The influence of social norms on community learning - a theoretical framework to understand learning processes in online innovation communities

Key words: online innovation communities; organizational learning; social norms

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Abstract

Recently, online innovation communities - responsible for a growing number of innovations - gain importance. The paper offers several theoretical propositions concerning the influence of socially enacted properties upon learning processes, and how this might enhance or hinder innovative activity. A literature review helps us to distinguish four socially enacted properties ˆ based on underlying social norms - that enable online innovation communities to organize themselves: support, sociality, structure, and sharing. In order to explain how these properties might promote innovation, we adapt and extend the 4I model of organizational learning to fit the online innovation community context.

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Introduction

In recent years, online communities are increasingly responsible for a growing number of innovations (Faulkner & Runde, 2009). Well-known examples of productive communities stem from the domain of open source software (e.g., Bonaccorsi & Rossi, 2003; Hertel, Niedner, & Herrmann, 2003; von Krogh, Spaeth, & Lakhani, 2003), by now a well-researched domain (von Krogh & von Hippel, 2006). However, innovative activities of online communities are not restricted to this high-tech domain (von Hippel, 2002; Von Hippel & Paradiso, 2008): in the literature, accounts are given of for example innovative basketball shoes (Füller, Jawecki, & Muhlbacher, 2007), library software (Morrison, Roberts, & von Hippel, 2000), recipes of French chefs (Fauchart & von Hippel, 2008), music instruments (Jeppesen & Frederiksen, 2006), juvenile products (Shah & Tripsas, 2007), rehabbing houses (Goodsell & Williamson, 2008), computer games (Huffaker, et al., 2009), mountain biking (Lüthje, Herstatt, & von Hippel, 2002), or cars (Müller-Seitz & Reger, 2009). Often, members of online innovation communities are user innovators: people that use certain products and/or services and improve these products and/or services themselves. Von Hippel (2006) states that indeed up to 40 % of innovations are developed by user innovators.

Aside from the productive ability of online innovation communities – that distinguishes them from other community types, such as social networking sites -, they are often characterized as self-organizing. They function without external governance and hierarchy (Kaiser & Müller-Seitz, 2008). Similarly, McLure Wasko & Faraj employ the term ‘electronic network of practice’, which is defined as ‘a self-organizing, open activity system focused on a shared practice that exists primarily through computer-mediated communication’ (2005: 37). Interaction is structured according to internal and implicit rules; it is based on trust rather than authority and control (Adler & Heckscher, 2006). This governance model is characterized by independence, autonomous participation and presentation, pluralism, and decentralization (O'Mahony, 2007). Accordingly, Wellman et al. define the term ‘community’ as ‘networks of interpersonal ties that provide sociability, support, information, a sense of belonging, and social identity’ (2002: 4).

Online innovation communities typically replace formal rules, procedures and routines by informal social norms. Social norms are defined as perceived appropriate action with normative content and recognition of shared perception. They form the basis of and inform interaction in these communities, and are especially important to fill the void that the absence of formal hierarchy (e.g., Lee & Cole, 2003)and face-to-face contact leaves (Kardorff, 2006).

The overarching concept of self-organization can be conceptualized according to a number of socially enacted properties, First, online innovation communities often feature an informal hierarchical *structure* (Ahuja & Carley, 1998). They do have leaders (Fleming & Waguespack, 2007), but these leaders emerge from among the community members instead of being installed by a decision maker from outside the community. Sometimes, this informality and bottom-up configuration (Langlois & Garzarelli, 2008) has been described as ‘horizontal innovation network’ (von Hippel, 2007). Second, members often assist and *support* each other (Baldwin, Hienerth, & von Hippel, 2006). This mechanism has often been observed in communities, and is related to the concept of collective invention (Allen, 1983). The help of others in the community, and subsequent improvement of products is valued and is frequently one of the motivations for individuals to become a part of the community (Hertel, et al., 2003; McLure Wasko

& Faraj, 2000). Online innovation communities are often more competitive in nature then offline communities (Haefliger, von Krogh, & Spaeth, 2008). Within the overall rationale of collaboration, members often compete with each other on dimensions like number of postings or quality of suggestions. Third, online innovation communities typically *disclose* knowledge and information to the wider public, in other words they 'freely reveal' their innovations (Baldwin, et al., 2006; Haefliger, et al., 2008; von Hippel, 2006). Knowledge is seen as a public good, that is shared out of a sense of obligation (McLure Wasko & Faraj, 2000). Anybody can access the information, without direct payment (von Hippel, 2002). The consequent wide diffusion of information and innovation processes is perceived as economical (Lüthje, et al., 2002; von Hippel, 2007). Finally, the community is a place for the establishment of *sociality*. Members often view the community as a sort of family, which plays an important role in their lives and motivates them to be a part of the community (Hertel, et al., 2003; McLure Wasko & Faraj, 2000). Taken together, these four socially enacted properties, which are based on underlying social norms, enable communities to organize themselves. It is this self-organizing ability that will be discussed in further detail in the remainder of the paper: how exactly does this self-organization work?

