: The Third Way. *Management Learning, 35*(419–434).

Emerson, R. M., Fretz, R. I., & Shaw, L. L. (2001). *Writing ethnographic fieldnotes*. Chicago: University of Chicago Press.

Emirbayer, M., & Mische, A. (1998). What Is Agency? *The American Journal of Sociology, 103*(4), 962–1023.

Fairhurst, G. T., & Uhl-Bien, M. (2012). Organizational discourse analysis (ODA): Examining leadership as a relational process. *The Leadership Quarterly, 23*(6), 1043–1062.

Fang, Y., & Neufeld, D. (2009). Understanding Sustained Participation in Open Source Software Projects. *Journal of Management Information Systems, 25*(4), 9–50.

Faraj, S., & Xiao, Y. (2006). Coordination in Fast-Response Organizations. *Management Science, 52*(8), 1155–1169.

Farjoun, M. (2010). Beyond Dualism: Stability and Change as a Duality. *Academy of Management Review, 35*(2), 202–225.

Fayol, H. (1916). General Principles of Management. In J. M. Shafritz & J. S. Ott (Eds.), *Classics of organization theory* (pp. 56–68). Oak Park, IL: Moore.

Feld, M. D. (1959). Information and Authority: The Structure of Military Organization. *American Sociological Review, 24*(1), 15–22.

Feldman, M. S. (2000). Organizational Routines as a Source of Continuous Change. *Organization Science, 11*(611–629).

Feldman, M. S. (2004). Resources in Emerging Structures and Processes of Change. *Organization Science, 15*(3), 295–309.

Feldman, M. S., & Orlikowski, W. J. (2011). Theorizing Practice and Practicing Theory. *Organization Science, 22*(5), 1240–1253.

Feldman, M. S., & Pentland, B. T. (2003). Reconceptualizing Organizational Routines as a Source of Flexibility and Change. *Administrative Science Quarterly, 48*, 94–118.

Feldman, M. S., & Quick, K. S. (2009). Generating resources and energizing frameworks through inclusive public management. *International Public Management Journal, 12*(2), 137–171.

Feldman, M. S., & Worline, M. (2012). Resources, Resourcing, and Ampliative Cycles in Organizations. In K. Cameron & G. Spreitzer (Eds.), *Oxford Handbook of Positive Organizational Scholarship* (pp. 629–641). New York, USA: Oxford University Press.

Feldman, M. S., & Worline, M. (2016). The Practicality of Practice Theory. *Academy of Management Learning & Education, 15*(2), 304–324.

Felin, T., & Foss, N. J. (2005). Strategic organization: a field in search of micro-foundations. *Strategic Organization*, *3*(4), 441–455.

Felin, T., Foss, N. J., Heimeriks, K. H., & Madsen, T. L. (2012). Microfoundations of Routines and Capabilities: Individuals, Processes, and Structure. *Journal of Management Studies*, *49*(8), 1351–1374.

Felin, T., Foss, N. J., & Ployhart, R. E. (2015). The Microfoundations Movement in Strategy and Organization Theory. *The Academy of Management Annals*, *9*(1), 575–632.

Ferlie, E., Fitzgerald, L., Wood, M., & Hawkins, C. (2005). The Nonspread of Innovations: The Mediating Role of Professionals. *Academy of Management Journal, 48*(1), 117–134.

Fiske, S. T., & Taylor, S. E. (1991). *Social cognition.* New York, USA: McGraw-Hill.

Foss, N. J. (1996). Knowledge-Based Approaches to the Theory of the Firm: Some Critical Comments. *Organization Science, 7*(5), 470–476.

Foucault, M. (1972). *Archaeology of knowledge.* Routledge classics. London, New York: Routledge.

Fox, S. (2000). Communities of Practice, Foucault and Actor-network Theory. *Journal of Management Studies, 37*(6), 853–867.

Garavan, T. N., Carbery, R., & Murphy, E. (2007). Managing intentionally created communities of practice for knowledge sourcing across organisational boundaries. *The Learning Organization, 14*(1), 34–49.

Gareis, B., Haltiner, K., & Klein, P. (2006). Strukturprinzipien und Organisationsmerkmale von Streitkräften. In B. Gareis & P. Klein (Eds.), *Handbuch Militär und Sozialwissenschaften* (2nd ed., pp. 14–25). Wiesbaden: VS Verlag für Sozialwissenschaften.

Geertz, C. (1973). *The interpretation of cultures*: Selected essays: Basic books.

Gell-Mann, M. (1994). Complex Adaptive Systems. In G. Cowan, D. Pines, & D. Meltzer (Eds.), *Complexity: Metaphors, Models, and Reality* (pp. 17–47). Addison-Wesley.

Gemmill, G., & Smith, C. (1985). A Dissipative Structure Model of Organization Transformation. *Human Relations, 38*(8), 751–766.

Gertner, D., Roberts, J., & Charles, D. (2011). University-industry collaboration: A CoPs approach to KTPs. *Journal of Knowledge Management, 15*(4), 625–647.

Gherardi, S. (2009a). Community of Practice or Practices of a Community. In Armstrong (Ed.), *The Sage handbook of management learning, education, and development* (pp. 514–530). Sage.

Gherardi, S. (2009b). Introduction: The Critical Power of the 'Practice Lens'. *Management Learning, 40*(2), 115–128.

Gherardi, S., & Nicolini, D. (2000). The Organizational Learning of Safety in Communities of Practice. *Journal of Management Inquiry, 9*(1), 7–18.

Gherardi, S., & Nicolini, D. (2002a). Learning in a Constellation of Interconnected Practices: Canon or Dissonance? *Journal of Management Studies, 39*(4), 419–436.

Gherardi, S., & Nicolini, D. (2002b). Learning the Trade: A Culture of Safety in Practice. *Organization, 9*(2), 191–223.

Gherardi, S., Nicolini, D., & Odella, F. (1998). Toward A Social Understanding of How People Learn in Organizations: The Notion of Situated Curriculum. *Management Learning, 29*(3), 273–297.

Gherardi, S., & Perrotta, M. (2011). Egg dates sperm: A tale of a practice change and its stabilization. *Organization, 18*(5), 595–614.

Gibson, C. B., & Birkinshaw, J. (2004). The Antecedents, Consequences, and Mediating Role of Organizational Ambidexterity. *Academy of Management Journal, 47*(2), 209–226.

Giddens, A. (1984). *The constitution of society: Outline of the theory of structuration*: University of California Press.

Gioia, D. A. (2003). Give It Up: Reflections on the Interpreted World (A Commentary on Meckler and Baillie). *Journal of Management Inquiry, 12*(3), 285–292.

Gioia, D. A., & Chittipeddi, K. (1991). Sensemaking and sensegiving in strategic change initiation. *Strategic Management Journal, 12*(6), 433–448.

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking Qualitative Rigor in Inductive Research: Notes on the Gioia Methodology. *Organizational Research Methods, 16*(1), 15–31.

Gioia, D. A., & Poole, P. P. (1984). Scripts in Organizational Behavior. *Academy of Management Review, 9*(3), 449–459.

Gioia, D. A., Price, K. N., Hamilton, A. L., & Thomas, J. B. (2010). Forging an Identity: An Insider-outsider Study of the Processes Involved in the Formation of Organizational Identity. *Administrative Science Quarterly, 55*, 1–46.

Gioia, D. A., Schultz, M., & Corley, K. G. (2000). Organizational Identity, Image, and Adaptive Instability. *Academy of Management Review, 25*(1), 63–81.

Giorgi, S., Lockwood, C., & Glynn, M. A. (2015). The Many Faces of Culture: Making Sense of 30 Years of Research on Culture in Organization Studies. *Academy of Management Annals, 9*(1), 1–54.

Glaser, B. G. (1992). *Basics of grounded theory analysis: Emergence vs forcing*: Sociology press.

Glaser, B. G., & Strauss, A. (1967). *The discovery of grounded theory: Strategies for qualitative research.* New York, USA: Aldine de Gruyter.

Glatz, R. L. (2016). Innere Führung – Bewährung im Einsatz. In A. Bach & W. Sauer (Eds.), *Schützen, Retten, Kämpfen – Dienen für Deutschland* (pp. 42–53). Berlin: Carola Hartmann Miles-Verlag.

Gleick, J. (1987). *Chaos.* New York: Viking Penguin.

Goffman, E. (1957). The characteristics of total institutions. *In Symposium on Preventive and Social Psychiatry* (pp. 312–338). Washington D.C.

Goldstein, J. A. (1999). Emergence as a Construct: History and Issues. *Emergence: Complexity and Organization, 1*(1), 49–72.

Goldstein, J. A. (2008). Conceptual Foundations of Complexity Science. In M. Uhl-Bien & R. Marion (Eds.), *A Volume in Leadership Horizons. Complexity Leadership. Part I: Conceptual Foundations* (pp. 17–48). Charlotte, NC: IAP Information Age Publishing.

Gongla, P., & Rizzuto, C. R. (2001). Evolving communities of practice: IBM Global Services experience. *IBM System Journal, 40*(4), 842–862.

Grant, R. M. (1996). Toward a knowledge-based theory of the firm. *Strategic Management Journal, 17*(2), 109–122.

Griffin, D., Shaw, P., & Stacey, R. D. (1998). Speaking of Complexity in Management Theory and Practice. *Organization, 5*(3), 315–339.

Gronn, P. (2002). Distributed leadership as a unit of analysis. *The Leadership Quarterly, 13*(4), 423–451.

Guba, E. G., & Lincoln, Y. S. (1994). Competing Paradigms in Qualitative Research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research* (pp. 105–117). Thousand Oaks, CA: Sage Publications.

Hagen, U. von (Ed.). (2006). *Armee in der Demokratie*: VS Verlag für Sozialwissenschaften.

Hagen, U. von, & Tomforde, M. (2012). Militärische Kulturen. In N. Leonhard & I.-J. Werkner (Eds.), *Militärsoziologie – Eine Einführung* (2nd ed., pp. 284–313). Wiesbaden: Gabler.

Hales, C. (2002). 'Bureaucracy-lite' and Continuities in Managerial Work. *British Journal of Management, 13*(1), 51–66.

Haltiner, K. (2006). Vom Landesverteidiger zum militärischen Ordnungshüter. In B. Gareis & P. Klein (Eds.), *Handbuch Militär und Sozialwissenschaften* (2nd ed., pp. 518–526). Wiesbaden: VS Verlag für Sozialwissenschaften.

Handley, K., Sturdy, A., Fincham, R., & Clark, T. (2006). Within and Beyond Communities of Practice: Making Sense of Learning Through Participation, Identity and Practice. *Journal of Management Studies, 43*(3), 641–653.

Handley, K., Clark, T., Fincham, R., & Sturdy, A. (2007). Researching Situated Learning. *Management Learning, 38*(2), 173–191.

Hardy, C., & Maguire, S. (2010). Discourse, Field-Configuring Events, and Change in Organizations and Institutional Fields: Narratives of DDT and the Stockholm Convention. *Academy of Management Journal, 53*(6), 1365–1392.

Harris, S. G. (1994). Organizational Culture and Individual Sensemaking: A Schema-Based Perspective. *Organization Science, 5*(3), 309–321.

