



Practice Ecosystem of Knowledge Co-Creation

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This conceptual paper proposes the practice ecosystem framework, which helps to understand how knowledge co-creation practices are taking place in the emerging forms of organizations. This framework seeks to address these changes by focusing on the evolutionary ontology and epistemology involved in co-creation of knowledge. The paper starts with clarifying the philosophical foundation and the theoretical background of the framework, such as the human activity theory, the theory of practice, organizational knowledge creation theory, including the process model of the knowledge-based firm, and the ecosystem theory. The paper contributes to the new advancements in the theory of knowledge creation.

Keywords: practice ecosystem, ontology and epistemology of becoming, knowledge and knowing, knowledge co-creation

Introduction

My goal is to propose the practice ecosystem framework, which helps us understand knowledge co-creation practices taking place in the emerging forms of organizations. There is a need for this contribution as the proliferation of innovative tools in information and communication technology allows the creation of knowledge anywhere and at any time. The place, space, time, and social context of knowledge work has changed dramatically. Because of technological advances and the increased complexity and uncertainty in the business environment, there is now a need for better understanding of knowledge co-creation practices.

On the one hand, technology (e.g., digitalization, ICT and IT-tools, mobile applications, augmented reality, internet of things (IoT), artificial intelligence, robotics, cognitive computing, and so on) develops very quickly. It is hard for businesses to keep up with the new technologies. Technology has changed the place and time of knowledge work, and this requires changes in organization structures, as well. The business models and organization structures need to be updated. Organizations become more lean, agile, and dynamic, with fluid and blurred boundaries. These are positive changes because boundaries can be obstacles to the flow of knowledge and innovation. Huizenga (2015, p. 200) distinguishes five types of boundaries: inter-functional, inter-unit, hierarchical, geographical, and exterior. He

argues, 'The formation of lateral linkages is an instrument with which to develop new competencies' (p. 194). The new forms of organizations are self-generating networks, virtual organizations (Handy, 1995), online communities (Faraj, Krogh, Monteiro, & Lakhani, 2016), collaborative communities (Heckscher & Adler 2006), social learning systems (Wenger, 2000), learning organizations (Senge, 1990; Senge, Scharmer, Jaworski, & Flowers, 2005), communities of practice (Wenger & Snyder, 2000; Wenger 2005), and evolving and open business ecosystems (West & Wood 2013). Consequently, the ontological view of organizations is more one of becoming than one of being.

On the other hand, there is a need for moving from knowledge as an asset to a more process- and practice-oriented view. In this new business context, the focus from knowledge as a commodity or organizational resource should move toward a more community and social consensus, and constructivist view of knowledge. While in dualism knowledge is viewed as power and as an important asset for knowledge-based organizations, in duality knowledge is viewed as continuously socially constructed, co-created and embedded in work practices. The duality view assumes that organizations are living organisms and distributed knowledge systems (Tsoukas, 2006, p. 94–116). Tsoukas concludes that 'viewing the firm as a distributed knowledge system helps us refine our view of what organizations are and, consequently, of what management is about. Organizations are seen as being in constant flux, out of which the potential for the emergence of practices is never exhausted – human action is inherently creative' (p. 111). In the mind economy, collaborative social learning is the main process of knowledge co-creation and knowing.

Thus, epistemology has shifted from an objectivist perspective to a practice-based perspective on knowledge (i.e., from knowledge to knowing). Because of these ontological and epistemological changes, I argue that there is a need for a better understanding of co-creation of knowledge as practice. With the proposed practice ecosystem framework, I seek to address this need.

The paper has four parts, plus references. In the introduction, I state the goal of this theoretical paper and present the need for re-thinking the knowledge creation theory from the implementation perspective. In the theoretical background and concepts part, building on the above-indicated ontological and epistemological shifts, I examine the relevant theories and concepts in order to build the practice ecosystem framework. Then, I describe the proposed framework and its components, demonstrating its evolutionary character. Finally, in the conclusion, I highlight the novelty of the practice ecosystem framework, and summarize its contributions to the theory of knowledge creation.

