The Social Scaffolding of Online Communities

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Online communities have become cornerstones of how work gets done in the 21st century. While being considered as a way to access a global workforce and often praised for their resources and open collaboration, there is not much consensus on how knowledge-intensive online communities actually "work". In this paper, we develop a theory of the "social scaffolding" of online communities. We advance prior research by arguing that online communities can feature one of four possible combinations of high and low degrees of fluidity and stability. We then theorize about the influence of these combinations on three "shades" of reciprocity as core mechanisms in online communities. Finally, we discuss the implications of our research and present an agenda for future research in which we call for increased attention to theoretical approaches toward online communities. Organizations will be able to use our framework in order to develop a strategic fit with – and thus, more effectively utilize the potential of – online communities.

Keywords: Online communities; reciprocity; fluidity; stability; social networks.

INTRODUCTION

Online communities have become cornerstones of how work gets done in the 21st century. Many organizations connect to a variety of online communities (Autio, Dahlander, & Frederiksen, 2013; Ollier-Malaterre, Rothbard, & Berg, in press). Most commonly, social network sites such as Facebook or other customer-targeted communities are used by firms as a marketing platform (Nambisan, 2002). More recently, knowledge-intensive communities become increasingly important to organizations and other stakeholder, for example in open collaboration (Levine & Prietula, in press). Well-known examples of knowledge-intensive online communities are Dell Idea Storm (Bayus, 2013) or open source software platforms using the Linux Kernel (O'Mahony & Ferraro, 2007). Yet, there is no clear consensus about how online communities actually "work". In other words, which mechanisms drive online community participation and make online communities thrive? Some studies discuss the "front-end" of online community collaboration, where motivations of people to participate are discussed. These motivations are either intrinsic, for example fun (Lakhani & von Hippel, 2003) or need (Bateman, Gray, & Butler, 2011); or extrinsic, for example rewards (Kankanhalli, Tan, & Wei, 2005) or reputation enhancement (Sun, Fang, & Lim, 2012). Other research has investigated outcomes of online community collaboration, for example in the open source software domain (Haefliger, von Krogh, & Spaeth, 2008) or other industries such as children's products (Shah & Tripsas, 2007) or sports (Füller, Jawecki, & Muhlbacher, 2007).

However, there is still no consensus about the way in which these different streams of research are intertwined. Recently, Faraj and colleagues (2011) objectified this issue and "identif[ied] a paucity of theoretical development" (2011: 1225) with regards to dynamic collaboration within online communities. Advancing their work, we develop a theory of the

"social scaffolding" of online communities. We argue that online communities can be fluid *and* stable at the same time. To that end we follow Faraj and colleagues, who pointed toward a paradox that lies at the heart of online communities and theorized that "online communities are characterized by constant changing […] yet there is no discontinuity, leaving the community essentially the same" (2011: 1226). They compare these communities with Heraclitus' expression that it is not possible to step twice into the same river. The river is constantly changing, if only slightly, and yet keeps its shape and general appearance. Building on work that has recognized the fluidity/stability paradox in traditional organizations (Gioia, Schultz, & Corley, 2000; Leana & Barry, 2000) we propose that the same holds for online communities: they are constantly changing and yet remain the same. Adopting a social network lens, we develop novel propositions about how the social structure of online communities may lead to one of four possible combinations, or states, of fluidity/stability. In particular, we argue that the distribution of core and periphery of the network is important (i.e., its coreness, see Borgatti & Everett, 1999), as well as the connectedness between the core and the periphery.

Subsequently, we theorize about the influence of these states on three "shades" of reciprocity. Reciprocity has been widely discussed as a crucial social exchange mechanism in knowledge-intensive online communities (Chiu, Hsu, & Wang, 2006b; Faraj & Johnson, 2011; Preece & Maloney-Krichmar, 2005; Wasko & Faraj, 2005; Wiertz & de Ruyter, 2007). We propose to take a more fine-grained approach toward reciprocity and differentiate between *sharing*, *support* and *sociality.* More specifically, we develop propositions about the influence of the state that the online community assumes on the three shades of reciprocity. For example, we argue that a high fluidity/high stability state is conducive for all three shades of reciprocity, whereas a low fluidity/high stability state advances mainly sociality. By aligning both fluidity

and stability, we reconcile them as necessary building blocks of online communities. In terms of practical contributions, we provide organizations with a yardstick of how to assess the value of online communities. Only if businesses understand which mechanisms are at the very basis of online community collaboration, will they be able to engage with them to the best of their ability. As a consequence of this understanding, organizations will be able to more effectively tap into resources that online communities typically foster in abundance, such as relevant and timely information and knowledge, access to social networks, and a voluntary "workforce" of participants who enjoy to hand out advice.

