Open Innovation via Firm-Hosted User Communities:

A Community of Practice Perspective

ABSTRACT

In this paper, we address the need for newer approaches to understand and engage with the social complexity of open innovation occurring through user communities that are hosted by firms. Despite their growing prevalence, we know relatively little about the role of firm-hosted user communities as external sources of innovation. We draw on a community of practice perspective that is grounded in social practice theory to develop a multi-level, relational framework that enables a holistic examination of the social practices at play in firm-hosted user communities. By integrating the perspectives of the users and firm employees at the individual level, with the user community and the host firm at the collective level, this framework serves to extend the firm-centric approach dominant in extant open innovation research. The framework lays the ground for researchers to adopt a practice-based approach in studying the social and relational dynamics within and across firm-hosted user communities. We thus conceive a way to embrace and better understand the multidimensional, interactive, collaborative nature of open innovation in the context of firm-hosted user communities.

Keywords: Open innovation; User communities; Communities of practice; Social practice theory

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Introduction

Open innovation (OI) has become a significant way for organizations to leverage external resources and commercialization paths for innovation through collaboration and purposive knowledge exchange beyond organizational boundaries (Chesbrough, 2003; Chesbrough & Bogers, 2014; West *et al.*, 2014). More recently, organizations are uncovering new avenues for OI by engaging with communities of users as co-creators of innovation (Bogers *et al.*, 2010; Piller & West, 2014; Von Hippel, 2005). Often this happens via online platforms, where firms are hosting or sponsoring specific user communities. Given their growing prevelance, a much more robust understanding of the role of firm-hosted user communities in OI is needed (Fichter, 2009; West & Lakhani, 2008).

The majority of OI research has taken a firm-centric approach, directing attention to outside-in (inbound) mechanisms of inter-firm knowledge exchange that boost internal R&D and innovation outcomes. The focus of these studies is on dyadic relations between the firm and its innovation partner (Piller & West, 2014; Vanhaverbeke *et al.*, 2014). Yet, to develop a more comprehensive understanding of user community-based OI, it is necessary to also study the phenomenon from the perspective of the users and the community, and adopt a multi-level approach that ultimately integrates intra- and extra-organizational perspectives (Vanhaverbeke *et al.*, 2014; West & Lakhani, 2008; West *et al.*, 2014). There is a need for research to go beyond dyadic interactions to study the one-to-many relationships between firms and users, the many-to-many relationships between users within the community, and

how these relationships shape OI via firm-hosted user communities (Piller & West, 2014; West & Lakhani, 2008).

The multi-entity structure and social dynamics in firm-hosted user communities challenge traditional conceptions of OI processes, and call for a more holistic, relational approach to address this form of co-innovation (Chesbrough & Bogers, 2014; West & Bogers, 2013). Accordingly, our goal in this paper is to conceptualize 'OI via firm-hosted user communities' as a complex, social, relational practice. In doing so, we contribute to the OI literature by adopting a community of practice (CoP) perspective (Brown & Duguid, 1991; Lave & Wenger, 1991; Wenger, 1998) that is grounded in social practice theory (Gherardi, 2008; Gherardi & Strati, 2012) as the basis of examining the interplay of OI practices within and across firm-hosted user communities. We thus respond to OI scholars, who have called for the adoption of alternate theoretical lenses from outside the OI field (Bogers *et al.*, 2010; Vanhaverbeke & Cloodt, 2014; West *et al.*, 2014) and in particular, draw on sociological and organizational behaviour perspectives (West & Lakhani, 2008) to explore and better understand the role of user communities in OI.

We offer a practice-based relational framework that integrates the perspective of the users, community, host organization and its employees, thus extending the hitherto firm-centric view to studying OI (Randhawa *et al.*, 2014; West & Lakhani, 2008). By linking the individual (users and employees) and collective (community and host organization) entities, our framework combines the micro and meso levels of analysis to enable a comprehensive investigation of OI via firm-hosted user communities. The focus of this framework is the interactive, social, relational practices between these entities through which OI emerges. By connecting the firm's practices - the primary concern of the OI paradigm - with users' practices - the focus of the user innovation (UI) paradigm - our framework implicitly lays the foundation for integrating these two perspectives. We suggest how future empirical research

can apply our framework to engage with the multidimensional, relational aspects that constitute OI in firm-hosted user communities.

This paper is structured as follows. First, we provide a summary of the OI literature in the context of firm-hosted user communities. Then, we adopt a CoP lens and draw on social practice theory to conceptualize OI via firm-hosted user communities as a complex, social, relational practice. Next, we develop a relational framework that lays the foundation for a practice-based approach to study the multidimensional, collaborative aspects of the phenomenon. In conclusion, we discuss how the framework can guide future research in this area.

OI in firm-hosted user communities

OI is a distributed innovation process where firms open up their boundaries to purposefully exchange knowledge with external stakeholders, so as to integrate and exploit complementary resources and capture value (Chesbrough, 2003, 2006a; Chesbrough & Bogers, 2014). OI was originally implemented through dyadic collaboration between two firms, but today OI occurs increasingly when organizations tap into communities of users as external sources of innovation (Baldwin & von Hippel, 2011; Piller & West, 2014). Users can be business users or individual users. The focus here is on individual users who share ideas and knowledge with the host firm, and also other users in the community to innovate in ways that improve a firm's offering.