In order to answer the question of how online communities organize themselves, we employ organizational learning theory. We argue that self-organization – enabled through socially enacted properties – results in innovative output through the process of community learning. Underlying this reasoning is that any form of innovative activity and creativity comprises some form of learning (Crossan, Lane, & White, 1999; Woodman, Sawyer, & Griffin, 1993), and that social norms influence learning processes. We adapt and extend Crossan, Lane & White's (1999) 4I model of organizational learning in order to fit the purpose of explaining how online innovation communities organize themselves. The model enables us to explain how, through the processes of community learning, social norms structure online innovation communities, and how this learning might subsequently facilitate or hinder innovative output. Each of the four socially enacted properties will be considered in turn, and will be related to the learning process(es) inextricably linked with that property. A number of propositions will then be formulated, describing a theoretically presumed relationship between the property and the learning process in question.

The paper is structured as follows. First, the model of community learning will be introduced. Next, socially enacted properties of online innovation communities will be considered, addressing theoretical underpinnings and empirical evidence. These properties will be related to the six learning processes as indicated by the model, followed by a number of propositions. Finally, we will conclude with a conclusion and discussion of our findings, and point out directions for future research.

The model of community learning

In the case of online communities, it is particularly the community context that provides a common ground for ideas and innovations (von Hippel, 2002). Until now little attention has been given to learning in online communities, in contrast to organizational learning that has been a core issue now for over two decades of research and has been discussed by various scholars (e.g., Brown & Duguid, 1991; Fiol & Lyles, 1985; Huber, 1991; Lawrence, Mauws, & Dyck, 2005; March, 1991; Vera & Crossan, 2004). This lack of attention is rather striking given that learning is considered to be the core organizing mechanism of communities (Brown & Duguid, 2001; Gherardi, 2000; Wenger, 2000). In fact, communities are believed to be the vehicles for learning where

learning happens while working and innovating (Brown & Duguid, 1991) . Through day to day interactions, existing social expertise and insights are revised or strengthened and new knowledge is created. These learning processes usually happen as a matter of fact, embedded within daily operational practices. In online innovation communities, learning is even at the core of its raison d'etre as the explicit purpose of such communities is to share and develop knowledge. Given that online innovation communities have an ability to learn in a dispersed setting without any formal involvement, its learning capability is actually very remarkable, making it even more striking that we lack academic insight how these learning competences come about. So far, it has been implicitly assumed that norms such as sociality or mutual support contribute to the self-organizing ability of communities. If, how and why this is the case still needs to be unravelled. Moreover, learning happens at various – sometimes intervening – levels. It might well be that certain norms stimulates learning at the level of the (in) group, yet has negative consequences at the level of the organization or larger community. Unravelling the influence of social norms on community learning will help to understand how it is possible that online innovation communities are able to come up with innovations without a formal institutional context. In this paper, we try to start research in this direction by reviewing how existing insights on online innovation communities help to understand how learning comes about. The question that follows is: "How do the informal social norms that are often mentioned in the literature on user innovation communities affect learning?" In order to capture the dynamics of learning in online innovation communities, we build on this tradition and adapt Crossan et al.'s (1999) 4I model of organizational learning to the community context. The model of community learning is depicted in Figure 1. Learning takes place on the individual level, group and community level.

In the 4I model of organizational learning, Crossan et al. (1999) introduce four learning processes: intuiting, interpreting, integrating, and institutionalizing. The process of *intuiting* is about the preconscious recognition of patterns and possibilities, tapping into tacit knowledge of individuals. Individuals find ways to put their ideas into words. This formulation of words forms a crossover to the process of *interpreting.* Here, ideas are explained to oneself and others. Language develops and becomes crucial to explain intuition, and insights become sophisticated and concrete. Through language, shared meaning and understanding develops. The process of interpreting stands for the transformation of knowledge at the individual to knowledge at the group level. From here, this shared meaning is further *integrated* into the community through dialogue and joint action, which takes place in groups. Language becomes a means to preserve what has been learned, and makes former tacit knowledge explicit. Language is also applied by groups to differentiate themselves from other groups. By doing so they further develop a shared understanding. The process of integrating connects knowledge from the group level to the institutional level. Finally, knowledge is *institutionalized* through embedding it into the community. Subsequently, routinized actions can occur that are part of a stable system with structures and procedures. Knowledge that becomes institutionalized is agreed upon by influential members of the community.