A SHORT HISTORY OF (ONLINE) COMMUNITIES

Theoretical attention to the structure of (offline) communities in society (e.g., Simmel, 1958) emerged when a loss of social interaction in local communities was occurring through urbanization and migration (Driskell & Lyon, 2002). The emergence of *virtual* communities has frequently been viewed as part of a similar switch in social life: a desire for social interaction drives many to online community participation (Rheingold, 2000; Ridings & Gefen, 2004). In fact, there is a considerable body of literature that speculates on the differences and similarities between offline and online social interaction (Cullen & Sommer, 2011; Garton, Haythornthwaite, & Wellman, 2006; Vaast, 2007b; Wellman, Boase, & Chen, 2002; Wellman, Haase, Witte, & Hampton, 2001) and seeks to understand emerging processes (O'Mahony & Ferraro, 2007; Spaulding, 2010; Toral, Martínez-Torres, & Barrero, 2009). In this paper, we focus on social mechanisms in online communities, given their growing importance to present-day organizations.

Early research on online communities was mainly conducted by sociologists (Wellman, 1997; Wellman et al., 2002) and was soon inspired by network scholars. Scientific discussions initially conceptualized electronic environments as poor compared to face-to-face communication (Wellman et al., 1996), and Internet use was coupled with a sense of loss of community cohesion (McPherson, Smith-Lovin, & Brashears, 2006). There is still no consensus on the implications of communicating in electronic environments versus face-to-face. Some researchers argue that text-based communication allows for new forms of interaction; for instance, the use of smiley's (Derks, Bos, & von Grumbkow, 2008). Others argue that Internet communication is merely an extension of our offline self that results in "networked individualism" (Rainie & Wellman, 2012). Finally, some scholars point out that our "Facebooked" lives might also lead to loneliness, fear, and vulnerability (Turkle, 2011).

The archetype of online communities is the online discussion forum embodied by text-based communication between individuals (Rheingold, 2000). After an initial period where online communities mainly served as vehicles for social contact (Wellman et al., 2002) and collaboration between scholars (Briggs & Burke, 2009), companies soon started to recognize the potential of online communities. In particular, firms started to see value in online communities when they utilized them as marketing and innovation tools (Jeppesen & Lakhani, 2010; Jeppesen & Frederiksen, 2006; O'Mahony, 2007; Shah, 2006). Nowadays, online communities are inextricably intertwined with many companies, especially in the Western world that is increasingly dominated by the knowledge-intensive, creative industries (United Nations, 2008). The phenomenon of "online community" is thus varied in nature and it branches out over many different areas of life and markets.

ONLINE COMMUNITIES DEFINED

Online communities infiltrate virtually all facets of many peoples' lives: the personal friends' network on Facebook (Ellison, Steinfield, & Lampe, 2007), a professional profile on LinkedIn (Papacharissi, 2009), shared interests on a hobby community (Moser, Ganley, & Groenewegen, 2013), or personal opinions on Twitter (Marwick & boyd, 2011). Following this development, scholars have shown an ever-increasing interest in the study of online or virtual communities (see Figure 1). Various disciplines, such as organization science, management, strategy, communication, and computer science have adopted online communities as a research pet child that most recently presented many interesting, novel and often surprising studies.

Insert Figure 1 about here

Online communities typically emerge around a shared purpose or common interest of people and are characterized by explicit and/or implicit rules and norms, enabled by a network of computer systems (Preece, 2000). Online communities are based on the willingness of members to establish connections and stimulate knowledge flows between individuals and groups (Faraj & Johnson, 2011). Most importantly, their development enables new forms of organizing through which a variety of purposes such as innovation, enjoyment, or professional support may be served (Dahlander & Frederiksen, 2012). Communities flourish or flounder based on the degree to which both collective and individual needs are satisfied (Butler, 2001). In comparison to formal organizations where rules, formal hierarchy, mission statements, codes of conducts, and the like dominate (although informal organization does play a role, see also March & Simon, 1958), online communities rarely feature such regulations. Communities are based on informal

communication and typically lack formalized structures and mechanisms controlling the behavior within them. Informal rules and norms are nevertheless powerful and influential in the functioning of communities (Feldman, 1984). At the same time, online communities depend on individuals' motivations to participate (Hertel, Niedner, & Herrmann, 2003; Wasko & Faraj, 2005).

A wide variety of online communities has been described and analytically dissected in great detail. In general, scholars differentiate between member-initiated and organization-sponsored communities (Porter, 2004). Member-initiated communities might have a social or professional orientation, whereas organization-sponsored communities might be commercial, non-profit or government oriented (Porter, 2004). For example, Facebook started out as a member-initiated social community, which only over time evolved into a for-profit organization (e.g., Ellison et al., 2007; Krasnova, Spiekermann, Koroleva, & Hildebrand, 2010). Organization-sponsored communities with a commercial orientation are often coined electronic networks of practice and have received ample scholarly attention (Wasko, Faraj, & Teigland, 2004; Whelan, 2007). These networks (located inside the firm), brand or marketing communities (often merely used as marketing tools) abd occupational or knowledge-intensive online communities are becoming increasingly important for organizations and organizing (Autio et al., 2013; Di Gangi & Wasko, 2009; Groenewegen & Moser, 2014; Jeppesen & Frederiksen, 2006; Miller, Fabian, & Lin, 2009; Moser et al., 2013). In this paper, we focus on this type of online communities and develop a theory that fits their characteristics and mechanisms as discussed in the literature (see also section "Reciprocity and the Social Scaffolding of Online Communities").