Organizations are hosting or sponsoring user communities, predominantly on online, web-based, social enterprise platforms as a deliberate means of enabling and managing user or community driven innovation (Jeppesen & Frederiksen, 2006; Wiertz & de Ruyter, 2007). Such firm-hosted communities can be involved across various stages of the OI process. Starbuck's 'MyStarbucksIdea' and Dell's 'IdeaStorm' are online community platforms for

ideation, while Lego's 'Mindstorm' is a co-design initiative providing users with a toolkit to design new solutions. Xerox's 'Open Xerox' and Nokia's 'Betalabsnokia' leverage users to test pre-commercialised products. Some organizations such as Threadless, an online T-shirt company, go a step beyond to base their business models around user community-based innovation and involve user communities across their entire value chain.

Despite being recognised as a distinct extra-organizational source of innovation, user communities have received only little research attention in the OI literature (Randhawa *et al.*, 2014; West & Lakhani, 2008). The limited research in this space is restricted to Open Source Software (OSS) communities (Dahlander & Wallin, 2006; von Hippel & von Krogh, 2003), with only some of these studies focusing on firm-sponsored OSS communities such as MySQL (e.g., West and O'Mahoney, 2008; Valimaki, 2003). Further, OSS communities fundamentally differ from other kinds of user communities both in structure and processes, making generalization of insights a challenge (West & Lakhani, 2008). This highlights that OI research should focus more on how firms can engage with user communities (Jeppesen & Frederiksen, 2006; West & Gallagher, 2006), and manage firm-hosted communities (Ebner *et al.*, 2009; Füller *et al.*, 2008).

There are two key characteristics of OI via firm-hosted user communities, which differentiate it from other inter-firm, outside-in forms of OI. One is a structural characteristic and the other relates to the processual aspects of how OI emerges through user communities. In regards to its structure, OI via firm-hosted user communities can be seen as a distributed system of multiple entities including the host firm and its employee members, the community and its individual user members. A comprehensive understanding of OI in this context requires a research framework that accounts for these multi-level structures and their mutual relationships. This is consistent with recent calls to complement the predominant firm-centric

view of OI in extant studies, with intra- and extra-organizational perspectives (Chesbrough & Bogers, 2014). The lack of research at the individual (Bogers *et al.*, 2010) and community (West & Lakhani, 2008) levels of analysis pose significant barriers to gaining holistic and unbiased insights on OI.

The processual characteristic of OI via firm-hosted user communities relates to the dynamic social relations between the entities involved. Collaboratively produced through iterative knowledge exchange between the host firm and its employees, community and its user members, OI in this context can be viewed as emerging from an interactive coupled model (Piller & West, 2014; West & Bogers, 2013). This model calls for focus on the reciprocal interactions and mutual relationships involved in the continuous co-creation of knowledge through this OI system (Chesbrough & Bogers, 2014). West and Lakhani (2008) also emphasise the need to examine social interactions and dynamics both within and across the community so as to advance research on community-based OI.

User innovation (UI) research, a complementary body of work, also centres on a distributed model of innovation. UI extensively discusses the role of users (e.g., Bogers *et al.*, 2010) and more recently user communities (von Hippel & von Krogh, 2003). However, integration of UI concepts into OI literature is a challenge, primarily due to incongruent precepts of the two paradigms (West *et al.*, 2014). While the UI literature tends to focus on users' personal utility and social value in a communal context, OI research is more concerned with the firms' appropriation of commercial value from innovation. As a result of their siloed foci, both UI and OI research have largely ignored the collaborative relationships and interactions between the host firm, users and the community (Piller *et al.*, 2014). Some scholars have recently alluded to the compatibility between these two research streams, especially in the context of OI via firm-hosted user communities where users contribute to innovations that are

commercialized by firms (Chesbrough & Bogers, 2014). This, however, requires a theoretical lens that can connect the pivotal points of OI (host firm) and UI (user and community), further reiterating the need for a multi-level framework with a focus on the social interactions and relational linkages between these entities.

Addressing these gaps, our aim is to conceptualize OI via firm-hosted user communities as a complex, multidimensional practice emerging through the social, relational dynamics at play within a distributed system where users within the community interact, and exchange knowledge and innovative ideas with not only the host organization and its members, but also with one another. We draw on CoP and social practice theory to comprehensively account for the practice of OI via firm-hosted user communities by encapsulating different levels (users and firm employees at the individual level, and user community and the host firm at the collective level). This forms the basis for developing a multi-dimensional framework that enables future studies to fully engage with the social complexity and multiple relational facets of OI via firm-hosted user communities. By linking the host firm with users and communities, our practice-based framework implicitly lays the foundation for the integration of the OI and UI research domains.

Toward a CoP-based conceptualization

Linking OI with knowledge and learning processes in firm-hosted user communities

A cornerstone in the OI concept is the purposeful inflows and outflows of knowledge across organizational boundaries. The continuous exchange of knowledge between the firm and entities that form part of the collaborative platform is a critical enabler for OI (Chesbrough & Bogers, 2014). OI occurrs through three processes of knowledge exchange: (i) outside-in or inbound, which involves the access and integration of knowledge from external sources; (ii) inside-out or outbound, which involves the outflow and commercialization of internally

developed knowledge; and (iii) coupled process, which combines inflows and outflows to result in a continuous co-creation of knowledge(Enkel *et al.*, 2009). The theoretical links between knowledge and OI are clearly established, particularly with reference to accessing and assimilating externally developed knowledge(Vanhaverbeke *et al.*, 2008), and the role of knowledge and learning capabilities in boosting OI outcomes (Huggins, 2010; Ordanini & Maglio, 2009).