Theoretical Background and Concepts

In this part of the paper, my goal is not to provide a comprehensive review of the related theories, rather to illustrate the changes in discourses. With this, I aim to demonstrate the need for the practice ecosystem framework and to establish the philosophical foundations of the proposed framework by illustrating the debates, discourses and changes in assumptions about both organizations and knowledge creation. First, evolution, both in theory and forms of organizations, is relevant because it demonstrates the need for an ontological shift from being to becoming. Second, I highlight the need for contributing to the knowledge creation theory. With this, I establish an argument regarding the changes in epistemology of knowledge toward evolutionary epistemology, toward becoming and duality. As a conclusion, I illustrate the philosophical assumptions of the proposed model in Figure 1. Then, I present the four theories that the proposed framework builds on, (i.e., the human activity theory, the theory of practice, the process model of the knowledge-based firm, and the theory of ecosystems).

Evolution of Views on Organizations

There is a change in assumptions on how organizations have been viewed over time. In his layered model, Scott (1998, p. 107) illustrates how these assumptions evolved from closed-rational systems, through closed-natural systems and open-rational systems, to open-natural systems. According to him, organizations were analyzed at three levels: (1) social-psychological (e.g., professional identities, values, sense making, meaning negotiation, and learning), (2) structural, and (3) ecological (e.g., interactions, practices, relationships, networks, and communities). This third level of analysis is relevant to this paper. Hannan and Freeman (1977) argue that 'the situation faced by the organization's analysts is more complex. Instead of three levels of analysis (i.e., individual, population, and community levels – added by the current author), he (Sic.) faces at least five: (1) members, (2) sub-units, (3) individual organizations, (4) populations of organizations, and (5) communities of (populations of) organizations' (p. 189).

Furthermore, in organizational studies there is a debate about the ontological status of organizations. Organizations could be viewed either objectively or subjectively, and both objectively and subjectively. Today in organizational studies, we can sense a substantial move toward a subjective ontology, and this is relevant to this paper. Based on a subjective ontology, an organization emerges through social interactions of people, and this is a jointly constructed reality. Contrary to positivism, constructivism assumes that an organization is a complex system, not a static, solid thing, not an objective or pre-given reality.

The constructivist, relational, interactionist view of organizations is

demonstrated by Chia (2003, p. 98–112), who argues that the term ‘organization’ means ‘world-making.’ He characterizes organizations as ‘the aggregative, unintended outcome of local efforts [...] as “islands” of a relatively stabilized order in a sea of chaos and flux [...] as temporary stabilized event clusters loosely held together by relational networks of meaning [...] as products of sense making.’ Chia’s view of organization is similar to that of Weick (1995), who sees organizations as ‘sense-making systems.’ Organizational sense making is relevant to this paper because of its dialectic, never-ending reconstruction of the experience, as well as its social and ongoing character being an integral part of the knowledge co-creation practices of people. Stacey argues that people construct an organization and, therefore, it can be viewed as ‘patterns of relating’ (2007, p. 265) of humans interacting with each other in constructing the organization. Similar to Stacey, an interaction view of organizations is represented by Fonseca (2002, p. 75–80) when he argues that “the organization” is temporarily “successful” patterns of interactions that participants accept as “good enough” to be continually repeated, so becoming organizational habits’ (2004, p. 77).

Networking and collaboration are essential practices of people in the new business models of organizations. Castells (2000, p. 151–152) believes that the new organizational forms in the information economy are based on networks: ‘Networks are the fundamental stuff of which new organizations are and will be made’ (2000, p. 168). Heckscher and Adler (2006, p. 11–105) present the firm as a collaborative community in the knowledge economy. According to them, communities take three forms (1) *Gemeinschaft*, (i.e. community in the shadow of hierarchy), (2) *Gesellschaft*, (i.e., community in the shadow of the market), and a (3) *Collaborative* form, where community itself is the dominant principle. The organization as a collaborative community is relevant to this paper. Collaborative community has three distinct characteristics: (1) its values are based on contribution, concern, honesty, and collegiality, (2) the organization as an organic division of labour coordinated by collaboration, and (3) identities that are interdependent, interactive, and have social character (2006, p. 16–17).