THE PARADOX OF FLUIDITY AND STABILITY

Organizational research has long recognized the opposing forces of fluidity and stability. Fluidity, a state of flowing or changing, is most discussed in literature on organizational change (e.g., Beckert, 2010; Hoffman, 1999), whereas stability, or continuity, is a recurring theme in the identity literature (e.g., Albert, Ashforth, & Dutton, 2000; Gustafson & Reger, 1995). Some scholars have aimed to reconcile the paradox. For example, Leana and Barry (2000) argue that stability and change create tensions which are an integral part of organizational life and thus need to be considered simultaneously. More recently, Faraj and colleagues have argued that online communities are "fluid organizational objects that are simultaneously morphing and yet retaining a recognizable shape" (2011: 1225). They point toward a paradox that lies at the heart of online communities. On the one hand, online communities are constantly in flux. Most communities are open to new members, there are no explicit sanctions in case of withdrawal, and quite often it is not necessary to explicitly reveal one's identity.[1] On the other hand, online communities are often relatively stable over time. They indeed retain a certain shape, host social interaction that is often rooted in social norms, and can at times be a platform for severe sanctioning in case of non-conformance. Heraclitus' expression that it is not possible to step twice into the same river provides a good metaphor for this paradox. The river is constantly changing, if only slightly, and yet keeps its shape and general appearance. The same holds for online communities: they are constantly changing and yet remain the same. In other words, online communities are fluid yet stable, noncommittal yet engaging, oblivious yet unforgiving. Recent research has made progress toward elucidating this paradox. For example, Autio and colleagues (2013) showed that an online community of digital music production remained stable

[1] This is not to say that own actions might not reveal certain personality or identity traits through communication and social interaction. See for example Vaast (2007a; 2007b).

over time, despite its international orientation and constant influx of members from more than 35 countries. In this paper, we theorize about the underlying mechanisms that may cause the paradox and discuss the different states – combinations of fluidity and stability – that online communities can assume. We explain how the community's social network configuration determines in which state the community is situated.

Social Networks and Online Communities

Online communities have often been studied from a social networks perspective. The nature of online interaction and the traces it leaves provide scholars with unique opportunities to investigate social dynamics on a previously unimagined scale (Groenewegen & Moser, 2014). Increasingly, studies of social network topologies emerge, where the distribution and characteristics of whole networks are studied. For example, Faraj and Johnson (2011) investigated five large-scale online communities and depicted network change and growth. Similarly, Dahlander and Frederiksen (2012) showed that the positioning between a network's core and its periphery affects innovation within the online community. From such a topology perspective, social network research typically distinguishes between network structure and the networks connectedness. The former addresses the size of the network core in relation to its periphery. The latter examines the degree of connectedness or the strength of ties between different parts of the network. Thus, we can distinguish different parts of the network – core and periphery – as well as the way in which these parts are connected.

Conceptually, social network researchers distinguish between a densely connected core and a loosely connected periphery (Borgatti & Everett, 1999). In a core periphery structure, any relationship between two people is then "a function of the extent to which each is associated with

the core" (Borgatti & Everett, 1999: 389). The phenomenon of a core periphery distribution in social networks has recently spurred organizational research. For example, Cattani and Ferriani (2008) found that an intermediate position between core and periphery in a social network is conducive for creativity. In a study of the Italian motorcycle industry, Lipparini and colleagues (2013) found that interaction between core and peripheral firms enhanced the capacity to leverage knowledge. Another widely discussed phenomenon in organizational social network research is the strength of ties (Granovetter, 1973; Nelson, 1989; Perry-Smith, 2006). Here, it is argued that the strength of the connection or tie between two people influences certain outcomes (Borgatti & Foster, 2003). As yet, evidence as to whether weak or strong ties should prevail in organizations is not conclusive. For example, Levin and Cross (2004) showed that especially weak ties were important for receiving useful knowledge. Contrary, Jack (2005) found that especially strong ties were beneficial for business activities. Summarizing, it seems that both the network structure as well as the strength of ties in the network matter for organizational outcomes. In this paper, we argue that the social network configuration of an online community determines its state (e.g., combination of fluidity and stability). In particular, we propose that a community's *fluidity* depends on its core periphery structure, whereas a community's *stability* depends on its connectedness.