Current OI research adopts traditional models of knowledge management viewing knowledge as a discrete, tangible resource that can be created and acquired through cognitive processes; and codified, stored and retrieved through for example IT databases and systems. Accordingly, research examining organizational learning for OI also view it as a formal, planned, mechanistic process of knowledge creation, retrieval and transfer between entities (Clausen, 2013; Lichtenthaler, 2007). Consistent with broader OI research, studies examining the role of knowledge, and the processes of leveraging internal and external knowledge (Aslesen & Freel, 2012; Lichtenthaler & Lichtenthaler, 2009) also take a firm-centric approach. The knowledge-based view (Kogut & Zander, 1996), absorptive capacity (Cohen & Levinthal, 1990), and the concepts of knowledge exploration and exploitation (March, 1991; Rivette & Kline, 2000) are key theoretical lenses used to explain the integration and exploitation of knowledge in the context of OI.

The original conceptions of OI are centred on collaboration between two partners and involve dyadic, one-to-one knowledge exchange relationships. Newer OI mechanisms such as firm-hosted user communities, however, involve one-to-many knowledge exchange relationships between the host firm and multiple users. Here, users collaborate and interact with not just the host firm but also with each other, resulting in many-to-many knowledge exchange relationships too. OI that is realized through firm-hosted user communities introduces much more complex dynamics to the creation and integration of knowledge. It follows an

interactive, collaborative process (Piller *et al.,* 2014; West and Bogers, 2014) where innovation is jointly created by the entities (Bogers *et al.* 2012). OI in this context is primarily driven by co-evolutionary learning routines arising out of mutual knowledge flows and reciprocal interactions amongst users in the community, and between the user community and members of the host organization.

Conventional conceptions of knowledge and learning appear inadequate for studying the complex, social, interactive nature of the coupled knowledge processes in community-based OI. The collaborative learning processes that both the members of the host organization and users within the community engage in are critical to the emergence of innovation. Hence, we suggest that the concept of social learning (Lave, 1988; Vygotsky, 1980), which posits that learning is fundamentally a social process, is well suited to explain how learning occurs, and drives OI through firm-hosted user communities. The notion of social learning is underpinned by practice theory that conceives learning as situated in social practice rather than in cognitive structures (Gherardi, 2001, 2009b). We now apply the social practice lens to knowledge, learning and OI in firm-hosted user communities.

A social practice view of knowledge, learning and OI in firm-hosted user communities

By viewing knowing and learning as socially situated, social practice theory acknowledges the complexity of knowledge sharing as a process that goes beyond mere acquisition and transfer of bodies of knowledge (Brown & Duguid, 1996; Lave, 1988). According to social practice theory, knowledge does not reside in people's heads or in databases, but is instead an activity that people 'do' together. From this perspective, knowledge and learning is seen as grounded in mundane, everyday practices, leading to the notions of knowing-in-practice and learning-in-practice (Gherardi, 2008; Gherardi & Nicolini, 2000). These works draw on earlier ideas on human knowledgebability that viewed knowledge as actively constructed in

practice (Bourdieu, 1977), intricately tied to routines of social life (Giddens, 1979) and situated action (Lave, 1988).

According to Gherardi (2009b), knowing/learning and practising, far from being distinct phenomena, are in fact tied by three kinds of relations, which are themselves intricately connected: *containment, mutual constitution* and *equivalence*. First, knowledge is seen as an activity that is *contained* in social practice. Second, knowledge and practice *mutually constitute* each other. Social knowledge and social action are reciprocal activities, that is, they interact and produce each other. Third, the *equivalence* between knowledge and practice means that practice is synonymous with knowing-in-practice, and knowledge is created in and through social practice. Hence, knowledge is not a static entity but a consequential activity that is dynamically and relationally produced when social actors engage in practice. Put differently, "knowing is an ongoing social accomplishment, constituted and reconstituted in everyday practice" (Orlikowski, 2002, p. 252).

We apply a practice-based approach in two ways. First, we adopt social practice as a philosophy or ontology in understanding knowledge, learning, and in turn OI in firm-hosted user communities. Accordingly, we conceive the phenomenon of OI via firm-hosted user communities to be fundamentally constituted of and produced by the social practices that the actors (individual users, user community, host organization and its employees) collaboratively engage in. Thus, social practice becomes the fundamental building block of the phenomenon under investigation (Feldman & Orlikowski, 2011; Orlikowski, 2002, 2010), with the reciprocal relations between the actors and their activities forming our primary focus.

We also use social practice as a theoretical lens. This aids our objective of understanding the "how" of the phenomenon, that is, how knowledge, learning and OI are embedded in the way

the social practices within and across user communities are produced and reproduced. Social practice theory has three theorizing principles: *situated action, rejection of dualism* and *mutual constitution* (Feldman & Orlikowski, 2011). We briefly discuss these principles and apply them in the context of OI via firm-hosted user communities.