Harrison, S. H., & Corley, K. G. (2011). Clean Climbing, Carabiners, and Cultural Cultivation: Developing an Open-Systems Perspective of Culture. *Organization Science, 22*(2), 391–412.

Harvey, J.-F., Cohendet, P., Simon, L., & Borzillo, S. (2015). Knowing Communities in the Front End of Innovation. *Research Technology Management, 58*(1), 46–54.

Harvey, J.-F., Cohendet, P., Simon, L., & Dubois, L.-E. (2013). Another cog in the machine: Designing communities of practice in professional bureaucracies. *European Management Journal, 31*(1), 27–40.

Hatch, M. J. (1993). The Dynamics of Organizational Culture. *Academy of Management Review, 18*(4), 657–693.

Hautz, J., Seidl, D., & Whittington, R. (2017). Open Strategy: Dimensions, Dilemmas, Dynamics. *Long Range Planning, 50*(3), 298–309.

Havermans, L. A., Den Hartog, D. N., Keegan, A. E., & Uhl-Bien, M. (2015). Exploring the Role of Leadership in Enabling Contextual Ambidexterity. *Human Resource Management, 54*(1), 179–200.

Hazy, J. K. (2008). Toward a Theory of Leadership in Complex Systems: Computational Modelling Explorations. *Nonlinear Dynamics, Psychology, and Life Sciences, 12*(3), 281–310.

Hazy, J. K. (2011). Parsing the 'influential increment' in the language of complexity: uncovering the systemic mechanisms of leadership influence. *International Journal of Complexity in Leadership and Management, 1*(2), 164–191.

Hazy, J. K., & Uhl-Bien, M. (2012). Changing the rules: The implications of complexity science for leadership research and practice. In D. Day (Ed.), *The Oxford Handbook of Leadership and Organizations*. Oxford: Oxford University Press.

Hazy, J. K., & Uhl-Bien, M. (2015). Towards operationalizing complexity leadership: How generative, administrative and community-building leadership practices enact organizational outcomes. *Leadership, 11*(1), 79–104.

Heckscher, C. (1994). Defining the post-bureaucratic type. In C. Heckscher & A. Donnellon (Eds.), *The Post-Bureaucratic Organization: new perspectives on organizational change* (pp. 14–62). Newbury Park, CA: Sage.

Heidegger, M. (1929). *Sein und Zeit*: Niemeyer.

Heifetz, R. A., & Laurie, D. L. (2001). The Work of Leadership. *Harvard Business Review*, 37–47.

Heizmann, H. (2011). Knowledge sharing in a dispersed network of HR practice: Zooming in on power/knowledge struggles. *Management Learning, 42*(4), 379–393.

Helfat, C. E., & Martin, J. A. (2014). Dynamic Managerial Capabilities. *Journal of Management*, *41*(5), 1281–1312.

Helfat, C. E., & Winter, S. G. (2011). Untangling Dynamic and Operational Capabilities: Strategy for the (N)ever-Changing World. *Strategic Management Journal, 32*(11), 1243–1250.

Helfat, C. E., & Peteraf, M. A. (2015). Managerial cognitive capabilities and the microfoundations of dynamic capabilities. *Strategic Management Journal*, *36*(6), 831–850.

Hendry, C. (1996). Understanding and Creating Whole Organizational Change Through Learning Theory. *Human Relations, 49*(5), 621–641.

Herstatt, C., & von Hippel, E. (1992). From Experience: Developing New Product Concepts Via the Lead User Method: A Case Study in a Low Tech Field. *Journal of Product Innovation Management, 9,* 213–221.

Holland, J. (1995). *Hidden order: How adaptation builds complexity*: Basic books.

Hong, J. F. L., & K. H.O, F. (2009). Conflicting Identities and Power Between Communities of Practice: The Case of IT Outsourcing. *Management Learning, 40*(3), 311–326.

Hotho, J. J., Saka-Helmhout, A., & Becker-Ritterspach, F. (2014). Bringing context and structure back into situated learning. *Management Learning, 45*(1), 57–80.

House, R. J. (1971). A Path Goal Theory of Leader Effectiveness. *Administrative Science Quarterly, 16*(3), 321–339.

Howard-Grenville, J. A. (2005). The Persistence of Flexible Organizational Routines: The Role of Agency and Organizational Context. *Organization Science, 16*(6), 618–636.

Howard-Grenville, J. A. (2007). Developing Issue-Selling Effectiveness over Time: Issue Selling as Resourcing. *Organization Science, 18*(4), 560–577.

Howard-Grenville, J. A., Golden-Biddle, K., Irwin, J., & Mao, J. (2011). Liminality as Cultural Process for Cultural Change. *Organization Science, 22*(2), 522–539.

Howorth, C., Smith, S. M., & Parkinson, C. (2012). Social Learning and Social Entrepreneurship Education. *Academy of Management Learning & Education, 11*(3), 371–389.

Hsu, M.-H., Ju, T. L., Yen, C.-H., & Chang, C.-M. (2007). Knowledge sharing behavior in virtual communities: The relationship between trust, self-efficacy, and outcome expectations. *International Journal of Human-Computer Studies, 65*(2), 153–169.

Iaquinto, B., Ison, R., & Faggian, R. (2011). Creating communities of practice: scoping purposeful design. *Journal of Knowledge Management, 15*(1), 4–21.

Jackson, W. A. (1999). Dualism, duality and the complexity of economic institutions. *International Journal of Social Economics, 26*(4), 545–558.

Jarzabkowski, P. A., Balogun, J., & Seidl, D. (2007). Strategizing: The challenges of a practice perspective. *Human Relations, 60*(1), 5–27.

Jarzabkowski, P. A., & Spee, A. P. (2009). Strategy-as-practice: A review and future directions for the field. *International Journal of Management Reviews, 11*(1), 69–95.

Jarzabkowski, P. A. (2004). Strategy as Practice: Recursiveness, Adaptation, and Practices-in-Use. *Organization Studies, 25*(4), 529–560.

Jarzabkowski, P. A. (2005). *Strategy as practice: An activity based approach*. London, GB: Sage.

Jeon, S., Kim, Y.-G., & Koh, J. (2011). An integrative model for knowledge sharing in communities-of-practice. *Journal of Knowledge Management, 15*(2), 251–269.

Jeppesen, L. B., & Laursen, K. (2009). The role of lead users in knowledge sharing. *Research Policy, 38*(10), 1582–1589.

Kane, G. C., & Alavi, M. (2007). Information Technology and Organizational Learning: An Investigation of Exploration and Exploitation Processes. *Organization Science, 18*(5), 796–812.

Kannan-Narasimhan, R., & Lawrence, B. S. (2018). How innovators reframe resources in the strategy-making process to gain innovation adoption. *Strategic Management Journal, 39*(3), 720–758.

Kaplan, S. (2011). Strategy and PowerPoint: An Inquiry into the Epistemic Culture and Machinery of Strategy Making. *Organization Science, 22*(2), 320–346.

Kark, R., Karazi-Presler, T., & Tubi, S. (2016). Paradox and Challenges in Military Leadership. In B. Schyns, C. Peus, & S. Braun (Eds.), *Monographs in Leadership and Management: volume 8. Leadership lessons from compelling contexts* (pp. 157–187). Bingley, UK: Emerald Group Publishing Limited.

Katz, D., & Kahn, R. L. (1978). *The social psychology of organizations*: Wiley New York.

Kauffman, S. A. (1993). *The origins of order: Self-organization and selection in evolution*: Oxford University Press, USA.

Kauffman, S. A. (1995). *At Home in the Universe, The Search for the Laws of Self-Organization and Diversity*: Oxford University Press, USA.

Keller, J. (2012). Führung und Führer im Militär. In N. Leonhard & I.-J. Werkner (Eds.), *Militärsoziologie – Eine Einführung* (2nd ed., pp. 475–491). Wiesbaden: Gabler.

Kellogg, K. C. (2009). Operating Room: Relational Spaces and Microinstitutional Change in Surgery. *American Journal of Sociology, 115*(3), 657–711.

Kellogg, K. C. (2011). Hot Lights and Cold Steel: Cultural and Political Toolkits for Practice Change in Surgery. *Organization Science, 22*(2), 482–502.

Kerno, S. J. (2008). Limitations of Communities of Practice: A Consideration of Unresolved Issues and Difficulties in the Approach. *Journal of Leadership & Organizational Studies, 15*(1), 69–78.

Kietzmann, J., Plangger, K., Eaton, B., Heilgenberg, K., Pitt, L., & Berthon, P. (2013). Mobility at work: A typology of mobile communities of practice and contextual ambidexterity. *The Journal of Strategic Information Systems, 22*(4), 282–297.

Kirkman, B. L., Cordery, J. L., Mathieu, J., Rosen, B., & Kukenberger, M. (2012). Global organizational communities of practice: The effects of nationality diversity, psychological safety, and media richness on community performance. *Human Relations, 66*(3), 333–362.

Kirkman, B. L., Mathieu, J. E., Cordery, J. L., Rosen, B., & Kukenberger, M. (2011). Managing a new collaborative entity in business organizations: Understanding organizational communities of practice effectiveness. *Journal of Applied Psychology, 96*(6), 1234–1245.

Kodama, M. (2002). Transforming an Old Economy Company Through Strategic Communities. *Long Range Planning, 35*(4), 349–365.

Kogut, B., & Zander, U. (1992). Knowledge of the Firm, Combinative Capabilities, and the Replication of Technology. *Organization Science, 3*(3), 383–397.

Kogut, B., & Zander, U. (1996). What Firms Do? Coordination, Identity, and Learning. *Organization Science, 7*(5), 502–518.

Koliba, C., & Gajda, R. (2009). "Communities of Practice" as an Analytical Construct: Implications for Theory and Practice. *International Journal of Public Administration, 32*(2), 97–135.

Koller, H., Schulte, B., Andresen, F., & Kreutzmann, A. (2020). Communities of practice as collective lead users. In R. Tiwari & S. Buse (Eds.), *Managing Innovation in a Global and Digital World* (pp. 131–144). Wiesbaden: Springer.

Kouamé, S., & Langley, A. (2018). Relating microprocesses to macro-outcomes in qualitative strategy process and practice research. *Strategic Management Journal, 39*(3), 559–581.

Kreutzmann, A., Koller, H., Andresen, F., & Schulte, B. (2016). Communities of Practice: Enabler of Organizational Knowledge Creation. In *Proceedings of the European Conference on Knowledge Management* (pp. 494–502). Academic Conferences International Limited.

Labianca, G., Gray, B., & Brass, D. J. (2000). A Grounded Model of Organizational Schema Change During Empowerment. *Organization Science, 11*(2), 235–257.

Langley, A. (1999). Strategies for Theorizing from Process Data. *Academy of Management Review, 24*(4), 691–710.

Langley, A. (2009). Studying processes in and around organizations. In D. A. Buchanon & A. Bryman (Eds.), *The Sage handbook of organizational research methods* (pp. 409–429). Thousand Oaks, CA: Sage Publications.

Langley, A., Smallman, C., Tsoukas, H., & van de Ven, A. H. (2013). Process Studies of Change in Organization and Management: Unveiling Temporality, Activity, and Flow. *Academy of Management Journal, 56*(1), 1–13.

Latour, B. (2005). *Reassembling the social: An introduction to actor-network-theory*. Clarendon lectures in management studies. Oxford: Oxford University Press.