First, fluidity refers to a state of flux, which in our case is most prominent in terms of new participants joining an online community. Social network research poses that a network's core is characterized by a dense and cohesive structure (Borgatti & Everett, 1999), which means that participants interact frequently and are closely connected. Indeed, members of the network core are often "key members" (Cattani & Ferriani, 2008: 826) and deeply immersed in the social structure (Dahlander & Frederiksen, 2012). Depending on the community, it will take time and

effort to reach and maintain a core position. Conversely, people who are not (yet) part of the core stay (at least temporarily) at the periphery. Therefore, if an online community features a small core and a large periphery, we theorize that fluidity is high. If people are not able or willing to join the core, they will remain peripheral or leave. Others will take their positions, resulting in a constantly changing periphery structure. The lure of the core, i.e. the attraction of the possibility to join the core, ensures a continuous stream of new participants. At the same time, core members will protect their position and raise the requirements for others to join the core, and thus keep it small. Correspondingly, a large core and a small periphery result in low fluidity. It is likely that people will stay in the core for a relatively long time, as the core provides them with certain benefits. If a relatively large part of all participants is then in the core, it follows that a relatively smaller part of people is situated in the periphery. Hence, change in the periphery is smaller, as less people join and/or leave the community again. Also, the overall structural change (both in core and periphery) is smaller, because a larger part of people stays in the core for a longer time.

Second, we argue that a community's *stability* depends on its connectedness. In doing so, we build on social network theories that discuss tie strength. However, where most research analyses tie strength between individual actors, we propose that in large networks like online communities, it matters how a community's components – core and periphery – are connected. Indeed, Cattani and Ferriani (2008) argued that peoples' relative closeness to the core influences outcomes. This indicates that it is necessary to not only divide the network into core and periphery, but also to investigate the connection between the two components. The connectedness and subsequent interaction between core and periphery may vary and explain the degree of stability in an online community. If the core is strongly tied to the periphery, stability

will be high. Close and frequent interaction affords the socialization of new participants (cf. Wenger, 2000) and ensures the maintenance of group norms (Wang & Chen, 2012). Also, strong ties between people have been associated with trust and shared experiences (Cannella & McFadyen, 2013; Nonaka, 1994), which contribute to stable and sustainable social structures (Burke & Stets, 1999; Hosmer, 1995; McEvily, Perrone, & Zaheer, 2003). Conversely, if the core is weakly tied to the periphery, stability will be low. Given that the core has less opportunities to transfer prevailing norms and coordinate action (Cattani & Ferriani, 2008) and that trust and shared experiences are lower, the stability of the social structure as a whole will be lower, too. Resulting from the above reasoning, we suggest the following propositions:

Proposition 1: When the core of the network is small (respectively large) compared to the periphery, fluidity will be high (respectively low).

Proposition 2: When the core of the network is strongly (respectively weakly) tied to the periphery, stability will be high (respectively low).

RECIPROCITY AND THE SOCIAL SCAFFOLDING OF ONLINE COMMUNITIES

In this paper, we propose a conceptual model to reconcile the seemingly opposing forces of fluidity and stability that are important in online communities. We coin this model the "social scaffolding" of online communities, because fluidity and stability provide the scaffold, or framework, within which social interaction occurs. As we have argued before, fluidity is high (respectively low) when the core of the network is relatively small (respectively large) compared to the periphery. We also posited that stability is high (respectively low) when the core of the

network is strongly (respectively weakly) tied to the periphery. Although online communities are in constant flux (Faraj et al., 2011) and it is therefore difficult to categorize them into more or less static states, we believe that it is useful to theorize about the temporary equilibrium that online communities can sustain. Following Langley (1999), we apply a strategy of "conceptual" temporal bracketing to theorize about these states.

So far, we have discussed how social network structures may afford different states of fluidity and stability, resulting in four possible combinations of fluidity and stability (Table 1). In the following, we will further develop our theory of the "social scaffolding" of online communities and relate the fluidity/stability states to "shades" of reciprocity in online communities. Although other social mechanisms may be meaningful in that respect (e.g., homophily or preferential attachment), reciprocity is most crucial in knowledge-intensive online communities as it is the antecedent of sustained knowledge sharing (Chiu et al., 2006b; Faraj & Johnson, 2011; Preece & Maloney-Krichmar, 2005; Wasko & Faraj, 2005; Wiertz & de Ruyter, 2007). Based on social exchange theory (Blau, 1964), reciprocity entails that action may be reciprocated at some point in the future. In particular, Blau states that "reciprocity is an equilibrating force, the assumption being that every social action is balanced by some appropriate counteraction" (1964: 336). In network theory, reciprocity lies at the core of social interaction (Labianca & Brass, 2006; Nowak, 2006; Pearce & David, 1983; Rangan, 2000; Tichy, Tushman, & Fombrun, 1979; Wasserman & Faust, 1994). It is typically referred to as the expectation of some future return on one's action, indicating "exchanges that are mutual and perceived by the parties as fair" (Chiu et al., 2006b: 1877).

Insert Table 1 about here

In this paper, we discern three distinct shades of reciprocity. We use the term "shade" to indicate that we embrace reciprocity in its often reported broad meaning (that is, a mutual exchange with expectations of some future return). However, we argue that scholars will profit from a more nuanced view of this quite broadly conceptualized mechanism. We discern three shades of reciprocity: *sharing, support* and *sociality.* All three shades of reciprocity are concerned with a mutual exchange, albeit of a different order. In the case of *sharing*, we refer to the exchange of knowledge and information regarding a specific topic in the online community. An example is that of a software developer who posts new lines of code on an open source software community. Where *support* is concerned, we refer to any form of assistance, help or guidance that individuals exchange in the context of the community. For example, that same developer might seek and get advice on how to fix a bug in the code. Finally, *sociality* is about social interaction between individuals that is not concerned with either sharing or support, but nevertheless involves some form of mutual exchange. For example, a software developer might congratulate another developer for a particularly smart piece of new code. Although all our examples fit the broad definition of reciprocity, we point out slight but distinct differences between the three shades of reciprocity.