Situated action means that the enactment of actions in a practical context is consequential to produce social reality. Thus, knowledge and learning underpinning OI are ongoing processes that are situated in practice (Gherardi & Nicolini, 2000; Nicolini *et al.*, 2003; Yanow, 2004). *Rejection of dualism* refers to the inherent duality that practice theory harbours, in turn, bridging dichotomies that exist in other theories (Schatzki *et al.*, 2001); including those between person versus world (subjectivism versus objectivism) (Bourdieu, 1977) and agency versus structure (actor versus context) (Giddens, 1979). In firm-hosted user communities, this implies the integration of the individual (users and firm employees) with the collective (user community and host firm), assuming blurred boundaries between these actors, their practices and the socio-material structures. Finally, *mutual constitution* stresses the mutual interconnectedness and recursive relationships between actors, actions and structures (Bradbury & Lichtenstein, 2000; Giddens, 1979). Firm-hosted user communities can thus be seen as "a field of embodied, materially interwoven practices centrally organized around shared practical understandings" of the users, community, host firm and its employees (Schatzki *et al*., 2001, p. 3). Knowing, learning and OI are constituted by the web of social practices and relational ties in which they are embedded.

Summarizing, relational thinking lies at the heart of practice theory and runs as a common thread across these three theorising principles. Relational thinking encapsulates two aspects that we argue are central to understanding OI via firm-hosted user communities. First, it explicitly acknowledges that a social phenomenon is constituted by *multiple* entities that are

mutually embedded in its socio-material context. In firm-hosted user communities, this serves to account for the distributed, multi-partner structure comprising of the host firm and its employee members, the community and its individual user members through which OI emerges (Vanhaverbeke *et al.,* 2014; West and Lakhani, 2008). Second, relational thinking opposes itself to a substantialist view that considers the attributes of such entities as being independent to the relationships that tie them (Østerlund & Carlile, 2005). In relational thinking, social entities develop their characteristics and derive their significance only in *relation* to other entities, rather than from the intrinsic features of entities that form part of the practice (Østerlund & Carlile, 2003), thus directing attention to the social processes, collective action and mutual relationships between the OI entities (Piller *et al*., 2014; Chesbrough & Bogers, 2014).

Underpinned by the notion of social practice theory, CoP has been conceived as a social space where knowledge, learning and innovation emerge in a community context (Brown & Duguid, 1991; Wenger, 1998; Lave & Wenger, 1991). The idea of knowledge and learning that underpins CoP is consistent with how it has been conceived in practice-based studies; that is, knowledge and learning are situated in a social structure (i.e. the community) and emerge out of the relational dynamics within and across these communities. Further, the concept of CoP also links learning with innovation because it explains how knowledge sharing processes and reciprocal interactions that are situated within a social context may lead to innovation. Therefore, we believe that the concept of CoP is particularly well suited to examining the social practices of OI via firm-hosted user communities.

Although researchers have indicated that the notion of CoP has its roots in social practice theory (Gherardi, 2008, 2009b; Brown & Duguid, 1991; Wenger, 1998), extant CoP studies have not yet explicitly grounded their research on a social practice framework, barring very

few exceptions (e.g., Brown & Duguid, 2001). However, we posit that CoP, which is essentially a conceptualization of social learning, fits squarely within the broader framework of social practice theory.

We now examine how well the concept of CoP aligns with the theoretical principles of practice theory, and then apply some its core ideas to conceptualise firm-hosted user communities as a CoP. Based on this, we aim to develop a CoP-based framework of OI via firm-hosted user communities that is firmly embedded in social practice theorization.

Aligning CoP with social practice theory

CoPs are emergent structures where the basis for knowledge, learning and innovation lies in the individual members' participation in the collective practices of the community. In CoPs, members pursue a common domain of interest by engaging in communal activities through mutual interactions and informal knowledge sharing, around which the community develops a shared repertoire of resources including routines, tools, artefacts and common ways of doing things. It is as a result of these activities that CoPs collective learning and innovation is produced (Brown & Duguid, 1991; Wenger & Snyder, 2000; Ystrom, 2010).

Seminal research on CoP is that of Lave and Wenger (1991) and Brown and Duguid (1991). Lave and Wenger (1991) focus on practices that reproduce existing knowledge to produce learning, while Brown and Duguid (1991) argue that the practices of a CoP also promote productive elements, improvisational activities and novel solutions required for learning to translate into innovation. Thus, they see work practices as an integral component that links learning and innovation in organizational settings. The concept of CoP offers a view "to bridge the gap between the organisation's static canonical view and the challenge of changing practice.' (p.50). It is the tension between canonical and non-canonical practices of the community that allows for change and innovation to occur. The central role of social practice

in CoP is implicit in these conceptualisations (e.g., Brown & Duguid, 1991; Wenger, 1998; Lave & Wenger, 1991).

Practice theorists have alluded to the clear linkage between the notions of social practice and CoP. For example, Gherardi et al. (1998, p. 279) posit that the notion of CoP reiterates the core thinking behind broader practice-based studies in stressing that any practice is embedded in social processes, and that learning takes place through the engagement in that practice. In fact, the concept of CoP has its intellectual roots in social practice theory (Gherardi, 2008). Yet, only a few CoP studies have explicitly used the precepts of practice theory to frame their research (e.g., Brown & Duguid, 2001). In order to render a robust theoretical foundation for a CoP-based conceptualisation of OI via firm-hosted user communities, we first draw an alignment between the notion of CoP and the theorizing principles of practice theory: *situated action, rejection of dualism*, and *mutual constitution*.

Situated action: Aligning with the principle of situated action, CoP studies regard knowledge, learning and innovation to be situated in social participation; in fact they are by-products of engagement in the various social practices of the community (Wenger, 1998; Lave & Wenger, 1991; Brown & Duguid, 1991). The unfolding of mundane activities and routine interactions within and across a CoP is an integral part of its functioning (Gergen, 1985; Gherardi & Nicolini, 2000).