The community of practice concept is relevant to this paper (Wenger, 2000, 2005; Wenger & Snyder 2000): firstly, because of its view on organizations and, secondly, because of its theory of social learning. Wenger (2005, p. 241–262) distinguishes two views of an organization: the designed organization (i.e., institution, formal organization) and the constellation of practice (i.e., the living organization or informal organization). He argues that ‘the organization itself could be defined as the *interaction* of these two aspects’ (2005, p. 241, italics added). However, institutionalization (i.e., formal organization) cannot make anything happen, as ‘communi-

ties of practice are the locus of “real work” (2005, p. 243). Communities of practice can be understood as ‘*shared histories of learning*’ (2005, p. 86, italics original), or ‘*the social fabric of learning*’ (2005, p. 251, italics original). Communities of practice play a decisive role in the negotiation of meaning, learning, the preservation and creation of knowledge, and the spreading of information, and are the home for identities. Therefore, it is relevant to the proposed framework.

In brief, in organizational studies subjective ontology, human interactions, practices, collaborations, networks, collaborative communities, and communities of practice characterize the dominant discourses about the ontology of organizations. Organizations are in constant evolution and change, (i.e., they are in a state of becoming rather than in a state of being). Furthermore, in the knowledge, mind economy ‘where information is the raw material of work, it has never been necessary to have all the people in the same place at the same time’ (Handy, 1995). The new form of virtual organization is a reality in the 21st century. In these new forms of organizations, people practice co-creation of knowledge and meaning, and this way learn together. Next, I will highlight the need for contributing to the dynamic theory of organizational knowledge creation (Nonaka, 1994; Nonaka, Toyama, & Konno, 2000) and to the theoretical framework of the process model of the knowledge-based firm (Nonaka, Toyama, & Hirata, 2008, p. 18–52, p. 241–245).

Need for Contributions to the Knowledge Creation Theory

I seek to answer the question: *Why does the organizational knowledge creation theory need to be developed?* The theory of knowledge creation has evolved and become more specific through the period of 1994–2017. Jakubik (2011a) argues that ‘Nonaka’s knowledge creation theory and its assumptions have been criticised by several authors [...] and these criticisms of the theory underline the need for contributions’ (p. 17). Jakubik summarizes the main arguments in the literature against the knowledge creation theory, which is the main theory of knowledge management (KM), in seventeen points (Jakubik, 2011b, p. 377). From this paper’s point of view, the most relevant criticisms are:

- There are deep conceptual problems and lack of conceptual clarity in the knowledge creation theory (Gourlay, 2006).
- The knowledge creation theory neglects previous research and ignores organization studies literature on knowledge creation (Gourlay, 2006).
- It is not quite understood how knowledge is created in communities (Cook & Brown, 1999; Tsoukas, 2000; Zboralski, 2009; Sun, 2010).

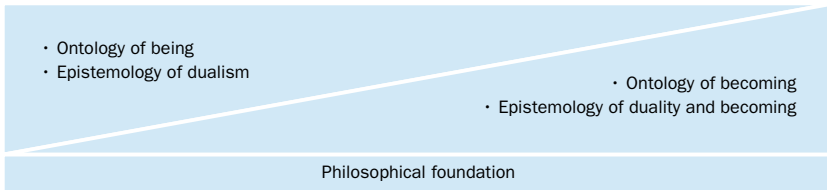


Figure 1 Shifts in Paradigm

- Ontological and epistemological issues of knowledge creation would need more attention (Nonaka et al., 2008).
- Discourses in KM are dominated by 'epistemology of possession' rather than 'epistemology of practice' (Schultze & Stabell, 2004; Sun, 2010).
- Discourses in KM are still characterized by a dichotomy rather than complementary views of knowledge (Heisig, 2009).
- Transformative change and becoming ontology are largely unexplored (Stacey, 2004; Senge et al., 2005; Gourlay, 2006).
- Better understanding and better models of social processes of knowledge creation are needed (Cook & Brown, 1999; Nonaka et al., 2008).
- There is a need for paradigm shift in KM research (Nonaka et al., 2008; Nonaka, 2010).

I seek to address some of the above issues in this paper by indicating the discourses in organization studies about organizations and knowledge creation, by establishing the ontological and epistemological foundations of the proposed framework (Figure 1), and by proposing the practice ecosystem framework for a better understanding of how knowledge is co-created in today's emerging forms of organizations.