Table 2 presents an illustrative overview of research into knowledge-intensive online communities. This overview is by no means exhaustive but it reflects the main characteristics of research into this type of online communities. For each article, we indicate whether or not one of the shades of reciprocities has been mentioned in the article. This is not to say that all studies

have explicitly investigated (a form of) reciprocity; rather, in the article there are references made to the existence of one or more shades of reciprocity. For example, in O'Mahony's and Ferraro's (2007) study of an open source software community the central concept is governance. In their account, however, they allude to the occurrence of what we coined *sharing*. An instance of sharing is that "community members in over 40 countries contribute to the development of the Debian Linux distribution" (O'Mahony & Ferraro, 2007: 1083), indicating that community members share their knowledge. Another example is that of Ross' (2007) London cab drivers. The study explains how people use the online community as a sanctuary and alludes to the existence of the three shades of reciprocity. To give one example, Ross describes joking and teasing in one of the excerpts from the community, which we interpret as *sociality* (2007: 317).

Some studies explicitly discuss shades of reciprocity. For example, Franke and Shah (2003: 157) state that "fully developed innovations […] are freely shared within the community and that the likelihood of free-sharing decreases as the level of competition within the community increases", indicating reciprocity in the form of sharing. Support has been discussed by Shah (2006: 1006) who reports that community members "observe questions of others and (…) they find that they can provide others with assistance with very little effort. They report providing assistance due to reciprocity and/or a desire to cultivate more developers who might be able to assist them in the future". Finally, sociality has been alluded to by Füller and colleagues (2007: 64), who describe the online community as a family: "For the most enthusiastic members, the online community is like a virtual family." They go on to describe that "The communication among members is typically marked by mutual respect." Again, the literature overview is not meant to be exhaustive. Rather, we used it as a means to identify the three shades of reciprocity in online community research.Concluding, reciprocity is an important mechanism in online

communities and has been explicitly studied and implicitly alluded to in the literature. As yet, however, it remains unclear under which conditions which shades of reciprocity prosper. To that extent, we theorize about how the social scaffolding of online communities as outlined above might be conducive to different shades of reciprocity.

Insert Table 2 about here

High Fluidity, High Stability

In this first state, a small social network core is strongly connected to the periphery, leading to high fluidity and high stability. We argue that this state is conducive for all three shades of reciprocity and thus, sharing, support and sociality will prosper. First, sharing is facilitated due to a strong connection and frequent interaction between the core and the periphery. In knowledge-intensive online communities, most social interaction is concerned with what community members feel are relevant topics. Hence, a lot of activity will inescapably lead to higher degrees of knowledge and information sharing. Second, sociality is fostered because the core entertains group norms that are transferred to newcomers through frequent interaction. Third, support occurs during socialization of new members, which are more frequent in this state due to the large periphery. New members require assistance and guidance, which is readily granted by the actively socializing members of the core. An example of an online community in a high fluidity/high stability state is the online community of cake decorators (Moser et al., 2013). It has a small core of active participants who have a strong connection with the large periphery. Many new participants enter the community. High influx of new participants, at the same time, enforces strong social norms. From this argumentation, Proposition 3 follows:

Proposition 3: High fluidity and high stability are conducive for all three shades of reciprocity (sociality, support and sharing).

Low Fluidity, Low Stability

In this state, a large social network core is weakly tied to the periphery, leading to low fluidity and low stability. Corresponding to the prior argument, this state is harmful for reciprocity in online communities. First, sharing is harmed because of a weak connection and thus infrequent interaction between core and periphery. When interaction does not occur frequently enough, there is simply no opportunity to share relevant knowledge and information. Second, sociality also suffers in this state. A weak connection and infrequent interaction make it difficult to develop shared norms and rules, which are often considered as antecedent to pro-social behaviour. Finally, support will also be harmed in this state because of infrequent interaction between the large core and the periphery. An example of an online community in a low fluidity/low stability state is Yahoo's GeoCities. Founded in 1999, it recently closed because of lack of activity and participation (Milian, 2009). Proposition 4 is formulated as follows:

Proposition 4: Low fluidity and low stability are harmful for all three shades of reciprocity (sociality, support and sharing).