Lave, J. (1988). *Cognition in practice: Mind, mathematics and culture in everyday life*: Cambridge University Press.

Lave, J. (2008). Epilogue: Situated Learning and Changing Practice. In A. Amin & J. Roberts (Eds.), *Community, Economic Creativity, and Organization* (pp. 283–296). Oxford University Press.

Lave, J., & Wenger, E. C. (1991). *Situated learning: Legitimate peripheral participation*: Cambridge University Press.

Lawrence, P. R., & Lorsch, J. W. (1967). Differentiation and Integration in Complex Organizations. *Administrative Science Quarterly, 12*(1), 1–47.

Leana, C. R., & Barry, B. (2000). Stability and Change as Simultaneous Experiences in Organizational Life. *Academy of Management Review, 25*(753–759).

Leavitt, H. J. (2003). Why hierarchies thrive. *Harvard Business Review, 81*(3), 96–102, 141.

Lee, T. W., Mitchell, T. R., & Sablynski, C. J. (1999). Qualitative Research in Organizational and Vocational Psychology, 1979–1999. *Journal of Vocational Behavior, 55*(2), 161–187.

Lee, L., Reinicke, B., Sarkar, R., & Anderson, R. (2015). Learning Through Interactions: Improving Project Management Through Communities of Practice. *Project Management Journal, 46*(1), 40–52.

Leifer, R. (1989). Understanding Organizational Transformation Using a Dissipative Structure Model. *Human Relations, 42*(10), 899–916.

Lesser, E. L., & Storck, J. (2001). Communities of practice and organizational performance. *IBM System Journal, 40*(4), 831–841.

Levina, N., & Vaast, E. (2006). Turning a Community into a Market: A Practice Perspective on Information Technology Use in Boundary Spanning. *Journal of Management Information Systems, 22*(4), 13–37.

Lewin, A. Y., & Volberda, H. W. (1999). Prolegomena on Coevolution: A Framework for Research on Strategy and New Organizational Forms. *Organization Science, 10*(5), 519–534.

Li, W. (2010). Virtual knowledge sharing in a cross-cultural context. *Journal of Knowledge Management, 14*(1), 38–50.
Lichtenstein, B. B. (2000). Emergence as a process of self-organizing: New assumptions and insights from the study of non-linear dynamic systems. *Journal of Organizational Change Management, 13*(6), 526–544.
Lichtenstein, B. B. (2014). *Generative emergence: A new discipline of organizational, entrepreneurial and social innovation*. New York, NY: Oxford University Press.
Lichtenstein, B. B., & Plowman, D. A. (2009). The leadership of emergence: A complex systems leadership theory of emergence at successive organizational levels. *The Leadership Quarterly, 20*(4), 617–630.
Lichtenstein, B. B., Uhl-Bien, M., Marion, R., Seers, A., Douglas Orton, J., & Schreiber, C. (2006). Complexity leadership theory: An interactive perspective on leading in complex adaptive systems. *Emergence: Complexity and Organization, 8*(4), 2–12.
Liedtka, J. (1999). Linking Competitive Advantage with Communities of Practice. *Journal of Management Inquiry, 8*(1), 5–16.
Lincoln, Y. S., & Guba, E. G. (1985). Designing a naturalistic inquiry. In Y. S. Lincoln & E. G. Guba (Eds.), *Naturalistic inquiry*. Beverly Hills, CA: Sage.
Lindkvist, L. (2005). Knowledge Communities and Knowledge Collectivities: A Typology of Knowledge Work in Groups. *Journal of Management Studies, 42*(6), 1189–1210.
Locke, K. (1996). Rewriting the Discovery of Grounded Theory after 25 Years? *Journal of Management Inquiry, 5*(3), 239–245.
Locke, K. (2001). *Grounded Theory in Management Research*. London: Sage Publications.
Lounsbury, M., & Glynn, M. A. (2001). Cultural entrepreneurship: Stories, legitimacy, and the acquisitions of resource. *Strategic Management Journal, 22*(6/7), 545–564.
MacIntosh, R., & MacLean, D. (1999). Conditioned Emergence: A Dissipative Structures Approach to Transformation. *Strategic Management Journal, 20*(4), 297–316.
Maguire, S., & McKelvey, B. (1999). Complexity and Management: Moving From Fad To Firm Foundations. *Emergence, 1*(2), 19–61.
Maitlis, S. (2005). The Social Processes of Organizational Sensemaking. *Academy of Management Journal, 48*(1), 21–49.
Maitlis, S., & Christianson, M. (2014). Sensemaking in Organizations: Taking Stock and Moving Forward. *Academy of Management Annals, 8*(1), 57–125.
Maitlis, S., & Lawrence, T. B. (2007). Triggers and Enablers of Sensegiving in Organizations. *Academy of Management Journal, 50*(1), 57–84.
March, J. G. (1981). Footnotes to Organizational Change. *Administrative Science Quarterly, 26*(4), 563–577.
March, J. G. (1991). Exploration and Exploitation in Organizational Learning. *Organization Science, 2*(1 Special Issue: Organizational Learning: Papers in Honor of and by James G. March), 71–87.
Marion, R. (1999). Th*e edge of organization: Chaos and complexity theories of formal social systems*: Sage.
Marion, R., & Uhl-Bien, M. (2001). Leadership in complex organizations. *The Leadership Quarterly, 12*(4), 389–418.
Marion, R., & Uhl-Bien, M. (2003). Complexity theory and Al Qaeda: Examining complex leadership. *Emergence, 5*(1), 54–74.

Markus, L. M. (2001). Toward a Theory of Knowledge Reuse: Types of Knowledge Reuse Situations and Factors in Reuse Success. *Journal of Management Information Systems, 18*(1), 57–93.

Marx, K. (1845/ 1977). Economic and philosophical manuscripts. In D.M.L. (Ed.), *Karl Marx selected writings*. Oxford University Press.

McDermott, R. (1999). Learning Across Teams: The role of Communities of Practice in Team Organizations. *Knowledge Management Review, 8*(3), 32–36.

McDermott, R. (2000). *Knowing in Community*. IHRIM Journal, 1–12.

McDermott, R., & Archibald, D. (2010). Harnessing Your Staff's Informal Network. *Harvard Business Review, 88*(3), 82–89.

McDermott, R., & O'Dell, C. (2001). Overcoming cultural barriers to sharing knowledge. *Journal of Knowledge Management, 5*(1), 76–85.

McEvily, B., Soda, G., & Tortoriello, M. (2014). More Formally: Rediscovering the Missing Link between Formal Organization and Informal Social Structure. *Academy of Management Annals, 8*(1), 299–345.

McKelvey, B. (1997). Perspective—Quasi-Natural Organization Science. *Organization Science, 8*(4), 351–380.

McKelvey, B. (1999). Complexity Theory in Organization Science: Seizing the Promise or Becoming a Fad. *Emergence, 1*(1), 5–32.

McKelvey, B. (2000). MicroStrategy from MacroLeadership: Distributed intelligence via new science. In A. Y. Lewin & H. W. Volberda (Eds.), *The Coevolution Advantage. Mobilizing the Self-Renewing Organization.* Thousand Oaks, CA: Sage.

McLeod, C., O'Donohoe, S., & Townley, B. (2011). Pot Noodles, Placements and Peer Regard: Creative Career Trajectories and Communities of Practice in the British Advertising Industry. *British Journal of Management, 22*(1), 114–131.

Meeuwesen, B., & Berends, H. (2007). Creating communities of practices to manage technological knowledge. *European Journal of Innovation Management, 10*(3), 333–347.

Miettinen, R., Samra-Fredericks, D., & Yanow, D. (2009). Re-Turn to Practice: An Introductory Essay. *Organization Studies, 30*(12), 1309–1327.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative Data Analysis: An Expanded Sourcebook*. Thousand Oaks, CA: Sage Publications.

Milosevic, I., Bass, A. E., & Combs, G. M. (2018). The Paradox of Knowledge Creation in a High-Reliability Organization: A Case Study. *Journal of Management, 44*(3), 1174–1201.

Mintzberg, H. (1979). *The Structuring of Organizations: A Synthesis of the Research.* Englewood Cliffs, NJ.

Mohr, L. B. (1982). *Explaining organizational behavior: The Limits and Possibilities of Theory and Research.* San Francisco, CA: Jossey-Bass.

Morath, R. A., Leonard, A. L., & Zaccaro, S. J. (2011). Military leadership: An overview and introduction to the special issue. *Military Psychology, 23*(5), 453–461.

Moreland, R. L., & Argote, L. (2003). Transactive Memory in Dynamic Organizations. In R. S. Peterson & E. A. Mannix (Eds.), *Leading and Managing People in the Dynamic Organization* (pp. 135–162). Routledge.

Mørk, B. E., Aanestad, M., Hanseth, O., & Grisot, M. (2008). Conflicting epistemic cultures and obstacles for learning across communities of practice. *Knowledge and Process Management, 15*(1), 12–23.

Mørk, B. E., Hoholm, T., Ellingsen, G., Edwin, B., & Aanestad, M. (2010). Challenging expertise: On power relations within and across communities of practice in medical innovation. *Management Learning, 41*(5), 575–592.

Morrill, C. (2008). Culture and organization theory. *The ANNALS of the American Academy of Political and Social Science, 619*(1), 15–40.

Mutch, A. (2003). Communities of Practice and Habitus: A Critique. *Organization Studies, 3,* 383–401.

Nag, N., Corley, K. G., & Gioia, D. A. (2003). Innovation Tensions: Chaos, Structure, and Managed Chaos. In L. V. Shavinina (Ed.), *The International Handbook on Innovation* (pp. 607–618). Elsevier.

Nag, R., Corley, K. G., & Gioia, D. A. (2007). The Intersection of Organizational Identity, Knowledge, and Practice: Attempting Strategic Change via Knowledge Grafting. *Academy of Management Journal, 50*(4), 821–847.

Nesheim, T., Olsen, K. M., & Tobiassen, A. E. (2011). Knowledge communities in matrix-like organizations: managing knowledge towards application. *Journal of Knowledge Management, 15*(5), 836–850.

Neufeld, D., Fang, Y., & Wan, Z. (2013). Community of Practice Behaviors and Individual Learning Outcomes. *Group Decision and Negotiation, 22*(4), 617–639.

Nicolini, D. (2009). Zooming In and Out: Studying Practices by Switching Theoretical lenses and Trailing Connections. *Organization Studies, 30*(2), 1391–1418.

Nicolini, D. (2011). Practice as the Site of Knowing: Insights from the Field of Telemedicine. *Organization Science, 22*(3), 602–620.

Nicolini, D. (2013). *Practice Theory, Work, and Organization: An Introduction* (First Edition). Oxford: Oxford University Press.

Nicolini, D., & Monteiro, P. (2016). The practice approach: For a praxeology of organisational and management studies. *In The Sage handbook of process organization studies* (pp. 110–126). Sage.

Nicolis, G., & Prigogine, I. (1989). *Exploring complexity.*

Nonaka, I., Toyama, R., & Konno, N. (2000). SECI, Ba and Leadership: a Unified Model of Dynamic Knowledge Creation. *Long Range Planning, 33*, 5–34.