Schultze and Stabell (2004, p. 556), drawing on the four paradigms of Burrell and Morgan (1979), described the four discourses (i.e., paradigms) of knowledge management research, (i.e. critical, functionalist, constructivist, and dialogic discourses). The framework proposed in this paper is based on epistemology of duality, evolutionary epistemology. I focus on the constructivist paradigm of knowledge creation because 'the constructivist discourse is concerned with practices of knowing and learning and the co-ordination of action in organizations' (Schultze & Stabell, 2004, p. 563). According to Schultze and Stabell (2004, p. 556), theories related to this paradigm are structuration theories, the theory of practice, sense making, and the actor network theory. In this paper, I draw on the theory of practice.

In brief, I establish the philosophical foundation of the proposed frame-

work by showing the shift in discourses about organizations and learning in organization studies and define the needs for contributions to the knowledge creation theory by shifting its current paradigm towards that of the epistemology of practice.

Theoretical Background of the Proposed Framework

In this part of the paper, I focus on the four theories (Figure 2) as essential building blocks of the proposed practice ecosystem framework, (i.e. on the human activity theory, the theory of practice, the organizational knowledge creation theory, including the process model of the knowledge-based firm, and the theory of ecosystems).

The human activity theory, according to Engeström (2005, p. 18), has 'its threefold historical origins in classical German philosophy (from Kant to Hegel), in the writings of Marx and Engels, and in the Soviet-Russian cultural-historical psychology of Vygotsky, Leontiev and Luria.' The human activity system presented by Engeström (1990, p. 79, 1994, p. 42, p. 80) has seven interrelated elements: (1) subject(s) (i.e., the individual or sub-group from whose point of view we analyze the activity), (2) tools (i.e., symbolic, physical, external, and internal tools, as well as instruments and signs), (3) rules (i.e., regulations, norms, and conventions), (4) community (i.e., groups and sub-groups that have the same problem space), (5) division of labor (i.e., horizontal division of tasks, vertical division of responsibilities), (6) object (i.e., problem space and raw materials at which the activity is directed), and (7) outcome (i.e., the results of the activity). These are also essential elements of the proposed practice ecosystem framework.

Next, I discuss the forms, main principles, definitions, and elements of the theory of practice. Practice has different forms and within them different human qualities (i.e., cognitive, affective, and physical) dominate. The

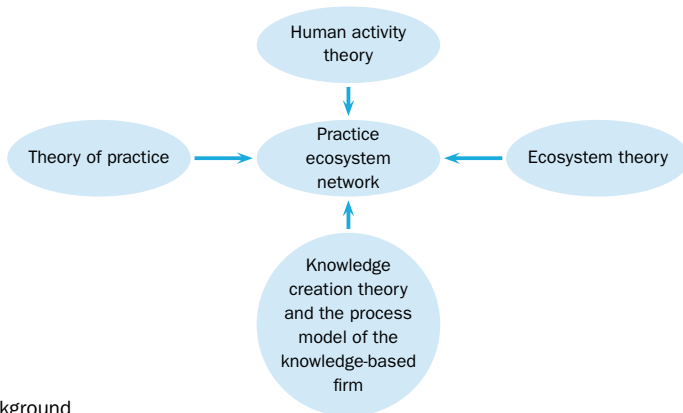


Figure 2
Theoretical Background

relationship of thinking and physical practices, (i.e., the role of mind and body in practice), is a topic discussed in the literature. De Certeau (1984) differentiates between tactical and strategic practice. The former refers to practices embedded into bodily routines (i.e., practices of body), and the latter is related to the mind, thinking, and sense making. In brief, in tactical practice the body dominates, while in strategic practice the mind does.

Similarly, Handy (1995) argues that the role of trust increases in the virtual dimension of organizations in the Three I Economy (i.e., information, ideas, and intelligence), where the economic growth 'would increasingly be more a matter for the mind than for the body.' Bordieu (1990, in Chia & MacKay, 2007) discusses the theory of practice, where he integrates human agency, subjectivism, and objectivism. Action is important because it integrates the body and mind in practice. 'A practice can be summarized to be an ontology that supports a practical view on the world, which is constituted through practices that are based on shared understanding, and remain dynamic' (Korkman, 2006, p. 23). After reviewing several definitions of practice, Korkman (2006, p. 20–23) argues that there are four principles of theory on practices: (1) practical, (2) contextual, (3) based on shared practical understanding, and (4) dynamic.