High Fluidity, Low Stability

In this state, a small social network core is weakly tied to the periphery, leading to high fluidity and low stability. Online communities in this state may feature high degrees of sharing and low degrees of sociality. First, this state is beneficial for the sharing shade of reciprocity. Although

there is a weak connection and infrequent interaction between core and periphery, the network's large periphery will be constantly changing. The many members of the periphery are bound to interact and thus exchange knowledge. As we have argued before, most interaction will address relevant topics in knowledge-intensive online communities; hence more interaction will lead to more sharing. It remains to be seen if the sharing that occurs in the periphery (rather than *between* core and periphery) is of similar quality. Second, sociality is harmed in this state. The small core may develop strong norms and rules, however because of infrequent interaction, these norms will not sufficiently be transferred to newcomers from the periphery. As such, sociality which is typically rooted in strong norms will be at a low. Finally, it remains undecided whether the anarchic state is conducive or harmful for support. Both scenarios are possible. In the first scenario support is advanced through because a small core in favour of support. Moreover, participants in the periphery also actively support each other. However, because core and periphery are weakly tied and thus in infrequent contact, the two might not act in tandem as no (or little) socialization occurs. Thus, the second scenario is that core and/or periphery are *not* advancing support, which over time leads to low degrees of overall support. An example of a community in a high fluidity/low stability state is Google+. This community grew exceptionally fast, thus featuring a large periphery. However, it ended up having participants "clash over what kind of behaviour they think should be allowed" (Charman-Anderson, 2011) due to infrequent interaction between core and periphery and insufficient transfer of social norms. From the above, we suggest the following Proposition 5:

Proposition 5: High fluidity and low stability are conducive for sharing and harmful for sociality.

Low Fluidity, High Stability

Finally, this state occurs when an online community has a large core that is strongly tied to the periphery. This state is beneficial for sociality, but harmful for sharing. First, sociality is advanced in this state as the large core develops strong social norms which are conducive for pro-social behavior. Many participants are positioned within the core; hence the strong norms shared within the core will subsequently guide social interaction. Although there is infrequent interaction with the periphery, the core is large enough to ensure the prevalence of these norms. Second, this state is harmful for sharing, because the large core interacts infrequently with the periphery and works to remain stable, thus rejecting change. Change, however, is needed to advance knowledge sharing, because the influx of new participants and knowledge triggers new ideas and the recombination of existing knowledge. Already shared knowledge may be circulated. However, at some point there is no need to share the same bits of knowledge again. The community may then embrace even more sociality.

It could also adopt support, which is the first of two possible support scenarios in this state. If support is advanced, the large core moves on to utilize the already shared and circulated knowledge in order to support each other in a more active way. The second scenario is that the core rejects support, and resorts to circulating existing knowledge in a very social environment. Antecedents for this second scenario could be that the strongly developed norms approve the more passive act of simply sharing knowledge, but shy away from the more active supporting others. Such support also entails giving and seeking advice, and it is possible that the norms have grown too strong to permit active support, or inhibit change in that direction. The infamous eGullet forum is an example for a community in a low fluidity/high stability state. eGullet is a platform for foodies and professionals in the culinary industries (see also Fauchart & von Hippel,

2008). The large core advises new members to carefully consider the important step of joining the community. They emphasize to take into account rules and regulations, and ask people to submit personal information (Egullet, 2012). This can potentially discourage people from joining the community. From the above argumentation, we formulate our final Proposition 6:

Proposition 6: Low fluidity and high stability are conducive for sociality and harmful for sharing.

DISCUSSION

In this paper, we have argued that there is no clear consensus about how online communities "work". We provide a theory of the "social scaffolding" in online communities, in other words the framework within which social interaction occurs. Advancing prior work (Faraj et al., 2011), we argue that online communities can assume one of four possible combinations of high and low degrees of fluidity and stability, what we coin "states". We draw on social network theory to explain differences between these states. Moreover, we link the four different states to different "shades" of reciprocity, a social mechanism that has been found to be crucial in accounts of online communities (Chiu, Hsu, & Wang, 2006a; Faraj & Johnson, 2011; Kankanhalli et al., 2005; Wasko & Faraj, 2000, 2005). These shades of reciprocity are sharing, sociality and support. The basic mechanism of reciprocity – a mutual exchange with expectations of some future return – holds for all three possibilities. However, each shade of reciprocity features a different emphasis. With our conceptual framework and propositions we aim to instigate further theorizing about online communities. Although an increasing number of scholarly articles address the phenomenon of online communities, in particular with regards to

knowledge sharing, few researchers have targeted the social underpinnings and dynamics that drive knowledge sharing. We believe that our work will inspire more theoretical approaches toward online community research and helps to bridge gaps that are still evident in this stream of research.

Our study makes a clear theoretical contribution by providing a framework that unravels social interaction, and in particular reciprocity, in online communities. We propose a model that accounts for differences between online communities, both in terms of their network structure and different utilization of reciprocity. Although we limit ourselves to a "conceptual" temporal bracketing (Langley, 1999), that is, we assume a static equilibrium, we believe that our theory will further our understanding of online communities. Only if we know how the social scaffold of online communities is built, will we be able to truly understand online communities. This holds also for the practical contributions of our research. We aim to provide possibilities to assess the value of online communities. Only if businesses understand which mechanisms are at the very basis of online community collaboration, will they be able to engage with them to the best of their ability. As a consequence of this understanding, organizations will be able to more effectively tap into resources that online communities typically foster in abundance, such as relevant and timely information and knowledge, access to social networks, and a voluntary "workforce" of participants who enjoy to hand out advice.