Nowak, K., Koller, H., Andresen, F., Kreutzmann, A., & Schulte, B. (2016). Influence of Moderation on Communication in Communities of Practice in Hierarchical Organizations. *In Proceedings of the European Conference on Knowledge Management* (pp. 692–699). Academic Conferences International Limited.

Oborn, E., & Dawson, S. (2010). Learning across Communities of Practice: An Examination of Multidisciplinary Work. *British Journal of Management, 21*(4), 843–858.

O'Reilly, C. A., & Tushman, M. L. (2013). Organizational Ambidexterity: Past, Present, and Future. *Academy of Management Perspectives, 27*(4), 324–338.

Orlikowski, W. J. (1992). The Duality of Technology: Rethinking the Concept of Technology in Organizations. *Organization Science, 3*(3), 398–427.

Orlikowski, W. J. (1996). Improvising Organizational Transformation over Time: A Situated Change Perspective. *Information Systems Research, 7*(1), 63–92.

Orlikowski, W. J. (2000). Using Technology and Constituting Structures: A Practice Lens for Studying Technology in Organizations. *Organization Science, 11*(4), 404–428.

Orlikowski, W. J. (2002). Knowing in Practice: Enacting a Collective Capability in Distributed Organizing. *Organization Science, 13*(3).

Orr, J. E. (1990). Sharing knowledge, celebrating identity: Community memory in a service culture. In D. S. Middleton & D. Edwards (Eds.), *Collective Remembering.* Newbury Park, CA: Sage.

Orr, J. E. (1996). *Talking about machines: An ethnography of a modern job.* Ithaca, NJ: Cornell University Press.

Østerlund, C., & Carlile, P. (2005). Relations in Practice: Sorting Through Practice Theories on Knowledge Sharing in Complex Organizations. *The Information Society, 21*(2), 91–107.

Pan, S. L., & Leidner, D. E. (2003). Bridging communities of practice with information technology in pursuit of global knowledge sharing. *The Journal of Strategic Information Systems, 12*(1), 71–88.

Pan, Y., Xu, Y., Wang, X., Zhang, C., Ling, H., & Lin, J. (2015). Integrating social networking support for dyadic knowledge exchange: A study in a virtual community of practice. *Information & Management, 52*(1), 61–70.

Parmigiani, A., & Howard-Grenville, J. A. (2011). Routines Revisited: Exploring the Capabilities and Practice Perspectives. *Academy of Management Annals, 5*(1), 413–453.

Paroutis, S., & Pettigrew, A. (2007). Strategizing in the multi-business firm: Strategy teams at multiple levels and over time. *Human Relations, 60*(1), 99–135.

Pastoors, K. (2007). Consultants: Love-hate relationships with communities of practice. *The Learning Organization, 14*(1), 21–33.

Patterson, O. (2014). Making Sense of Culture. *Annual Review of Sociology, 40*(1), 1–30.

Pattinson, S., & Preece, D. (2014). Communities of practice, knowledge acquisition and innovation: a case study of science-based SMEs. *Journal of Knowledge Management, 18*(1), 107–120.

Pattinson, S., Preece, D., & Dawson, P. (2016). In search of innovative capabilities of communities of practice: A systematic review and typology for future research. *Management Learning, 47*(5), 506–524.

Patvardhan, S. D., Gioia, D. A., & Hamilton, A. L. (2015). Weathering a Meta-Level Identity Crisis: Forging a Coherent Collective Identity for an Emerging Field. *Academy of Management Journal, 58*(2), 405–435.

Peltonen, T., & Lämsä, T. (2004). Communities of Practice and the Social Process of Knowledge Creation: Towards a New Vocabulary for Making Sense of Organizational Learning. *Problems and Perspectives in Management, 4*(249–262).

Penrose, E. (1959). *The Theory of the Growth of the Firm.* Oxford: Oxford University Press.

Pettigrew, A. M. (1979). On Studying Organizational Cultures. *Administrative Science Quarterly, 24*(4), 570–581.

Pettigrew, A. M. (1990). Longitudinal Field Research on Change: Theory and Practice. *Organization Science, 1*(3, Special Issue: Longitudinal Field Research), 267–292.

Pfeffer, J., & Salancik, G. R. (1978). *The external control of organizations: A resource dependence perspective.* Stanford, CA: Stanford University Press.

Phelan, S. E. (1999). A Note on the Correspondence Between Complexity and System Theory. *Systemic Practice and Action Research, 12*(3), 237–246.

Plowman, D. A., Baker, L. T., Beck, T. E., Kulkarni, M., Solansky, S. T., & Travis, D. V. (2007a). Radical Change Accidentally: The Emergence and Amplification of Small Change. *Academy of Management Journal, 50*(3), 515–543.

Plowman, D. A., & Duchon, D. (2008). Dispelling the myths about leadership: From cybernetics to Emergence. In M. Uhl-Bien & R. Marion (Eds.), *A Volume in Leadership Horizons. Complexity Leadership. Part I: Conceptual Foundations* (pp. 129–153). Charlotte, NC: IAP Information Age Publishing.

Plowman, D. A., Solansky, S., Beck, T. E., Baker, L., Kulkarni, M., & Travis, D. V. (2007b). The role of leadership in emergent, self-organization. *The Leadership Quarterly, 18*(4), 341–356.

Podsakoff, P. (2000). Organizational citizenship behaviors: a critical review of the theoretical and empirical literature and suggestions for future research. *Journal of Management, 26*(3), 513–563.

Poole, M. S., van de Ven, A. H., Dooley, K. J., & Holmes, M. E. (Eds.). (2000). *Organizational change and innovation processes: Theory and methods for research.* New York, NY: Oxford University Press.

Pratt, M. G. (2009). For the Lack of a Boilerplate: Tips on Writing up (and Reviewing) Qualitative Research. *Academy of Management Journal, 52*(856–862).

Prigogine, I. (1997). *The end of certainty*. New York, USA: Free Press.

Prigogine, I., & Allen, P. M. (1982). The Challenge of Complexity. In W. C. Schieve & P. M. Allen (Eds.), *Self-organization and dissipative structures: Applications in the physical and social sciences* (pp. 3–40). University of Texas Press.

Prigogine, I., & Lefever, R. (1973). Theory of Dissipative Structures. In H. Haken (Ed.), *Synergetics. Cooperative Phenomena in Multi-Component Systems* (pp. 124–135). Wiesbaden: Springer.

Prigogine, I., & Stengers, I. (1984). *Order out of chaos: Man's new dialogue with nature*: Bantam Books.

Probst, G., & Borzillo, S. (2008). Why communities of practice succeed and why they fail. *European Management Journal, 26*(5), 335–347.

Pyrko, I., Dörfler, V., & Eden, C. (2017). Thinking together: What makes Communities of Practice work? *Human Relations, 70*(4), 389–409.

Pyrko, I., Dörfler, V., & Eden, C. (2019). Communities of Practice in Landscapes of Practice. *Management Learning, 50*(4), 482–499.

Quinn, R. W., Spreitzer, G. M., & Lam, C. F. (2012). Building a Sustainable Model of Human Energy in Organizations: Exploring the Critical Role of Resources. *Academy of Management Annals, 6*(1), 337–396.

Raelin, J. A. (1997). A Model of Work-Based Learning. *Organization Science, 8*(6), 563–578.

Raelin, J. A. (2005). We the Leaders: In Order to Form a Leaderful Organization. *Journal of Leadership & Organizational Studies, 12*(2), 18–30.

Raelin, J. A. (2011a). From leadership-as-practice to leaderful practice. *Leadership, 7*(2), 195–211.

Raelin, J. A. (2011b). The End of Managerial Control? *Group & Organization Management, 36*(2), 135–160.

Raelin, J. A. (2016). Imagine there are no leaders: Reframing leadership as collaborative agency. *Leadership, 12*(2), 131–158.

Rao, H., & Dutta, S. (2012). Free Spaces as Organizational Weapons of the Weak. *Administrative Science Quarterly, 57*(4), 625–668.

Reckwitz, A. (2002). Toward a Theory of Social Practices. *European Journal of Social Theory, 5*(2), 243–263.

Regine, B., & Lewin, R. (2000). Leading at the Edge: How Leaders Influence Complex Systems. *Emergence, 2*(2), 5–23.

Rennstam, J., & Kärreman, D. (2020). Understanding control in communities of practice: Constructive disobedience in a high-tech firm. *Human Relations 73*(6), 864–890.

Rescher, N. (1996). *Process metaphysics: An introduction to process philosophy*: Suny Press.

Retna, K. S., & Ng, P. T. (2011). Communities of practice: dynamics and success factors. *Leadership & Organization Development Journal, 32*(1), 41–59.

Rindova, V., Dalpiaz, E., & Ravasi, D. (2011). A Cultural Quest: A Study of Organizational Use of New Cultural Resources in Strategy Formation. *Organization Science, 22*(2), 413–431.

Roberts, J. (2006). Limits to Communities of Practice. *Journal of Management Studies, 43*(3), 623–639.

Rouleau, L. (2005). Micro-Practices of Strategic Sensemaking and Sensegiving: How Middle Managers Interpret and Sell Change Every Day. *Journal of Management Studies, 42*(7), 1413–1441.

Sandberg, J., & Tsoukas, H. (2015). Making sense of the sensemaking perspective: Its constituents, limitations, and opportunities for further development. *Journal of Organizational Behavior, 36*(S1), 6–32.

Sapsed, J., & Salter, A. (2004). Postcards from the Edge: Local Communities, Global Programs and Boundary Objects. *Organization Studies, 25*(9), 1515–1534.

Scarso, E., Bolisani, E., & Salvador, L. (2009). A systematic framework for analysing the critical success factors of communities of practice. *Journal of Knowledge Management, 13*(6), 431–447.

Schatzki, T. R. (2001). Introduction: practice theory. In T. R. Schatzki, K. Knorr Cetina, & E. von Savigny (Eds.), *The Practice Turn in Contemporary Theory* (pp. 10–23). New York, USA: Routledge.

Schatzki, T. R. (2005). The Sites of Organizations. *Organization Studies, 26*(3), 465–484.

Schatzki, T. R., Knorr Cetina, K., & Savigny, E. von (Eds.). (2001). *The Practice Turn in Contemporary Theory*. New York, USA: Routledge.

Schein, E. H. (1985). *Organizational Culture and Leadership*. San Francisco, CA: Jossey-Bass.

Schein, E. H. (1990). Organizational Culture. *American Psychologist, 45*(2), 109–119.

Schneider, A., Bullinger, B., & Brandl, J. (2020). Resourcing Under Tensions: How frontline employees create resources to balance paradoxical tensions. *Organization Studies*, (Online First).

Schneider, M., & Somers, M. (2006). Organizations as complex adaptive systems: Implications of Complexity Theory for leadership research. *The Leadership Quarterly, 17*(4), 351–365.

Schreiber, C., & Carley, K. M. (2006). Leadership style as an enabler of organizational complex functioning. *Emergence, 8*(4), 61–76.

Schulte, B., Andresen, F., & Koller, H. (2017). Culture in the Making: The Cultural Conjunction between Communities and a hierarchical Organization. *Proceedings of the Academy of Management Annual Meeting, 2017*(1).

Schulte, B., Andresen, F., & Koller, H. (2020). Exploring the Embeddedness of an Informal Community of Practice Within a Formal Organizational Context: A Case Study in the German Military. *Journal of Leadership & Organizational Studies*, 27(2), 153–179.