Knowledge co-creation is a social practice. I concur with Hislop (2009, p. 34), who defines six characteristics of knowledge from practice-based epistemology as follows: (1) knowledge is embedded in practice, (2) tacit and explicit knowledge are inseparable, (3) knowledge is embodied in people, (4) knowledge is socially constructed, (5) knowledge is culturally embedded, and (6) knowledge is contestable (i.e., open to dispute). He provides a definition of practice and connects this activity with knowledge creation:

Practice refers to purposeful human activity. It is based on the assumption that activity includes both physical and cognitive elements, and that these elements are inseparable. Knowledge use and development is therefore regarded as a fundamental aspect of activity Hislop (2009, p. 33).

Jarzabkowski, Balogun, and Seidl (2006, p. 5, 2007, p. 8–11) define praxis, practices, and practitioners as follows:

- *Praxis* is 'situated, socially accomplished flows of activity that strategically are consequential for the direction and survival of the group, organization or industry.'
- *Practices* are 'cognitive, behavioural, procedural, discursive, motivational and physical practices that are combined, coordinated and adapted to construct practice.'
- *Practitioners* are 'actors who shape the construction of practice through *who* they are, *how* they act and *what* resources they draw upon' (emphasis original).

Wenger (2005) builds his social theory of learning on four interconnected and mutually defining components: meaning, practice, community, and identity. He defines practice as ‘a way of talking about the shared historical and social resources, frameworks, and perspectives that can sustain mutual engagement in action’ (p. 5). Furthermore, he adds the following (p. 13, emphasis original):

Theories of *social practice* address the production and reproduction of specific ways of engaging with the world. They are concerned with everyday activity and real-life settings, but with an emphasis on the social systems of shared resources by which groups organize and coordinate their activities, mutual relationships, and interpretations of the world.

Concurring with Wenger’s theory of social learning, Tsoukas argues that ‘we learn to engage in practical activities through our participation in social practices’ (Tsoukas, 2003, p. 424, emphasis added). I assume that knowledge creation is a social practice. Therefore, these definitions of practice are important for the proposed framework because they highlight the main characteristics and elements of practice.

Korkman (2006, p. 27) identifies five elements of practice: (1) subject(s) (agent), (2) physical space (material context), (3) images (symbolic tools, beliefs, religion, values, and aesthetics), (4) tools and skills (know-how and concrete tools), and, (5) action that connects all of these elements. In this paper, I extend his view by adding more elements to practice such as time, ‘know-what’ or intention, motivation, and social context. Time includes history, present, and future (Wenger, 2005; Stacey, 2007) as an important element of practice. Knowing-what, having an intention, a goal, and an initial objective all help give direction to action and interaction, and in doing so energize the agent to act.

I would argue that practice means who (agent) is doing (action) what (know-what, objectives and goals), why (images, values, and beliefs), where (cultural, social, physical, virtual, and mental contexts), with what tools and skills (know-how), and when (history or the present). Practice is a dynamic, dialectic, and evolutionary concept. The duality of body and mind, practice and theory, object and subject is synthesized in becoming. Practice develops through time in a series of events as becoming-being-becoming and through a synthesis of bodily and mental actions and interactions, through participating and thinking in a specific place, time, and space.

Concurring with the above-mentioned definitions of practice, I argue that knowledge co-creation practices of people are very practical, and need certain skills, competencies, equipment, tools and good luck, or a necessary constellation of the specific contexts (i.e., social, material, and historic).

The ecosystem of these practices is social (i.e., groups of people, communities, and teams) and material (i.e., physical conditions of the context), historical, and cultural (i.e., languages, religions, values, and habits) at the same time. Knowledge co-creation practices are contextual regarding history and culture, because through them the skills, competences, and tacit knowledge (i.e., knowhow) have developed in the community through collaborations, actions, human interactions (i.e., discussions and dialogue), and retrospective sense making.