Future research should empirically test the soundness and validity of our theory. In particular, the antecedents and dynamics of the fluidity/stability paradox promise to yield rich insights. In the current research, we did not discuss the antecedents of the "states" that communities can assume, neither did we speculate about reasons why a small or large core should emerge, or why the core should be strongly or weakly tied to the periphery. However, for

a full understanding of online communities it is necessary to investigate the antecedents of their social scaffolding. Also, future research needs to address change in states, and the reasons for and consequences of that change. In our framework, a high fluidity/high stability state is desirable, because it is conducive for all three shades of reciprocity. It follows that stakeholders might be interested to arrive at such a state, regardless of the community's current state. We suggest that a life-cycle model might provide valuable directions for how online communities develop over time. For example, in the early stages an online community might assume a state of high fluidity and low stability, because it has only been around for a short time and could only develop a small core. But the community is new and attractive; therefore many new participants will join and enlarge the periphery. Therefore, over time, the community will probably assume another state. It might become high fluidity/high stability, meaning that it has a small core that is strongly tied to its periphery. Such a state would then be conducive for all three shades of reciprocity. The reasons for a possible change of state are yet to be discovered. To close, we hope that our research contributes to an enhanced understanding of online communities, and instigates further theoretical thinking and empirical work in that respect.

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FIGURE 1

Published Articles on "Virtual" and "Online Communities" Over Time

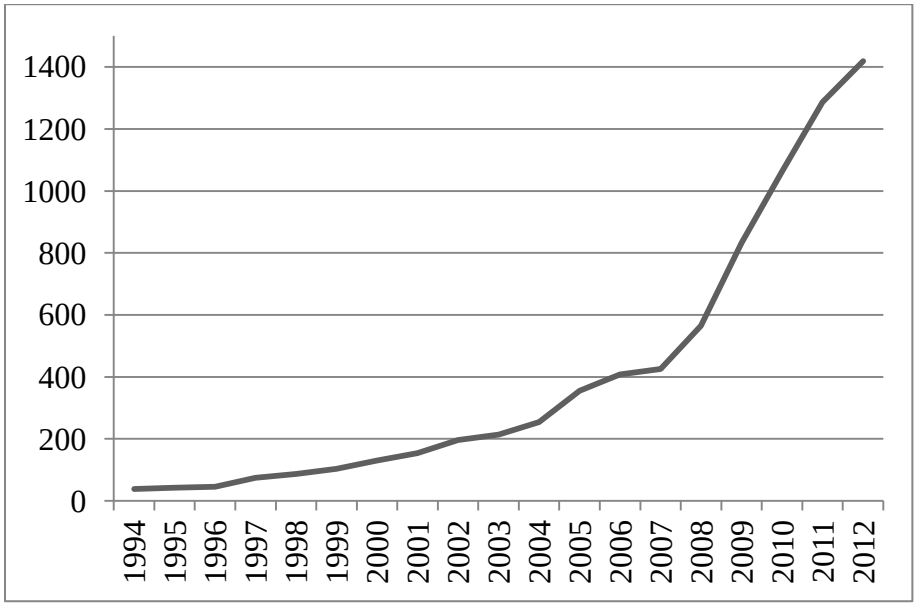

TABLE 1

Four possible combinations of fluidity and stability

Core/periphery	Connectedness
Small core (high fluidity)	Strongly tied (high stability)
Large core (low fluidity)	Weakly tied (low stability)
Small core (high fluidity)	Weakly tied (low stability)
Large core (low fluidity)	Strongly tied (high stability)

TABLE 2

Illustrative Overview of Research on Knowledge-Intensive Online Communities

Source	Occupation	Key Findings	Methodology	Sociality	Support	Sharing
Bagozzi & Dholakia (2006)	Developing new software code	This study found that cognitive, affective and social determinants of participation indeed have consequences on online activity. Furthermore, participants' experience level moderates the extent of the Linux User Group's influence and its impact on the user's participation.	Survey	●	●	●
Cova & Pace (2006)	Developing new forms of business; product innovation, e.g. cakes made out of Nutella	The online community thrives on personal self-exhibition in front of peers and uses rituals that are linked to the brand to effectuate this exhibition. The authors argue that this is a new form of "sociality", as it differs from previously reported peer-to-peer interaction.	Case study		●	●
Dholakia et al. (2004)	Depending on the community, e.g. Linux, MUD's, newsgroups, company-sponsored venues	This survey-based study finds that group norms and social identity determine online community participation. Furthermore, the type of community moderates this determination and the strength of impact on group norms and social identity.	Survey	●	●	
Fang & Neufeld (2009)	Developing new software code	This case study based research shows that situated learning and identity construction (adapted from Wenger's legitimate peripheral participation theory) were associated with sustained participation in an online community. Long-term participants were found to make both conceptual/advising and practical contributions.	Case study	●	●	●
Fauchart & von Hippel (2008)	New recipes	This mixed-methods study shows how chefs enforce social norms to protect their otherwise unprotected intellectual property (recipes).	Interviews, survey	●	●	●