Schulte, B., Koller, H., Andresen, F., & Kreutzmann, A. (2016a). How to Manage the Unmanageable? Leadership in Coping with Communities of Practice. *Proceedings of the 17th European Conference on Knowledge Management,* 796–805.

Schulte, B., Koller, H., Andresen, F., & Kreutzmann, A. (2016b). The Conjunction between Communities of Practice and their Host Organization – a Cultural Perspective. *Academy of Management Proceedings, 2016*(1).

Schumpeter, J. A. (1949). *Economic Theory and Entrepreneurial History: Change and the Entrepreneur; Postulates and Patterns of Entrepreneurial History*. Cambridge, MA: Harvard University Press.

Schwandt, D. R. (2008). Individual and Collective Coevolution: Leadership as emergent Structuring. In M. Uhl-Bien & R. Marion (Eds.), *A Volume in Leadership Horizons. Complexity Leadership. Part I: Conceptual Foundations* (pp. 101–128). Charlotte, NC: IAP Information Age Publishing.

Schwandt, T. A. (1994). Constructivist, Interpretivist Approaches to Human Inquiry. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research* (pp. 221–259). Thousand Oaks, CA: Sage Publications.

Seidl, D., & Whittington, R. (2014). Enlarging the Strategy-as-Practice Research Agenda: Towards Taller and Flatter Ontologies. *Organization Studies, 35*(10), 1407–1421.

Seidl, D., Whittington, R., & Krogh, G. von. (2019). *Cambridge Handbook of Open Strategy*: Cambridge University Press.

Seiffert, A. (2012). „Generation Einsatz" – Einsatzrealitäten, Selbstverständnis und Organisation. In A. Seiffert, P. C. Langner, & C. Pietsch (Eds.), *Der Einsatz der Bundeswehr in Afghanistan. Sozial- und politikwissenschaftliche Perspektiven.* Wiesbaden: VS Verlag für Sozialwissenschaften.

Selznick, P. (1948). Foundations of the Theory of Organization. *American Sociological Review, 13*(1), 25–35.

Sewell, W. H. (1992). A Theory of Structure: Duality, Agency, and Transformation. *American Journal of Sociology, 98*(1), 1–29.

Sewell, W. H. (2005). The Concept(s) of Culture. In G. M. Spiegel (Ed.), *Practicing History: New directions in historical writing after the linguistic turn* (pp. 76–95). Routledge.

Siebold, G. L. (2007). The Essence of Military Group Cohesion. *Armed Forces & Society, 33*(2), 286–295.

Siedlok, F., Hibbert, P., & Sillince, J. (2015). From practice to collaborative community in interdisciplinary research contexts. *Research Policy, 44*(1), 96–107.

Simon, H. A. (1962). The Architecture of Complexity. *Proceedings of the American Philosophical Society, 106*(467–482).

Sirmon, D. G., Hitt, M. A., & Ireland, R. D. (2007). Managing Firm Resources in Dynamic Environments to Create Value: Looking inside the Black Box. *Academy of Management Review, 32*(1), 273–292.

Smets, M., & Jarzabkowski, P. (2013). Reconstructing institutional complexity in practice: A relational model of institutional work and complexity. *Human Relations, 66*(10), 1279–1309.

Smets, M., Morris, T., & Greenwood, R. (2012). From Practice to Field: A Multilevel Model of Practice-Driven Institutional Change. *Academy of Management Journal, 53*(4), 877–904.

Smircich, L. (1983). Concepts of Culture and Organizational Analysis. *Administrative Science Quarterly, 28*(3), 339–358.

Smith, A. C.T., & Graetz, F. (2006). Complexity theory and organizing form dualities. *Management Decision, 44*(7), 851–870.

Smith, C., & Gemmill, G. (1991). Change in the Small Group: A Dissipative Structure Perspective. *Human Relations, 44*(7), 697–716.

Smith, H. A., & McKeen, J. D. (2003). Creating and Facilitating Communities of Practice. In C. W. Holsapple (Ed.), *Handbook of Knowledge Management* (pp. 393–407). Berlin: Springer.

Snell, R. S. (2001). Moral Foundations of the Learning Organization. *Human Relations, 54*(3), 319–342.

Soeters, J. L., Winslow, D. J., & Weibull, A. (2006). Military Culture. In G. Caforio (Ed.), *Handbook of the Sociology of the Military* (pp. 237–254). Springer Science and Business Media.

Sonenshein, S. (2014). How Organizations Foster the Creative Use of Resources. *Academy of Management Journal, 57*(3), 814–848.

Spender, J. C. (1996). Making knowledge the basis of a dynamic theory of the firm. *Strategic Management Journal, 17*(2), 45–62.

Spender, J. C., & Grant, R. M. (1996). Knowledge and the firm: Overview. *Strategic Management Journal, 17*(Winter Special Issue), 5–9.

Spreitzer, G., Sutcliffe, K., Dutton, J. E., Sonenshein, S., & Grant, A. M. (2005). A Socially Embedded Model of Thriving at Work. *Organization Science, 16*(5), 537–549.

Stacey, R. D. (1995). The Science of Complexity: An Alternative Perspective for Strategic Change Processes. *Strategic Management Journal, 16*(6), 477–495.

Stacey, R. D. (1996). *Complexity and creativity in organizations.* San Francisco, CA: Berrett-Koehler Publishers.

Stieger, D., Matzler, K., Chatterjee, S., & Ladstaetter-Fussenegger, F. (2012). Democratizing Strategy: How Crowdsourcing Can Be Used for Strategy Dialogues. *California Management Review, 54*(4), 44–68.

Stigliani, I., & Ravasi, D. (2012). Organizing Thoughts and Connecting Brains: Material Practices and the Transition from Individual to Group-Level Prospective Sensemaking. *Academy of Management Journal, 55*(5), 1232–1259.

Strauss, A., & Corbin, J. (1990). *Basics of qualitative research: Grounded Theory Procedures and Techniques.* Thousand Oaks, CA: Sage Publications.

Strauss, A., & Corbin, J. (1994). Grounded Theory Methodology: An Overview. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research* (pp. 273–285). Thousand Oaks, CA: Sage Publications.

Styhre, A., Josephson, P.-E., & Knauseder, I. (2006). Organization Learning in Non-writing Communities: The Case of Construction Workers. *Management Learning, 37*(1), 83–100.

Suchmann, L. A. (1987). *Plans and situated Actions: The problem of human-machine communication*: Cambridge University Press.

Suddaby, R. (2006). From the Editors: What Grounded Theory Is Not. *Academy of Management Journal, 49*(4), 633–642.

Surie, G., & Hazy, J. K. (2006). Generative leadership: Nurturing innovation in complex systems. *Emergence: Complexity and Organization, 8*(4), 13–26.

Swan, J., Scarbrough, H., & Robertson, M. (2002). The Construction of 'Communities of Practice' in the Management of Innovation. *Management Learning, 33*(4), 477–496.

Swidler, A. (1986). Culture in Action: Symbols and Strategies. *American Sociological Review, 51*(2), 273–286.

Swidler, A. (2001a). *Talk of Love: How Culture Matters*. Chicago: University of Chicago Press.

Swidler, A. (2001b). What anchors cultural practices. In T. R. Schatzki, K. Knorr Cetina, & E. von Savigny (Eds.), *The Practice Turn in Contemporary Theory* (pp. 83–101). New York, USA: Routledge.

Tallman, S., & Chacar, A. S. (2011a). Knowledge Accumulation and Dissemination in MNEs: A Practice-Based Framework. *Journal of Management Studies, 48*(2), 278–304.

Tallman, S., & Chacar, A. S. (2011b). Communities, alliances, networks and knowledge in multinational firms: a micro-analytic framework. *Journal of International Management, 17*(3), 201–210.

Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal, 28*(13), 1319–1350.

Teece, D. J. (2014). The Foundations of Enterprise Performance: Dynamic and Ordinary Capabilities in an (Economic) Theory of Firms. A*cademy of Management Perspectives, 28*(4), 328–352.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic Capabilities and Strategic Management. *Strategic Management Journal, 18*(7), 509–533.

Thietart, R.-A., & Forgues, B. (1995). Chaos Theory and Organization. *Organization Science, 6*(1), 19–31.

Thomas, N. (2017). Control and autonomy irony in communities of practice from a power-based perspective. *Journal of Management Development, 36*(4), 466–477.

Thompson, J. D. (1967). *Organizations in action: Social science bases of administrative theory*: Routledge.

Thompson, M. (2005). Structural and Epistemic Parameters in Communities of Practice. *Organization Science, 16*(2), 151–164.

Thompson, M. (2011). Ontological Shift or Ontological Drift? Reality Claims, Epistemological Frameworks, and Theory Generation in Organization Studies. *Academy of Management Review, 36*(4), 754–773.

Tinoco, J. K., & Arnaud, A. (2013). The Transfer of Military Culture to Private Sector Organizations: A Sense of Duty Emerges. *Journal of Organizational Culture, Communications, and Conflict, 17*(2), 37–62.

Tomforde, M. (2010). Neue Militärkulturen: Wie verändert sich die Bundeswehr durch die Auslandseinsätze. In M. Apelt (Ed.), *Forschungsthema Militär. Militärische Organisationen im Spannungsfeld von Krieg, Gesellschaft und soldatischen Subjekten* (pp. 193–219). Wiesbaden: Springer.

Tomforde, M. (2015). Einsatzkultur und die Deutung von Kultur beim Militär. In Salzborn & Zapf (Eds.), *Krieg und Frieden. Kulturelle Deutungsmuster* (pp. 109–136).

Tönnies, F. (1887). *Community and society*. The urban sociology reader, 13.

Tsoukas, H. (1996). The Firm as a Distributed Knowledge System: A Constructionist Approach. *Strategic Management Journal, 17*, 11–25.

Tsoukas, H. (2017). Don't Simplify, Complexify: From Disjunctive to Conjunctive Theorizing in Organization and Management Studies. *Journal of Management Studies, 54*(2), 132–153.

Tsoukas, H., & Chia, R. (2002). On Organizational Becoming: Rethinking Organizational Change. *Organization Science, 13*(5), 567–582.

Tushman, M. L., & O'Reilly, C. A. (1996). Ambidextrous Organizations: Managing Evolutionary and Revolutionary Change. *California Management Review, 38*(4), 8–30.

Uhl-Bien, M. (2006). Relational Leadership Theory: Exploring the social processes of leadership and organizing. *The Leadership Quarterly, 17*(6), 654–676.

Uhl-Bien, M., & Arena, M. (2017). Complexity leadership. *Organizational Dynamics, 46*(1), 9–20.

Uhl-Bien, M., & Arena, M. (2018). Leadership for organizational adaptability: A theoretical synthesis and integrative framework. *The Leadership Quarterly, 29*(1), 89–104.

Uhl-Bien, M., & Marion, R. (2008). Introduction: Complexity Leadership – A Framework for Leadership in the Twenty-First Century. In M. Uhl-Bien & R. Marion (Eds.), *A Volume in Leadership Horizons. Complexity Leadership. Part I: Conceptual Foundations* (pp. xi–xxiv). Charlotte, NC: IAP Information Age Publishing.