Rejection of duality: CoP bridges the duality between person and world by stressing the interrelationship between members of the community and their broader social contexts "…over time and in relation to other tangential and overlapping communities of practice" (Lave and Wenger, 1991, p. 98). In CoPs, individual members actively engage in a shared practice. Focussing on organizational CoPs, Brown and Duguid (1991) indicate that learning and innovation "lies on the interface between an organisation and its environment." (p.51). In

keeping with Schatzki *et al*. (2001), we see CoPs as spaces where the individual and collective, as well as the actor and context meet.

Mutual constitution: CoPs are systems in which the knowing and doing are mutually constituted; therefore a change in practice involves changes in knowing and doing (Gherardi, 2000; Carlile, 2002; Nicolini *et al*., 1996). Lave and Wenger (1991) support this by arguing that "learning is not merely situated in practice….; learning is an integral part of generative social practice in the lived-in world" (p. 35). Members of a CoP engage in iterative social interactions and knowledge exchange, indicating reciprocal relationships and mutual embeddedness between actors, actions and their contexts.

Our analysis suggests that the concept of CoP is underpinned by the principles of practice theory. Based on the works of Brown and Duguid (1991); Lave and Wenger (1991) and Wenger (1998), we propose what we believe are the central aspects of CoP that inherently harbour social practice ontology: *distributed structure, collaborative relationships, collective practice, shared resource*s, and *social construction*. We now describe these aspects of a CoP individually, knowing that in reality they jointly constitute and reconstitute each other through their relational dynamics.

CoPs are made up of a complex web of members, activities and socio-material resources in a community context, acknowledging that the processes of knowledge, learning and innovation are embedded in a multi-entity, *distributed structure*. Members of a CoP are involved in *collaborative relationships* as they mutually engage in knowledge sharing and reciprocal interactions that result in complex social exchange both within and across the community. These recursive relations that tie actors, activities and structures arise out of the routine activities that the members perform jointly. Over time, this allows the CoP to develop a *collective practice*. Closely linked with the emergence of communal practices is the

development of *shared resources*, which include tangible artifacts such as tools, documents, and procedures, as well as tacit aspects like community-developed rituals and conventions. CoP members also engage in *social construction*, a process by which members negotiate meaning and world views through participation in communal activities, which help construct both individual identities and a shared understanding of the practice.

In essence, CoPs develop among individuals who mutually engage with each other and their socio-cultural context, to collaboratively create a joint practice around which they develop a common repertoire and socially constructed understandings. It is through this complex, relational process that knowledge exchange, learning and innovation emerges. Clearly, the CoP perspective has the ability to address the social and interactive aspects of knowledge exchange and innovation, something that conventional theories used in OI research have failed to achieve. We hence argue that the concept of CoP can be suitably applied in the context of OI via firm-hosted user communities. In the next section, and apply them to conceptualise firm-hosted user communities as a CoP.

Firm-hosted user communities as a CoP

Comprising of a group of users informally and contextually bound together by shared domain of interest and the pursuit of a joint enterprise, user communities meet the description of a CoP (Lave & Wenger, 1991; Brown & Duguid, 1991, Wenger, 1998). User communities are to a high degree emergent and self-forming, establish common ways of working through mutual engagement, and develop a shared repertoire of tools and artifacts, in a way that resembles CoP (Roberts, 2006; Swan *et al.*, 2002). The mutual relationships and knowledge sharing in such CoPs contribute to learning and innovation (Brown & Duguid, 1991; Wenger & Snyder, 2000; Ystrom, 2010). User communities serve as collaborative, open arenas where users from around the world come together voluntarily, participate in joint activities and

reciprocal relations, and share knowledge actively leading to the collective emergence of innovation (Füller *et al.*, 2008; von Hippel & von Krogh, 2003).

Such user communities are predominantly virtual with online technological platforms bringing together disparate and distributed users temporally and spatially. Research on Virtual CoPs (VCoPs) suggests they are organic, emergent structures constituted and reconstituted through interactions among community members, and between community and members of the larger institutional environment (Ardichvili *et al.*, 2003; Barab *et al.*, 2004; Henri & Pudelko, 2003; Hung & Nichani, 2002). VCoPs, like any CoP, are characterized by voluntary participation, shared domain, common identity, joint activity and active interaction, pointing to the applicability of the CoP concept in exploring the dynamics within online communities. There are many studies on the role of information technology as a medium for communal relations and knowledge sharing in VCoPs (e.g., Ardichvili, 2008; Preece, 2000). Von Wartburg *et al.* (2006) suggest that VCoPs are"… a more effective organizational form for knowledge creation than traditional and formal ways of structuring interaction" (p. 299).

While a CoP was originally conceived as a free-floating structure that enables emergent learning and change (Wenger, 1998), some CoPs such as firm-hosted user communities are in reality tools used by management to achieve organizational goals such as innovation. As a result, firms structure, manage and control these user communities through purposive measures. Acknowledging this, later CoP work has seen a shift towards "cultivating" CoPs (Wenger *et al.*, 2002), indicating the role of organizational action and rationalizing processes in appropriating CoP outcomes. Similarly, OI research also highlights the role of structured processes and frameworks in enhancing value capture (Chiaroni *et al.*, 2011; Dahlander & Piezunka, 2013). OI driven by firm-hosted user communities thus highlights the need for

balancing deliberate, planned organizational practices with the emergent practices within the user communities so as to enable learning and innovation.