The outcomes of the practices are always uncertain and unknown because they depend on not only skills, equipment, tools, and resources applied in action, but also on the constellation of the context, environment (social and material context) and luck. Yet, one needs to be prepared (i.e., educated, skilled, experienced) in order to be able to take advantage of luck. In this sense, practice is dynamic. People, when collaborating, have a shared understanding of their practice because of their common purpose and goal. They agree on why to act in a certain way and they share common understanding on the ways of practices (i.e., there are rules and principles guiding their practices). Because of this, a common understanding of the rules and principles of practices developed through the history of their collaborative practices. During the co-creation of knowledge people as 'nomadic dwellers' develop their practices by talking with people, doing, exercising, sensing, and feeling, as well as through intuitions in a specific cultural, social and time-space context.

The other theory on what the proposed framework is building on is the process model of the knowledge-based firm by Nonaka, Toyama, and Hirata (2008, pp. 18–52, 241–245). 'The model consists of seven basic components: the SECI (i.e., Socialization, Externalization, Combination, and Internalization – added by the current author) process of *dialogue* and *practice*; *knowledge vision* and *driving objectives*, which both give direction and energy to the SECI process; *ba*, a space-time nexus needed for the SECI process to occur; *knowledge assets*, which are the inputs and outputs of the SECI process; and the *environment*, as an ecosystem of knowledge and multi-layered *ba*' (p. 27, *emphases original*). These components are important for the proposed framework.

Finally, the ecosystem theory is relevant to the proposed conceptual model. Tukiainen, Lindell, and Burström (2014) argue that 'in business ecosystems the research tradition and taxonomy is missing' (p. 6). They present the business ecosystem's definition, structures and conditions for ecosystem management and leadership (pp. 6–15). Tukiainen et al. (2014) illustrate the emerging four different definitions of ecosystems from the period of 1993 to 2012, from more generic to more specific, industry-related ecosystems. They conclude that there are multiple ecosystem definitions.

'However, all definitions share the elements of co-evolvement, interdependencies and networks' (p. 7). According to their definition (p. 8):

The ecosystem is described as: a set of companies (large and small) from different industries that want to work with each other because they have complementary economic, knowledge and/or capability interests, usually based on technological or business interdependencies. The firms are loosely or tightly coupled in order to co-create value, but largely independent of geographical location. Firms may sometimes compete and sometimes collaborate.

There are different types of ecosystems, e.g., product, the internet of things, ICT, digital, industrial, technology ecosystems, and so on. However, there is no practice ecosystem for knowledge co-creation, even though knowledge and knowing are the main contributors to value creation in the mind economy. Therefore, I argue that there is a need for the practice ecosystem framework of knowledge co-creation. This could be the novelty and contribution of the theoretical model proposed in this paper.

To conclude, I argue that knowledge co-creation practices happen in the practice ecosystem and that the proposed framework is an extension of the human activity system, filling a gap in the theory of business ecosystems. In the next part, building on the theories, and concepts emerging from the theoretical background discussion, I present the practice ecosystem framework (Figure 3), define its building components (Table 1), and illustrate its evolutionally character (Figure 4).

The 'Practice Ecosystem' Framework

In this part of the paper, I describe the proposed framework, its components and demonstrate its evolutionary character. The practice ecosystem framework (Figure 3) is built on four theories (Figure 2): (1) the human ac-