Uhl-Bien, M., & Marion, R. (2009). Complexity leadership in bureaucratic forms of organizing: A meso model. *The Leadership Quarterly, 20*(4), 631–650.

Uhl-Bien, M., Marion, R., & McKelvey, B. (2007). Complexity Leadership Theory: Shifting leadership from the industrial age to the knowledge era. *The Leadership Quarterly, 18*(4), 298–318.

Vaara, E., & Whittington, R. (2012). Strategy-as-Practice: Taking Social Practices Seriously. *Academy of Management Annals, 6*(1), 285–336.

van de Ven, A. H., & Huber, G. P. (1990). Longitudinal Field Research Methods for Studying Processes of Organizational Change. *Organization Science, 1*(3), 213–219.

van de Ven, A. H., & Poole, M. S. (2005). Alternative Approaches for Studying Organizational Change. *Organization Studies, 26*(9), 1377–1404.

van Maanen, J. (1979). The Fact of Fiction in Organizational Ethnography. *Administrative Science Quarterly, 24*(4), 539–550.

van Maanen, J., & Barley, S. (1984). Occupational Communities: Culture and Control in Organizations. In L. L. Cummings & B. Staw (Eds.), *Research in Organizational Behavior* (pp. 287–365). Greenwich, CT: Jai Press.

van Maanen, J., & Schein, E. H. (1979). Toward a Theory of Organizational Socialization. *Research in Organizational Behavior, 1*, 209–264.

von Hippel, E. (1986). Lead Users: A Source of Novel Product Concepts. *Management Science, 32*(7), 791–805.

Warburg, J. (2010). Paradoxe Anforderungen an Soldaten im Kriegs(einsatz). In A. Dörfler-Dierken & G. Kümmel (Eds.), *Identität, Selbstverständnis, Berufsbild. Implikationen der neuen Einsatzrealität für die Bundeswehr* (pp. 57–76). Wiesbaden: VS Verlag für Sozialwissenschaften.

Wasko, M., & Faraj, S. (2000). "It is what one does": why people participate and help others in electronic communities of practice. *The Journal of Strategic Information Systems, 9*(2–3), 155–173.

Wasko, M., & Faraj, S. (2005). Why Should I Share? Examining Social Capital and Knowledge Contribution in Electronic Networks of Practice. *MIS Quarterly, 29*(1), 35–57.

Wasko, M., Faraj, S., & Teigland, R. (2004). Collective Action and Knowledge Contribution in Electronic Networks of Practice. *Journal of the Association for Information Systems, 5*(11), 493–513.

Weber, K. (2005). A toolkit for analyzing corporate cultural toolkits. *Poetics, 33*(3–4), 227–252.

Weber, K., & Dacin, M. T. (2011). The Cultural Construction of Organizational Life: Introduction to the Special Issue. *Organization Science, 22*(2), 287–298.

Weber, M. (1947). *The theory of social and economic organization*: Free Press.

Weber, R. P. (1990). *Basic content analysis*: Sage.

Weick, K. E. (1974). Middle range theories of social systems. *Behavioral Science, 19*(6), 357–367.

Weick, K. E. (1979). Cognitive processes in organizations. *Research in Organizational Behavior, 1*(1), 41–74.

Weick, K. E. (1988). Enacted Sensemaking in crisis situations. *Journal of Management Studies, 25*(4), 305–317.

Weick, K. E. (1993). The Collapse of Sensemaking in Organizations: The Mann Gulch Disaster. *Administrative Science Quarterly, 38*(4), 628–652.

Weick, K. E. (1995). *Sensemaking in organizations*. Thousand Oaks, CA: Sage.

Weick, K. E., & Quinn, R. E. (1999). Organizational Change and Development. *Annual Review of Psychology, 50*, 361–386.

Weick, K. E., Sutcliffe, K., & Obstfeld, D. (2005). Organizing and the Process of Sensemaking. *Organization Science, 16*(4), 409–421.

Weick, K. E., Sutcliffe, K. M., & Obstfeld, D. (1999). Organizing for High Reliability: Processes of Collective Mindfulness. In R. S. Sutton & B. Staw (Eds.), *Research in Organizational Behavior* (pp. 31–66). Stanford: Jai Press.

Weigt, J. (2014). Führungskultur und soldatisches Ethos der Bundeswehr im Einsatz. In T. Bohrmann, K.-H. Lather, & F. Lohmann (Eds.), *Handbuch Militärische Berufsethik* (pp. 243–262). Wiesbaden: Springer.

Weinfurtner, T., & Seidl, D. (2019). Towards a spatial perspective: An integrative review of research on organisational space. *Scandinavian Journal of Management, 35*(2).

Wenger, E. C. (1998). *Communities of practice: Learning, meaning, and identity*. Cambridge, USA: Cambridge University Press.

Wenger, E. C. (2000). Communities of Practice and Social Learning Systems. *Organization, 7*(2), 225–246.

Wenger, E. C. (2004). Knowledge management as a doughnut: Shaping your knowledge strategy through communities of practice. *Ivey Business Journal, 68*(3), 1–8.

Wenger, E. C. (2010). Communities of practice and social learning systems: the career of a concept. In C. Blackmore (Ed.), *Social learning systems and communities of practice* (pp. 179–198). London: Springer.

Wenger, E. C., McDermott, R., & Snyder, W. M. (2002). *Cultivating Communities of Practice: A Guide to Managing Knowledge.* Cambridge, USA: Harvard Business School Press.

Wenger, E. C., & Snyder, W. M. (2000). Communities of Practice-The Organizational Frontier. *Harvard Business Review,* 139–145.

Wenzel, M., & Koch, J. (2018). From entity to process: toward more process-based theorizing in the field of organizational change. *Journal of Accounting & Organizational Change, 14*(1), 80–98.

Wernerfelt, B. (1984). A Resource-Based View of the Firm. *Strategic Management Journal, 5*(2), 171–180.

Whetten, D. A. (1989). What Constitutes a Theoretical Contribution? *Academy of Management Review, 14*(4), 490.

Whittington, R. (1996). Strategy as Practice. *Long Range Planning, 29*(5), 731–735.

Whittington, R. (2003). The Work of Strategizing and Organizing: For a Practice Perspective. *Strategic Organization, 1*(1), 117–125.

Whittington, R. (2006). Completing the Practice Turn in Strategy Research. *Organization Studies, 27*(5), 613–634.

Whittington, R. (2019). *Opening Strategy: Professional Strategists and Practice Change, 1960 to Today*: Oxford University Press.

Whittington, R., Cailluet, L., & Yakis-Douglas, B. (2011). Opening Strategy: Evolution of a Precarious Profession. *British Journal of Management, 22*(3), 531–544.

Whittington, R., Jarzabkowski, P., Mayer, M., Mounoud, E., Nahapiet, J., & Rouleau, L. (2003). Taking Strategy Seriously. *Journal of Management Inquiry, 12*(4), 396–409.

Wiedner, R., Barrett, M., & Oborn, E. (2017). The Emergence of Change in Unexpected Places: Resourcing Across Organizational Practices in Strategic Change. *Academy of Management Journal, 60*(3), 823–854.

Williamson, O. E. (1979). Transaction-Cost Economics: The Governance of Contractual Relations. *The Journal of Law & Economics, 22*(2), 233–261.

Wittgenstein, L. (1953). *Philosophische Untersuchungen.*

Yakhlef, A. (2008). Towards a post-human distributed cognition environment. *Knowledge Management Research & Practice, 6*(4), 287–297.

Yakhlef, A. (2010). The three facets of knowledge: A critique of the practice-based learning theory. *Research Policy, 39*(1), 39–46.

Yanow, D. (2000). Seeing Organizational Learning: A 'Cultural' View. *Organization, 7*(2), 247–268.

Yanow, D. (2004). Translating Local Knowledge at Organizational Peripheries. *British Journal of Management, 15*(1), 9–25.

Yin, R. K. (2009). *Case Study Research: Design and Methods* (Fourth Edition). Applied Social Research Methods Series: Vol. 5. London, GB: Sage.

Zaccaro, S. J., & Klimoski, R. J. (2001). The Nature of Organizational Leadership: An Introduction. In S. J. Zaccaro & R. J. Klimoski (Eds.), *The Nature of Organizational Leadership. Understanding the Performance Imperatives Confronting Today's Leaders* (pp. 3–41). San Francisco, CA: Jossey-Bass.

Zboralski, K. (2009). Antecedents of knowledge sharing in communities of practice. *Journal of Knowledge Management, 13*(3), 90–101.

Archival Data Inventory

Andritzky, M. G. (2011). 2./QRF 5 – Task Force Baghlan: Kämpfer, Vermittler und Aufbauhelfer. In H.-C. Beck & C. Singer (Eds.), *Entscheiden Führen Verantworten* (pp. 221–226). Berlin: Carola Hartmann Miles Verlag.

Apelt, M. (2006). Militärische Sozialisation. In B. Gareis & P. Klein (Eds.), *Handbuch Militär und Sozialwissenschaften* (2nd ed., pp. 26–39). Wiesbaden: VS Verlag für Sozialwissenschaften.

Apelt, M. (2012). Das Militär als Organisation. In M. Apelt & V. Tacke (Eds.), *Handbuch Organisationstypen* (pp. 133–149). Wiesbaden: Springer.

Bach, A., & Sauer, W. (2016). Einführung der Herausgeber – Vielfältige Auftragserfüllung auf der Basis bewährter Führungsgrundsätze. In A. Bach & W. Sauer (Eds.), *Schützen, Retten, Kämpfen – Dienen für Deutschland* (pp. 29–30). Berlin: Carola Hartmann Miles-Verlag.

Bake, J. (2010). Das Bild vom demokratischen Soldaten: Erste Ergebnisse der empirischen Fallstudie zur Bundeswehr. In A. Dörfler-Dierken & G. Kümmel (Eds.), *Identität, Selbstverständnis, Berufsbild: Implikationen der neuen Einsatzrealität für die Bundeswehr* (pp. 129–137). Wiesbaden: VS Verlag für Sozialwissenschaften.

Beck, H.-C. (2016). Warum benötigt die Bundeswehr eine Führungskultur und ein soldatisches Leitbild. In A. Bach & W. Sauer (Eds.), *Schützen, Retten, Kämpfen – Dienen für Deutschland* (31–41). Berlin: Carola Hartmann Miles-Verlag.

Beck, H.-C., & Singer, C. (2011). Die Fragen an die Konzeption der Inneren Führung im 21. Jahrhundert – gibt es Antworten? In H.-C. Beck & C. Singer (Eds.), *Entscheiden Führen Verantworten* (pp. 188–199). Berlin: Carola Hartmann Miles Verlag.

Berns, A., & Wöhrle-Chon. (2006). Interkulturelles Konfliktmanagement. In B. Gareis & P. Klein (Eds.), *Handbuch Militär und Sozialwissenschaften* (2nd ed., pp. 350–359). Wiesbaden: VS Verlag für Sozialwissenschaften.

Biehl, H. (2010). Kampfmoral und Kohäsion als Forschungsgegenstand, militärische Praxis und Organisationsideologie. In M. Apelt (Ed.), *Forschungsthema Militär: Militärische Organisationen im Spannungsfeld von Krieg, Gesellschaft und soldatischen Subjekten*. Wiesbaden: Springer.