A relational framework of OI via firm-hosted user communities

Grounding the CoP-based framework in social practice theory

By applying a CoP perspective that is based on the precepts of social practice, we develop a framework can serve as the foundation for studying the complex, social, relational practices involved in learning and OI via firm-hosted user communities. In keeping with social practice ontology, we see situated practice as the core aspect of the phenomenon under investigation (Feldman & Orlikowski, 2011; Orlikowski, 2010). As we note that the CoP concept aligns well with theorizing principles of social practice theory, we also adopt social practice as a theoretical lens. This is in sync with the view of Gherardi (2009a) who has indicated that the intellectual roots of CoP lie so clearly in practice theory that there is merit in reversing the terminology from CoP to the 'practice of community' (Gherardi, 2009a). In line with this, our framework enables a shift in focus from communities as a context for practices, to the actual enactment of practices and how people participate in communities as the key to learning and innovation.

Grounding CoP in social practice ontology and theory helps overcome key limitations of extant CoP conceptualisation, which view CoPs as mainly inward-looking structures (e.g., Lave & Wenger, 1991; Wenger, 1998), and in an organizational setting, as an *intra-organizational* structure (Brown & Duguid, 1991). However, firm-hosted user communities as we understand them here are clearly *extra-organizational* entities that are leveraged as external sources for innovation. Organizational permeability that aid collaborative interactions with extra-organizational entities such as user communities are core to the OI

paradigm, (Bogers & West, 2012; Chesbrough, 2006a, 2006b; Vanhaverbeke *et al.*, 2008), and are fundamental to examining the processes of learning and OI in a community context.

Brown and Duguid (1991) allude to the applicability of the CoP concept in understanding how organizations leverage external sources of innovation: "*Emergent* communities of the sort we have outlined that span the boundaries of an organisation would then seem a likely conduit of external and innovative views into an organisation" (p.54). Yet, CoP research has not yet accounted for the complex and distributed processes of community-based OI that rely on knowledge and innovation exchanges external to firm boundaries. To address this shortcoming, we use social practice theory that accounts for the inter-entity relationships between the user community and the host organization. Our aim is to render a robust theoretical basis to our CoP-based relational framework of OI via firm-hosted user communities.

Aspects of the relational framework

Our practice-based framework depicts firm-hosted user communities as a CoP where knowing and learning, and in turn, OI emerge from the social practices and relational dynamics between its constituent entities. In line with the relational thinking inherent in practice-based approach, we frame this CoP as a seamless and holistic social structure incorporating four closely interconnected entities – users and employees (at the *individual* or *micro* level) and user community and host firm (at the *collective* or *meso* level) – along with their interrelated practices mutually embedded in the community context (Figure 1).

Insert Figure 1 here

Our framework accounts for the following aspects of firm-hosted user communities as a CoP:

Multi-entity structure: The framework presents firm-hosted user communities as a distributed system of multiple entities - the host firm and its employee members, the community and its user members (Vanhaverbeke *et al.,* 2014a; West & Lakhani, 2008), along with the practices situated in their participation in the community (shown as overlapping circles in Figure 1). This is in alignment with a practice-based view which would depict a CoP not as a mere aggregation of its members (and their characteristics) but through the relations shaped by their practices. To aid more granular insights, we divide the CoP into different levels - user and employees at the individual or micro level, and community and host firm at the collective or meso level - allowing for analysis from these different perspectives. In keeping with the practice-based approach, we represent this multi-entity structure as a "texture of practice" (Gherardi, 2009b) and theorize dualisms as constituted mutually (Taylor, 1993) by linking the individual and the collective aspects of the CoP (micro and meso levels of analysis).

Relational processes: The framework draws attention to the mutual embeddedness and relational interdependencies between the actors, practices and their context, thus acknowledging the collaborative, social connections between them (Piller *et al*., 2014; West & Lakhani, 2008). We anticipate using the framework to analyse the mutual knowledge sharing practices and recursive interactions between the entities that constitute firm-hosted user communities (shown as multidirectional arrows in Figure 1) through which learning and OI emerge in the CoP. We take the view that one can understand actions only in *relation* to the practical contexts in which they are situated. Underpinned by relational thinking in practice theory, the framework looks not only at the recursive dynamics of a given relation but regards situated practice as the locus for the production and reproduction of relations.

Thus, we argue that our relational framework can form the basis to study OI via firm-hosted user communities as a multidimensional, relational practice. We now discuss how researchers can apply the framework to engage with the social complexity of the phenomenon.

Avenues for future research

We developed a relational framework to guide further research in OI via firm-hosted user communities from a CoP perspective. We see many opportunities for researchers to address a variety of questions using our practice-based framework. Future empirical research can focus on any of the five aspects of a CoP identified earlier: *distributed structure, collaborative relationships, collective practice, shared resource*s, and *social construction*.

Distributed structure: The framework can be used to examine aspects related to the distributed, multi-entity structure of firm-hosted user communities. A key research opportunity is to explore the phenomenon from both intra- and extra-organizational perspectives. Research can be conducted using this framework at any of four levels of analysis: user, community, firm employee and firm (West et al., 2006; West & Lakhani, 2008; Vanhaverbeke et al., 2014a). For example, at the individual employee level, research can examine the effect of employee attitudes on their engagement with user communities. At the collective level, research can look at how firms can develop an organizational culture that fosters user communities. Researchers can also engage in multi-level analysis using this framework, which opens another array of interesting opportunities for future research.