TABLE 2

Continued

Source	Occupation	Key Findings	Methodology	Sociality	Support	Sharing
Fleming & Waguespack (2007)	Developing new software code	In this mixed-methods study, leaders in open innovation communities are found to make strong technical contributions. Human and social capital influences promotion to leadership, and leaders occupy either a brokerage or boundary-spanning position. Boundary-spanners are more likely to become leaders.	Mixed methods			●
Franke & von Hippel (2003)	Developing new software code	Heterogeneous need of users within the field of Apache security software users' is satisfied by innovating users' own modifications to software.	Survey			●
Füller et al. (2007)	Developing new innovative basketball shoes	Core online community members, mostly driven by excitement, are responsible for the development of joint innovations in the domain of basketball shoes.	Netnography	●	●	●
Goodsell & Williamson (2008)	Rehabbing and revitalizing a city	Integration of an offline and online community (coined a "hybrid" community) is achieved by six dynamics: information & explanations, hot topics, humor, exercising control, encouragement and connecting online & offline.	Virtual ethnography	●	●	●
Haefliger et al. (2008)	Developing new software code	This research finds that open source software developers re-use software code because they quickly want to integrate functionalities, write their preferred software code, and have limited resources.	Case study (interviews and content analysis)		●	●
Hall & Graham (2004)	Developing new code-breaking techniques	Online community participants often join these groups in order to discover information, but over time reciprocity becomes a more important driver of interaction.	Mixed methods (survey, content analysis, interviews)	●	●	●
Hemetsberger & Reinhardt (2006)	Developing new software code	Learning processes take place on the individual and social level, leading to concrete experience, reflective observation, abstract conceptualization, and active experimentation (individual level), and collective reflection, collective conceptualization, virtual experimentation, and participative practice (social level).	Case study		●	●

TABLE 2

Continued

Source	Occupation	Key Findings	Methodology	Sociality	Support	Sharing
Hertel et al. (2003)	Developing new software code	Individuals and teams are engaged in software development, because of identification, pragmatic motives and tolerance of time investment (individual level), and evaluation of team goals and self-efficacy (team level).	Survey			●
Lakhani & von Hippel (2003)	Developing solutions to problems with Apache software	The Apache systems (based on user-to-user assistance) functions, based on information input by users that return learning benefits to these same users.	Mixed methods (survey, pattern analysis)		●	●
Lee & Cole (2003)	Developing new software code	This study develops a model that focuses on the learning process of developing software code, and that this process is driven by criticism and error correction.	Case study	●	●	●
Morrison et al. (2000)	Developing and adapting library software	User innovators (with technical capabilities on the 'leading edge') have been found to modify software in order to fit their needs, which are of commercial interest to the manufacturers. Knowledge is freely shared among users.	Survey			●
Müller-Seitz & Reger (2009)	Develop a tangible product, a car, according to the principles of OSS	This study compares online communities outside of OSS with OSS characteristics and finds that some principles are unique to OSS.	Case study		●	●
O'Mahony (2003)	Developing new software code	OSS communities use legal and normative tactics to protect their products when the aim is to make these products publicly available.	Ethnography	●		
O'Mahony & Ferraro (2007)	Developing new software code	This study examines the governance system of an OSS community over time and finds that participants share a basis of formal authority (bureaucracy) which is limited with democratic mechanisms (democracy).	Mixed methods (ethnography, statistical analysis)			●
Piller et al. (2005)	Depending on the community	Online community participants engage in collaborative co-design in order to reduce mass confusion that can arise in large online environments.	Case study		●	

TABLE 2

Continued

Source	Occupation	Key Findings	Methodology	Sociality	Support	Sharing
Ross (2007)	Creating new routes through London, coming up with new tips, finding shortcuts	London cab drivers interact differently in backstage versus front-stage regions, allowing them to enact several interactions that might not be able in the front/backstage region.	Case study	●	●	●
Shah (2006)	Developing new software code	Online community participants join the community out of need and stay as a hobby. A core group of these hobby participants ensures sustainability of the community.	Case study	●	●	●
Shah & Tripsas (2007)	Designing and creating new juvenile products	User innovators become 'accidental' entrepreneurs. They typically engage in collective interaction while developing their product.	Survey	●	●	●
Van Oost et al. (2009)	Developing a local wireless network	This study develops a concept of community innovation that accounts for collective innovation that is user initiated.	Case study		●	●
von Krogh et al. (2003)	Developing new software code	This research distinguishes dimensions of "joining script", "specialization", "contribution barriers" and "feature gifts" among new participants in software developing communities in order to understand how these participants contribute software code.	Case study			●
Wasko & Faraj (2000)	Developing new software code	Knowledge is found to be considered as a public good. Knowledge exchange, then, happens out of community interest, generalized reciprocity and pro-social behavior.	Survey	●	●	●