Blumröder, C. (2014). Führen im Gefecht. Erfahrungen als Kommandeur in Kunduz. In A. Kozica (Ed.), *Unternehmen Bundeswehr? Theorie und Praxis (militärischer) Führung* (pp. 183–198). Berlin: Hartmann Miles-Verl.

BMVg (1956). *Gesetz über die Rechtsstellung der Soldaten* (Soldatengesetz). Berlin.

BMVg. (2003). *Verteidigungspolitische Richtlinien: für den Geschäftsbereich des Bundesministers der Verteidigung*. Berlin.

BMVg. (2004). *Konzeption der Bundeswehr* (KdB). Berlin.

BMVg. (2006). *Weißbuch 2006: zur Sicherheitspolitik Deutschlands und zur Zukunft der Bundeswehr*. Berlin.

BMVg. (2008). *Zentrale Dienstvorschrift 10/1: Innere Führung Selbstverständnis und Führungskultur der Bundeswehr.* Berlin.

BMVg. (2013). *Konzeption der Bundeswehr*. Berlin.
BMVg. (2015). A-2630/1: *Das äußere Erscheinungsbild der Soldatinnen und Soldaten der Bundeswehr.*
BMVg. (2016). *Weißbuch: Zur Sicherheitspolitik und zur Zukunft der Bundeswehr*. Berlin.
Bredow, W. von. (2010). Probleme der Transformation und das neue Bild des Soldaten. In A. Dörfler-Dierken & G. Kümmel (Eds.), *Identität, Selbstverständnis, Berufsbild: Implikationen der neuen Einsatzrealität für die Bundeswehr* (121–128). Wiesbaden: VS Verlag für Sozialwissenschaften.
Bredow, W. von. (2015). Auslandseinsätze der Bundeswehr. In W. von Bredow (Ed.), Grundwissen Politik. *Sicherheit, Sicherheitspolitik und Militär: Deutschland seit der Vereinigung* (pp. 251–267). Wiesbaden: Springer VS.
bw TV. *Der Lehrgang Sprengmeister*.
Carstens, N. (2014). Führen und Entscheiden als Verbandsführer im Kampfeinsatz. In T. Bohrmann, K.-H. Lather, & F. Lohmann (Eds.), *Handbuch Militärische Berufsethik* (pp. 215–232). Wiesbaden: Springer.
Collmer, S. (2007). Information as a Key Resource: The Influence of RMA and Network-Centric Operations on the Transformation of the German Armed Forces. *Occasional Paper Series.* (8).
Demmer, U. (2011). Die Ritter der Drachenburg. *Spiegel,* 17, 32–35.
Deutsche Marine Blog. (2016). *Multinationale Einsatzvorbereitung auf höchstem Niveau.*
Deutscher Bundestag. (2015). *Drucksache 18/7250: Unterrichtung durch den Wehrbeauftragten Jahresbericht 2015*. Berlin.
Deutscher Bundestag. (2016). *Drucksache 18/10900: Unterrichtung durch den Wehrbeauftragten Jahresbericht 2016*. Berlin.
Ebert, D. (2007). Taktische Datenlinks – Einsatzzwecke. In G. Teege, Eggendorfer, Tobias, Eiseler, Volker, & M. Göhner (Eds.), *Militärische mobile Kommunikationsnetze* (pp. 29–47).
Elbe, M. (2006). Der Offizier – Ethos, Habitus, Berufsverständnis. In B. Gareis & P. Klein (Eds.), *Handbuch Militär und Sozialwissenschaften* (2nd., pp. 459–472). Wiesbaden: VS Verlag für Sozialwissenschaften.
Gareis, B. (2006). Auslandseinsätze der Bundeswehr. In B. Gareis & P. Klein (Eds.), *Handbuch Militär und Sozialwissenschaften* (2nd, pp. 274–283). Wiesbaden: VS Verlag für Sozialwissenschaften.
Gareis, B., Haltiner, K., & Klein, P. (2006). Strukturprinzipien und Organisationsmerkmale von Streitkräften. In B. Gareis & P. Klein (Eds.), *Handbuch Militär und Sozialwissenschaften* (2nd, pp. 14–25). Wiesbaden: VS Verlag für Sozialwissenschaften.
Gebauer, M. Partnering in Afghanistan: New McChrystal Approach Means Greater Danger for German Forces. *Spiegel*.
Glatz, R. L. (2016). Innere Führung – Bewährung im Einsatz. In A. Bach & W. Sauer (Eds.), *Schützen, Retten, Kämpfen – Dienen für Deutschland* (pp. 42–53). Berlin: Carola Hartmann Miles-Verlag.
Gorski, P. H. (2011). Aspekte der Menschenführung im Wandel von Gesellschaft und Militär. In H.-C. Beck & C. Singer (Eds.), *Entscheiden Führen Verantworten* (pp. 129–136). Berlin: Carola Hartmann Miles Verlag.

Grohmann, H.-C. (2011). Führungsverantwortung im Einsatz und Gefecht. In H.-C. Beck & C. Singer (Eds.), *Entscheiden Führen Verantworten* (pp. 212–220). Berlin: Carola Hartmann Miles Verlag.

Grundsätze der Truppenführung des Heeres, Heeresamt 1955.

Grützner, C. (2007). Überblick über taktische Datenlinks. In G. Teege, Eggendorfer, Tobias, Eiseler, Volker, & M. Göhner (Eds.), *Militärische mobile Kommunikationsnetze* (pp. 7–29).

Gwerder, R. (2010). Ladung zünden: Sprengseminar D-A-CH 2010. *bauen&retten*, 6–9.

Hagen, U. von, & Tomforde, M. (2012). Militärische Kulturen. In N. Leonhard & I.-J. Werkner (Eds.), *Militärsoziologie – Eine Einführung* (2nd., pp. 284–313). Wiesbaden: Gabler.

Haltiner, K. (2006). Vom Landesverteidiger zum militärischen Ordnungshüter. In B. Gareis & P. Klein (Eds.), *Handbuch Militär und Sozialwissenschaften* (2nd, pp. 518–526). Wiesbaden: VS Verlag für Sozialwissenschaften.

Hamann, R. (2009). Im Gleichschritt in die Sackgasse? Vier Thesen zu Auslandseinsätzen der Bundeswehr. In G. Kümmel (Ed.), *Streitkräfte unter Anpassungsdruck: Sicherheits- und militärpolitische Herausforderungen Deutschlands in Gegenwart und Zukunft* (1st ed., pp. 57–70). Baden-Baden: Nomos Verlagsgesellschaft GmbH & Co. KG.

Hardthöhen Kurier. (2011). Tactical Data Link Management bei RAPID ARROW 2010. *Hardthöhen Kurier*, 05.

Hasholzner, C., & Lankes, R. (2014). Die Sprengung des AFE Turmes in Frankfurt am Main. *Pioniere: Magazin der Pioniertruppe und des Bundes Deutscher Pioniere*. (9), 36–37.

Haupt, T. (2014). Ein Offizier in der Wirtschaft: Wie die Führungsprinzipien der Bundeswehr auf den Manageralltag vorbereiten. In A. Kozica (Ed.), *Unternehmen Bundeswehr? Theorie und Praxis (militärischer) Führung* (pp. 229–237). Berlin: Hartmann Miles-Verl.

Heiberg, M. (1991). *Peacekeepers and local populations: Some comments on UNIFIL*. In The United Nations and Peacekeeping (pp. 147–169). Springer.

Hellmann, K.-U. (2015). Wenn der Nebel des Krieges aufzieht … Anmerkungen zur Transformation der Bundeswehr. In M. Apelt & K. Senge (Eds.), *Organisationssoziologie. Organisation und Unsicherheit* (pp. 195–212). Wiesbaden: Springer VS.

Huber, R. K., & Eggenhofer, P. (2005). Transformation der Bundeswehr: Intellektuelle und kultureller Herausforderungen. 50 Jahre Bundeswehr – Welche Armee brauchen wir heute? *Deutsche Sicherheitspolitik–Rückblick, Bilanz und Perspektiven*, 92–104.

Inspekteur des Heeres (2014). *Die Neuausrichtung des Heeres.* Strausberg.

Keller, J. (2012). Führung und Führer im Militär. In N. Leonhard & I.-J. Werkner (Eds.), *Militärsoziologie – Eine Einführung* (2nd ed, pp. 475–491). Wiesbaden: Gabler.

Keller, J., & Tomforde, M. (2007). Interkulturelle Kompetenz auf dem Prüftsand: Die Auslandseinsätze der Bundeswehr. In L. Krysl (Ed.), *Schriftenreihe der Landesverteidigungsakademie: Vol. 2007,18. Interkulturelle Kompetenz: Voraussetzung für erfolgreiche Aufgabenerfüllung postmoderner Streitkräfte* (pp. 161–194). Wien: LVAk.

Klein, P. (2006). Unteroffizier als Führer, Ausbilder und Erzieher sowie als Fachleute in Technik und Verwaltung. In B. Gareis & P. Klein (Eds.), *Handbuch Militär und Sozialwissenschaften* (2nd ed., pp. 473–481). Wiesbaden: VS Verlag für Sozialwissenschaften.

Koelbl, H. (2011). Afghanistan-Einsatz: „Bist du in der Lage, auf einen Menschen zu schießen? Das konnte ich klar mit Ja beantworten". *Zeit.* (49).

Kozica, A. (2014). Emotional intelligente Führung in der militärischen Führungspraxis. In A. Kozica (Ed.), *Unternehmen Bundeswehr? Theorie und Praxis (militärischer) Führung* (pp. 131–160). Berlin: Hartmann Miles-Verl.

Langner, P. C. (2012). Erfahrungen von Fremdheit als Ressource verstehen – Herausforderungen interkultureller Kompetenz im Einsatz. In A. Seiffert, P. C. Langner, & C. Pietsch (Eds.), *Der Einsatz der Bundeswehr in Afghanistan: Soial- und politikwissenschaftliche Perspektiven* (pp. 123–142). Wiesbaden: VS Verlag für Sozialwissenschaften.

Leonhard, N. (2018). Über den (Wesens)Kern des Soldatseins. In S. Müller-Hermann, R. Becker-Lenz, S. Busse, & G. Ehlert (Eds.), Edition Professions- und Professionalisierungsforschung: Vol. 10. *Professionskulturen – Charakteristika unterschiedlicher professioneller Praxen* (pp. 7–29). Wiesbaden: Springer Fachmedien Wiesbaden.

Leonhard, N., & Biehl, H. (2012). Beruf Soldat. In N. Leonhard & I.-J. Werkner (Eds.), *Militärsoziologie – Eine Einführung* (2nd ed., pp. 393–423). Wiesbaden: Gabler.

Libero, L. de. (2010). Soldatische Identität, Tradition und Einsatz. In A. Dörfler-Dierken & G. Kümmel (Eds.), *Identität, Selbstverständnis, Berufsbild: Implikationen der neuen Einsatzrealität für die Bundeswehr* (47-). Wiesbaden: VS Verlag für Sozialwissenschaften.

Lohmann, F. (2014). Interkulturelle Kompetenz inner- und außerhalb militärischer Strukturen. In T. Bohrmann, K.-H. Lather, & F. Lohmann (Eds.), *Handbuch Militärische Berufsethik* (pp. 93–118). Wiesbaden: Springer.