Collaborative relationships: Researchers can use our framework to study the interactive collaborative processes at play within the distributed system. The focus here is on the knowledge exchange, social interactions and mutual relationships between the entities involved. Our relational framework allows research to go beyond dyadic interactions between

firms to examine the one-to-many relationships between firms and participant users. For example, studies can explore how firms can most effectively collaborate with individual users and best incentivise user innovators to engage in firm-hosted communities. Many-to-many user interactions within the community can also be brought into focus. For example, how reciprocal interactions between users result in communal practices can be investigated.

Collective practice: The framework is useful to examine aspects related to the formation and impact of a joint practice in firm-hosted user communities. For example, studies can investigate to what extent firm-hosted communities display self-governing traits. Exploring the dynamics between competitive and collaborative behaviour in firm-hosted user communities is another interesting research opportunity. Research can also look at the tensions between canonical and non-canonical practices of the community, as well as the impact of communal practices on the organizational practices of OI. These entail an analysis of the recursive relations that tie the actors and their practices.

*Shared resource*s: Our framework can guide research on the development and usage of shared resources in firm-hosted user communities. These resources can include explicit, canonical artifacts such as tools, documents and procedures. For example, future studies can focus on the tools and infrastructure platforms that facilitate collaboration in firm-hosted user communities. Examining how a firm-hosted user community engages with the procedures, rules and conditions of engagement laid down by the host firm is also a potential area for future research. Besides, exploring tacit forms of shared resources is also possible through our framework. This can include an investigation of how communal norms, values and rituals emerge from relational interactions between users in a community, and with members of the host organization.

Social construction: Research can apply our framework to examine how individuals engage in social construction as part of the collective practice. The focus here is on the meaning-making processes of individual members. One possibility is to explore how users co-construct identities through their participation in firm-hosted user communities. Studying how employee identities shape their engagement in user communities is another potential area of research. Researchers can also examine how users develop shared understandings on the way of doing things within the community.

The practice-based relational framework connects the firm (employee) practices – the primary concern of the OI paradigm - with the user (community) practice – the key focus of the UI paradigm. This implies that future research responding to calls to integrate these two perspectives (Piller *et al.*, 2014; Chesbrough & Bogers, 2014) may find this framework useful. By focussing on the mutual embeddedness and relational interdependencies between user (community) and firm (employee), our framework sets the ground for bridging the gap between the hitherto incompatible precepts of these research domains, and allows for holistic, unbiased insights that account for both the user and firm perspectives.

Table 1 summarizes how our multi-level practice-based framework can form the basis for future research that seeks to engage with the complex, social, relational facets of OI via firm-hosted user communities. We present multiple research opportunities at each level of analysis. It is clear that a variety of research questions can be empirically investigated by using this framework to address diverse aspects of the practice. In doing a practice-based study, future researchers narrow down the inquiry to a more manageable sub-field and transform the existing subject matter into a practice-theoretical question (e.g., study how collective practice emerges from relational interactions among individual user). Such a practice-based study is underpinned by a social practice ontology and theoretical lens (Feldman & Orlikowski, 2011; Orlikowski, 2010). The focus here is on the theoretical

relationships between the actors and their practices viewed as distinct yet interconnected aspects of the phenomenon (Feldman & Orlikowski, 2011).

Insert Table 1 here

The first step in conducting such a practice-based research is to select a focal perspective: Individual (micro) or collective (meso) and then an appropriate level of analysis: user, community, employee or firm. Depending on the question being addressed, research can also include multi-level analysis. The core research question would determine the main empirical practice to be focussed on. Irrespective of the specific research question, in keeping with the principle of social practice theory, it is the actual enactment of practices and how actors participate within and across the CoP (and not just the CoP as a structural entity itself) that forms the core of inquiry (Brown & Duguid, 1991; Gherardi, 2009a; Roberts, 2006). The objective of analysis in a practice-based study hence is not to express deterministic associations between one aspect of the system and another (e.g., structure and agency), but to explain the system as an integrated whole by referring to the relations between them that unfold in practice.

In this manner, our consolidated practice-based approach forms an aid to empirically understand OI via firm-hosted user communities as a complex, social, relational practice by incorporating integrated levels of analysis, and the social practices and relational interplay between actors in the CoP.

Conclusion

Responding to the need for newer approaches in studying the multidimensional, relational aspects of OI via firm-hosted user communities, in this paper, we conceive a way of exploring this phenomenon from a sociological perspective. We adopt a CoP perspective that is grounded in social practice theory to develop a multi-level, relational framework that enables a comprehensive investigation of the social practices at play within firm-hosted user communities from multiple standpoints (individual users and employees, and collective community and host firm). By extending the firm-centric approach to research and enabling a holistic understanding of OI via user communities, we address a significant gap in extant OI research (Vanhaverbeke et al., 2014a; Chesbrough & Bogers, 2014). Our framework directs attention to the interactive, collaborative practices between the entities involved in this OI process, an area that has not yet received sufficient research focus (Chesbrough & Bogers, 2014; West & Lakhani, 2008; West & Bogers, 2014). By linking the host firm with users and communities, our practice-based framework implicitly lays the foundation for the integration of the OI and UI research domains (Piller *et al*., 2014). We suggest how future empirical research can apply our framework to engage with the social complexity of OI via firm-hosted user communities.