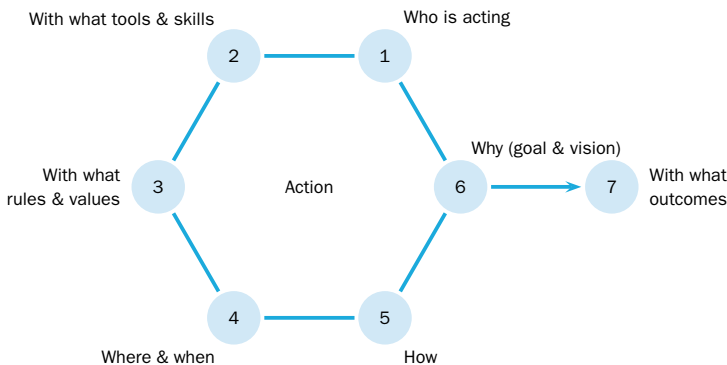


Figure 3 Practice Ecosystem of Knowledge Co-Creation

Table 1 Elements of the Practice Ecosystem Framework

Elements	Descriptions
Who is acting	Subject(s), agent(s) who performs the practice. The practitioners can be individuals or groups. Some examples of this are knowledge workers, managers, leaders, chief knowledge officer, chief digital officer, and chief information officer.
With what tools and skills	Tools are instruments, artefacts, symbolic, external and internal symbols, IT, ICT (e.g., communication tools, video conferencing, and Skype), physical ecosystems of practice, and existing and new-knowledge assets. Skills are the know-how of the practitioners.
With what rules and values	Rules are conditions for practices. Example: explicit or implicit rules, regulations, principles, norms, values, equality, appreciation, culture, conventions, ethics, way of dialogue, modes of actions, and interactions.
Where and when	This is the social context of practice. Example: community environment, formal and/or informal organization, online communities, groups, subgroups, teams customers, partners, suppliers, and persons who share the same problem space.
How	Division of labor – who is doing what, division of tasks and responsibilities, horizontal and vertical division of work, activities, and practices. However, these practices integrate physical, cognitive, and affective dimensions into a whole. These practices lead to social learning and knowing.
Why (goal and vision)	Goal and vision are the problem space at which the activity is directed, they are the driving objectives. Example: focus, development area, and the problem to explore, understand, and solve.
With what outcomes	Outcome(s) of the activity of the practitioner are the solution of a problem, and a realized vision. The outcome of the action could lead to changes, new organization, new knowledge, innovation, new problem, and new challenges that would need solutions. This is the drive for a new action and a new practice ecosystem based on the action. This way it enforces the evolutionary character of the framework.

tivity theory (Engeström, 1990, 1994, 2005); (2) the forms, principles and elements of the theory of practice (Bordieu, 1977; De Certeau, 1984; Korkman, 2006); (3) the organizational knowledge creation theory, including the theoretical framework of the process model of the knowledge-based firm (Nonaka, Toyama, & Hirata, 2008, pp. 18–52, 241–245); and (4) the theory of business ecosystems (Tukiainen, Lindell, & Burström, 2014). The framework emphasizes the evolutionary ontology and evolutionary epistemology of knowledge co-creation practices.

Table 1 describes the interrelated elements of the practice ecosystem framework. It is important to see these seven elements of the framework as interrelated elements that are connected by action. A series of actions will lead to practices.

Nonaka and Takeuchi (1995, p. 57) argue that the core of their organizational knowledge creation theory is the SECI knowledge conversion pro-

Time, place, space.
 Ontology and epistemology
 of becoming.
 Co-creation of knowledge
 and knowing.

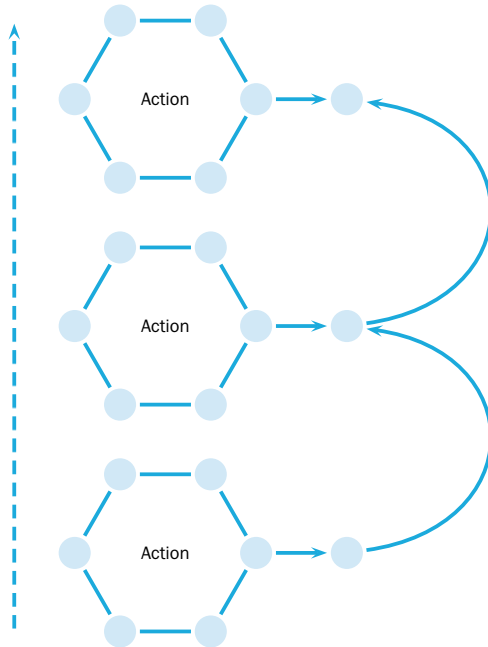


Figure 4
 Evolutionary Character
 of the Practice
 Ecosystem

cess. I would argue that knowledge creation happens not as a merging of tacit and explicit knowledge but as human practice of engaging, learning together, and sense making. This social interaction and action of people requires a practice ecosystem. This social practice denies the dichotomy of knowledge, and the dichotomy of the physical (body), the cognitive (mind), and the affective (emotional) practices. This social practice of knowledge creation also requires a shift in the knowledge creation paradigm toward the ontology and epistemology of becoming.