Löwenstein, S. (2010). "Partnering" in Afghanistan: Verbunden im Kampf gegen die Taliban. *Frankfurter Allgemeine Zeitung*.

Matthews, M. D. (2014). *Head strong: How psychology is revolutionizing war*. New York, NY: Oxford Univ. Press.

Nagels, U. (2015). Die III. Inspektion: 7 Jahre Spezialisten Ausbildung. *Pioniere: Magazin der Pioniertruppe und des Bundes Deutscher Pioniere.* (11), 34–35.

Nichting, A. (2016). Gestaltungsmöglichkeiten eines Einheitsführers. In A. Bach & W. Sauer (Eds.), *Schützen, Retten, Kämpfen – Dienen für Deutschland* (pp. 379–385). Berlin: Carola Hartmann Miles-Verlag.

Ohm, D. (2010). Soldatische Identität – normativ. In A. Dörfler-Dierken & G. Kümmel (Eds.), *Identität, Selbstverständnis, Berufsbild: Implikationen der neuen Einsatzrealität für die Bundeswehr* (pp. 41–46). Wiesbaden: VS Verlag für Sozialwissenschaften.

Pionierschule und Fachschule des Heeres für Bautechnik. *Die Pioniere: Geschichte und Vorbilder unserer Truppengattung.* Ingolstadt.

RK Marine Kiel. *Fregattengeneration F124 der Marine.* Retrieved from http://www.rk-marine-kiel.de/files/bundeswehr/fahrzeuge/fregatte_f124.pdf.

Rützel, S. (2009). Überblick Taktische Datenlinks. In G. Teege (Ed.), *Militärische Kommunikationstechnik:*(pp. 1–53). Norderstedt: Books on Demand GmbH.

Sauer, W. (2011). Der stille Wandel. Anforderungen an militärische Führungskräfte heute. In H.-C. Beck & C. Singer (Eds.), *Entscheiden Führen Verantworten* (pp. 63–71). Berlin: Carola Hartmann Miles Verlag.

Sauer, W. (2016). Führungsbegleitung in militärischen Organisationen – Der freiwillige Weg zu höherer Führungskompetenz? In A. Bach & W. Sauer (Eds.), *Schützen, Retten, Kämpfen – Dienen für Deutschland* (pp. 165–172). Berlin: Carola Hartmann Miles-Verlag.

Schneider, J. (2016). Ausbildung, Beratung und Unterstützung im Nord-Irak- Bewährung von Führungsgrundsätzen. In A. Bach & W. Sauer (Eds.), *Schützen, Retten, Kämpfen – Dienen für Deutschland* (pp. 54–61). Berlin: Carola Hartmann Miles-Verlag.

Schneiderhan, W. (2016). Verantwortung für die Innere Führung in Zeiten der Umbrüche – Eine gemeinsame Aufgabe der politischen und der militärischen Führung. In A. Bach & W. Sauer (Eds.), *Schützen, Retten, Kämpfen – Dienen für Deutschland* (pp. 259–268). Berlin: Carola Hartmann Miles-Verlag.

Schultze, S. (2016). Einsatz prägt – Erfahrungen eines Infanteriefeldwebels. In A. Bach & W. Sauer (Eds.), *Schützen, Retten, Kämpfen – Dienen für Deutschland* (pp. 226–232). Berlin: Carola Hartmann Miles-Verlag.

Schwitalla, A. (2010). *Afghanistan, jetzt weiß ich erst…: Gedanken aus meiner Zeit als Kommandeur des Provincial Reconstruction Team FEYZABAD*: Carola Hartmann Miles Verlag.

Seiffert, A. (2012). „Generation Einsatz" – Einsatzrealitäten, Selbstverständnis und Organisation. In A. Seiffert, P. C. Langner, & C. Pietsch (Eds.), *Der Einsatz der Bundeswehr in Afghanistan: Sozial- und politikwissenschaftliche Perspektiven.* Wiesbaden: VS Verlag für Sozialwissenschaften.

Seiffert, A. (2015). Wie der Afghanistaneinsatz die Soldaten und auch die Bundeswehr prägt und verändert. In V. Bock, J. J. Frühbauer, A. Küppers, & C. Sturm (Eds.), *Christliche Friedensethik vor den Herausforderungen des 21. Jahrhunderts* (1st ed., pp. 177–190). Baden-Baden: Nomos Verlagsgesellschaft mbH & Co. KG.

Seiffert, A. (2016). Aus der empirischen Feldforschung – Wofür riskieren Soldaten ihr Leben. In A. Bach & W. Sauer (Eds.), *Schützen, Retten, Kämpfen – Dienen für Deutschland* (pp. 213–226). Berlin: Carola Hartmann Miles-Verlag.

Sembretzki, J. (2016). Kampfmoral und Führen mit Auftrag – Entscheidende Voraussetzungen für das bestehen im Gefecht. In A. Bach & W. Sauer (Eds.), *Schützen, Retten, Kämpfen – Dienen für Deutschland* (pp. 207–212). Berlin: Carola Hartmann Miles-Verlag.

Senger, R. (2011). Auftragstaktik – Tradition, Erfahrung, Chance. In H.-C. Beck & C. Singer (Eds.), *Entscheiden Führen Verantworten* (pp. 72–82). Berlin: Carola Hartmann Miles Verlag.

Staller, J. (2014). Panzerpionierkompanie 550: Übung am zukünftigen Standort Stetten am kalten Markt. *Pioniere: Magazin der Pioniertruppe und des Bundes Deutscher Pioniere.* (10), 23–26.

Tappe, A. (2015). Aspekte zur Geschichte und zum Aufbau der Interkulturellen Einsatzberatung und Ausbildung für die Auslandseinsätze der Bundeswehr. In R. L. Glatz & R. Tophoven (Eds.), *Am Hindukusch – und weiter: Die Bundeswehr im Auslandseinsatz: Erfahrungen, Bilanzen, Ausblicke* (pp. 156–186). Bonn: Bundeszentrale für politische Bildung.

Tiedke, M. (2018a). *„Achtung, Turm fällt" – Sprengung in Lehnin.*

Tiedke, M. (2018b). *Es wird brenzlig: Als Sprengmeister in Lehnin.*

Tomforde, M. (2006). „Einmal muss man schon dabei gewesen sein…" – Auslandseinsätze als Initiation in die neue Bundeswehr. In U. von Hagen (Ed.), *Armee in der Demokratie* (pp. 101–122). VS Verlag für Sozialwissenschaften.

Tomforde, M. (2008). Zu viel verlangt? Interkulturelle Kompetenz während der Auslandseinsätze der Bundeswehr. In G. Kümmel (Ed.), *Streitkräfte im Einsatz: Zur Soziologie militärischer Interventionen* (pp. 69–86). Nomos.

Tomforde, M. (2009). „Bereit für drei Tassen Tee?". Die Rolle von Kultur für Auslandseinsätze der Bundeswehr. In S. Jaberg, H. Biehl, G. Mohrmann, & M. Tomforde (Eds.),

Auslandseinsätze der Bundeswehr – Sozialwissenschaftliche Analysen, Diagnosen und Perspektiven (pp. 71–92). Berlin: Duncker & Humboldt.

Tomforde, M. (2010). Neue Militärkulturen: Wie verändert sich die Bundeswehr durch die Auslandseinsätze. In M. Apelt (Ed.), *Forschungsthema Militär: Militärische Organisationen im Spannungsfeld von Krieg, Gesellschaft und soldatischen Subjekten* (pp. 193–219). Wiesbaden: Springer.

Tomforde, M. (2015). Einsatzkultur und die Deutung von Kultur beim Militär. In Salzborn & Zapf (Eds.), *Krieg und Frieden: Kulturelle Deutungsmuster* (pp. 109–136).

Tomforde, M. (2016). Mein neuer Stamm? Ein ethnologischer Blick auf die Bundeswehr. In A. Dörfler-Dierken & G. Kümmel (Eds.), *Schriftenreihe des Zentrums für Militärgeschichte und Sozialwissenschaften der Bundeswehr*: Band 16. Am Puls der Bundeswehr: Militärsoziologie in Deutschland zwischen Wissenschaft, Politik, Bundeswehr und Gesellschaft (pp. 235–256). Wiesbaden: Springer VS.

Trautvetter, K. (2011). Der Lufttransport im Einsatz. In H.-C. Beck & C. Singer (Eds.), *Entscheiden Führen Verantworten* (pp. 242–248). Berlin: Carola Hartmann Miles Verlag.

Ullrich, U. (2011). Interkulturelle Kompetenz in der Bundeswehr. In H.-C. Beck & C. Singer (Eds.), *Entscheiden Führen Verantworten.* Berlin: Carola Hartmann Miles Verlag.

Ullrich, U. (2012). Interkulturelle Kompetenz in der Bundeswehr – spart Blut und schont die Nerven. In G. Ebner (Ed.), *Interkulturalität als Instrumentarium für Einsatz und Führung* (89–102). Wien: Schriftenreihe der Landesverteidigungsakademie.

Ullrich, U. (2014). Interkulturelle Kompetenz in der Bundeswehr – Verständnis, Bedeutung und Perspektiven. In E. Vanderheiden & C.-H. Mayer (Eds.), *Handbuch Interkulturelle Öffnung: Grundlagen, Best Practice, Tools* (pp. 130–135). Vandenhoeck & Ruprecht.

Ullrich, U. (2016). (Inter-)kulturelle Kompetenz und Diversity Management – Beiträge zur Weiterentwicklung der Inneren Führung. In A. Bach & W. Sauer (Eds.), *Schützen, Retten, Kämpfen – Dienen für Deutschland* (pp. 199–206). Berlin: Carola Hartmann Miles-Verlag.

Warburg, J. (2010). Paradoxe Anforderungen an Soldaten im Kriegs(einsatz). In A. Dörfler-Dierken & G. Kümmel (Eds.), *Identität, Selbstverständnis, Berufsbild: Implikationen der neuen Einsatzrealität für die Bundeswehr* (pp. 57–76). Wiesbaden: VS Verlag für Sozialwissenschaften.

Weigt, J. (2014). Führungskultur und soldatisches Ethos der Bundeswehr im Einsatz. In T. Bohrmann, K.-H. Lather, & F. Lohmann (Eds.), *Handbuch Militärische Berufsethik* (pp. 243–262). Wiesbaden: Springer.

Weigt, J. (2016). Anforderungen an militärische Führungskräfte. In A. Bach & W. Sauer (Eds.), *Schützen, Retten, Kämpfen – Dienen für Deutschland* (pp. 152–164). Berlin: Carola Hartmann Miles-Verlag.

Wiesendahl, E. (2014). Kernkompetenzen von Soldaten der Einsatzarmee Bundeswehr. In T. Bohrmann, K.-H. Lather, & F. Lohmann (Eds.), *Handbuch Militärische Berufsethik* (65–91). Wiesbaden: Springer.

Wieting, J. (2010). Erfahrungen als Patrouillenführer im ersten Einsatzkontingent 2002. In S. Brinkmann & J. Hoppe (Eds.), *Generation Einsatz: Fallschirmjäger berichten ihre Erfahrungen aus Afghanistan* (pp. 32–46). Berlin: Hartmann Miles-Verlag.