Figure 1 – OI via firm-hosted user communities: A practice-based relational framework
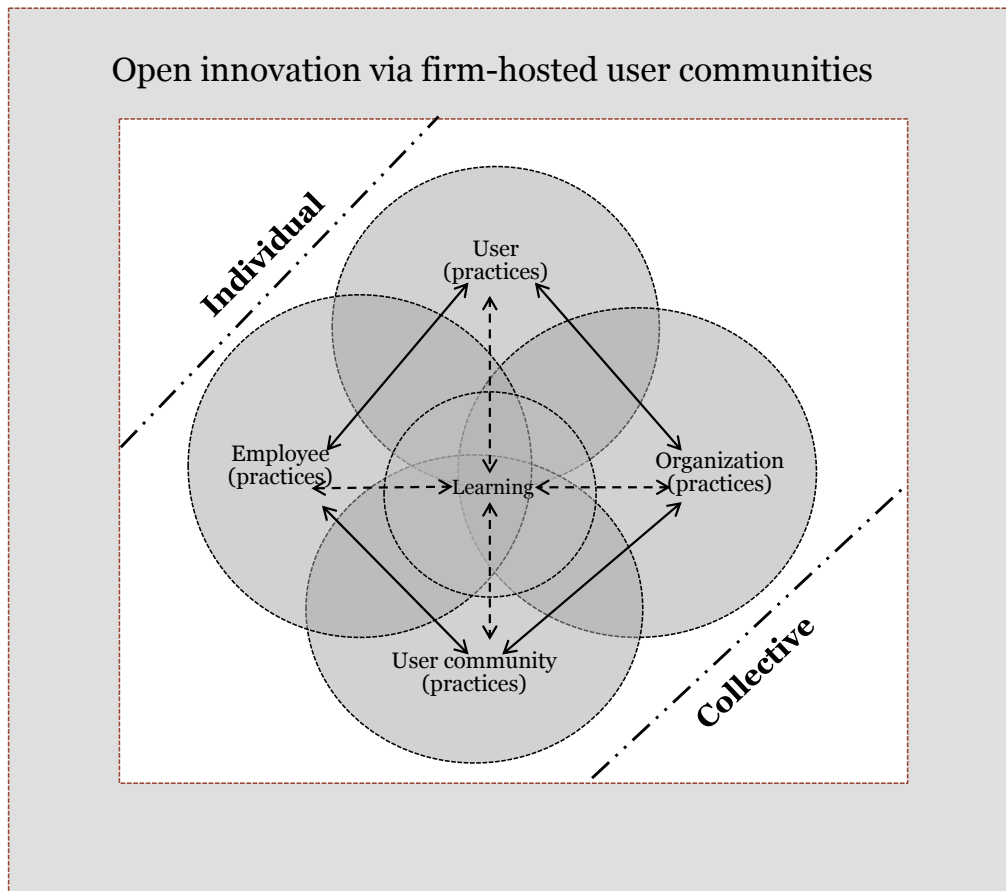

Open innovation via firm-hosted user communities

Individual

User
(practices)

Employee
(practices)

Learning

Organization
(practices)

User community
(practices)

Collective

Table 1 – Avenues for application of the practice-based relational framework for future empirical research

	Focal perspective	Levl of analysis	Core of the inquiry	Empirical practice under investigation	Potential research questions
1	Individual (Micro level)	User	Social practices and relational linkages between:	Identity construction	How do users co-construct individual identities through their engagement in the open innovation process?
			o User ←→ User	Social exchange	How do user interactions help develop shared understandings on the way of doing things within the community?
			o User ←→ Community	User motivation	What role do intrinsic and extrinsic motivators play in user engagement in firm-hosted user communities?
			o User ←→ Employee	Negotiation of meaning	How do users' meaning-making processes shape their participation behaviour while co-innovating with firms?
			o User ←→ Host firm		
		Employee	Social practices and relational linkages between:	Employee attitude	What impact does the attitude of innovation project team members have on their engagement with users in firm-hosted communities?
			o Employee ←→ Employee	Employee motivation	What motivates employees to collaborate and engage with users in firm-hosted communities?
			o Employee ←→ User	Leadership	What role do open innovation project leaders play in planning, directing and implementing collaborative initiatives with user communities?
			o Employee ←→ Community		
			o Employee ←→ Host firm		
2	Collective (Meso level)	User community	Social practices and relational linkages between:	Community culture	How do communal norms, values and rituals emerge from relational interactions between users in a community?
			o Community ←→ User	Communal dynamics	What are the dynamics between competitive and collaborative behaviour in firm-hosted user communities?
			o Community ←→ Employee	Impact of communal practices	How do collective practices developed by the community impact organizational practices of OI?
			o Community ←→ Host firm	Community tension	How do firm-hosted user communities relate to the procedures, rules and conditions of engagement laid down by the host firm?
				Communtiy self-governance	To what extent do firm-hosted communities display self-governing traits?
		Host firm	Social practices and relational linkages between:	Organizational culture	How can firms develop an organizational culture that fosters user community-based innovation?
			o Host firm ←→ User	Governance	What governance modes should firms adopt to manage firm-hosted user communities?
			o Host firm ←→ Community	User incentives	How can firms best incentivise user innovators in firm-hosted communities?
			o Host firm ←→ Employee	Strategy	How can firms achieve alignment between corporate strategy, OI strategy and the strategic objectives of its community innovation projects?
				Collaboration platforms	How can firms pick the right tools and infrastructure platforms that facilitate collaboration with user communities?

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