Next, I illustrate the evolutionary character of the framework in Figure 4. Knowledge co-creation practice is an ongoing, dynamic, and evolutionary process. When a new problem space, development area, or new vision emerges there will be a new practice ecosystem created around the actions of practitioners. A series of actions will lead to knowledge creation practice.

In this part of the paper, I presented the practice ecosystem framework, described its elements, and demonstrated its evolutionary character. Next, I will conclude and discuss the novelty, contributions, and limitations of the proposed framework.

Conclusion

The main goal of this conceptual paper was to propose the practice ecosystem framework, which helps us understand the knowledge co-creation prac-

tices taking place in the emerging forms of organizations. I presented the evolutionary views on organizations and the need for developing the knowledge creation theory. These led to evolutionary ontology and epistemology as the philosophical foundation of the proposed framework (Figure 1). Then, I overviewed the theoretical background (Figure 2) of the framework, and provided definitions of the main concepts. Finally, I described the practice ecosystem framework of knowledge co-creation (Figure 3), its seven elements (Table 1), and demonstrated its evolutionary character (Figure 4). Now, I will summarize the main contributions of this framework.

Firstly, how knowledge is co-created in diverse, emerging new forms of organizations would need more understanding. Focusing on the online community as space for knowledge flows, Faraj et al. (2016, p. 12) call for 'new ways of representing action, actors, artifacts, and outcomes.' I argue that the practice ecosystem framework contributes to a better understanding of knowledge development practices in the complex, interconnected and dynamic business environment.

Secondly, Schultze and Stabell (2004, pp. 568–569) propose three areas for future research: (1) capturing the double-edged nature of knowledge, (2) incorporating evolutionary epistemology into the development of knowledge, and (3) finding out how their four discourses are espoused by practitioners, and why. The practice ecosystem framework contributes to the second future research area, because it is based on the evolutionary philosophies of both ontology and epistemology (Figure 1) and the framework itself has an evolutionary character (Figure 4).

Thirdly, Nonaka and von Krogh (2009, pp. 644–646) realized the importance of social practice in knowledge creation. However, they still assume a tacit-explicit knowledge dichotomy. They admit that 'the relationship between organizational knowledge creation theory and the social practice view of organizational knowledge is underdeveloped. This is a challenge for organizational knowledge creation' (p. 646). However, they are quite skeptical, because they conclude that 'social practices may be necessary, but not sufficient, for understanding organizational knowledge creation' (p. 646). I argue that focusing on social practices and the practice ecosystem contributes to a better understanding of the evolution of knowledge. As future research, Nonaka and von Krogh (2009) see that 'there are major research opportunities in intersection between social practices and organizational knowledge creation' (p. 647). This paper is a small step in this journey and I think that exploring this relationship will lead us to a better understanding of knowledge co-creation practices.

Finally, this research paper contributes to constructivist discourses, to the practice view of knowledge, where knowledge emerges in social interactions. The proposed framework highlights the importance of the hu-

man practice and ecosystem concepts in co-creation of knowledge in a technology-driven business environment. The novelty value of this paper is that the 'practice ecosystem' has not yet been explored in the literature.

As with any research paper, this also has limitations. The proposed framework builds on theories. Therefore, empirical research would validate, demonstrate how the model works, justify its usefulness for businesses, and indicate its managerial implications. I fully concur with Weick (2016, p. 335), who writes that 'when we inquire, we engage in a variety of actions, such as conjecturing, complicating, and differentiating.' Building a theory is an 'interim struggle' and it is associated with words like 'guess, speculation, supposition, conjecture, proposition, hypothesis, conception, explanation, model' (p. 335). I feel that my 'interim struggles,' when aiming to build the practice ecosystem framework, contribute to a better understanding of knowledge co-creation practices, because 'organizational research gains value either when it makes empty concepts fuller by linking them with perceptions or makes blind perceptions more meaningful by linking them with concepts' (Weick, 2016, p. 337).

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