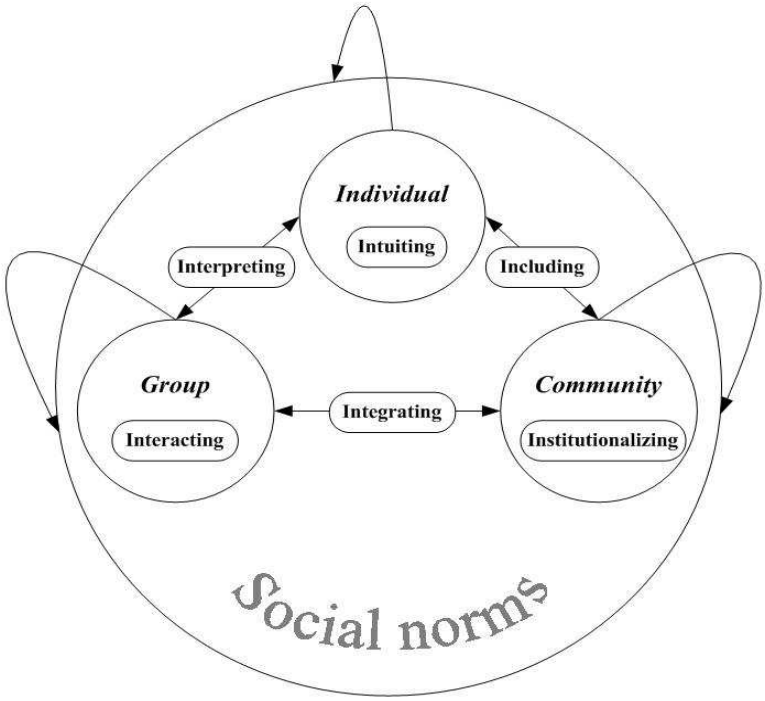

Figure 1: Model of community learning

Not only does the 4I model of organizational learning capture the feed forward process of learning, it also indicates a feedback loop. Knowledge from the community level is transferred back to the group and individual level, and is incorporated in a new cycle of community learning. However, the feedback loop is not described as meticulous as the feed forward process. In the model of community learning (Figure 1), we placed feedback arrows at the individual, group and community level. We suppose that these feedback mechanisms occur at every level of the learning process, and not only during the last part of the feed forward process, namely institutionalizing. In that manner we do justice to the possibility of mutual influence between the three levels. Furthermore, the feedback mechanisms feed into the general context of social norms. In this paper, learning is seen as a process that is inseparable from the context within which it evolves. It is situated within certain circumstances (Lave & Wenger, 1991), and cannot be detached from these circumstances.

Next to including double headed arrows in the 4I model of Crossan et al (1999), we extend the original 4I model by adding two processes: *interacting* (at the group level) and *including* (between the individual and community level). Whereas interpreting (between individual and group level) and integrating (between group and community level) address mechanisms that explain how knowledge is transferred from one level to the other as pointed out above, interacting explicitly illustrates mechanisms that take place within the group level. It is about the interaction within the group, thus exceeding individual's narrow grasp, but not yet arriving at the greater community level. Interacting concerns individuals that are engaged in the same (sub-)group, and that together further their sense of shared understanding within the group. Including links the community to the individual level. It concerns the way in which institutionalized knowledge reaches the individual, for example by means of rules, procedures and routines. Rules concerning membership might be part of this process. On the other hand, it explains how individuals include the community into their daily lives: by

consciously choosing for this particular community, they include the institutionalized rules, procedures and routines and make them part of their being.

Concluding, we assume that enacted social properties in online innovation communities influence the six learning processes as mentioned above. By theorizing about the direction and content of these influences, we might better understand how these communities are able to self-organize. In the next section, we will elaborate on the importance and characteristics of social norms that form the basis for socially enacted properties.

Social norms in online innovation communities

In the field of online innovation communities, several research directions have already been explored in the past. For example, a number of studies have been conducted into individual's motivation to contribute to communities and interact within community boundaries (e.g., Hertel, et al., 2003; Kang, Lee, Lee, & Choi, 2007; McLure Wasko & Faraj, 2005; Wiertz & de Ruyter, 2007). This research extends to the individual's role in the communities (Fleming & Waguespack, 2007). A second stream of research focuses on products and services that are developed (e.g., Baldwin, et al., 2006; Dahlander, Frederiksen, & Rullani, 2008; Füller, et al., 2007; Ross, 2007; Sonet & Brody, 2007). Lastly, the role of community attributes, conditions and capabilities are addressed (O'Mahony, 2003; von Hippel, 2001; von Krogh, et al., 2003).

However, the influence of social norms upon community mechanisms is still under-researched. Often, community properties are mentioned in passing, for example when Fauchart & von Hippel (2008) describe the enforcement of social norms in their account of an informal intellectual property system. Here, a community member who did not adhere to the informal rules of reciprocating knowledge was severely sanctioned by other community members. He 'stole' a recipe from another chef, without referring to this chef as the source of the recipe. Recipes are not protected by formal intellectual property laws, which is why the community of chefs installed their own, informal intellectual property system. It functioned so well that the perpetrator was compelled to offer excuses, and was subsequently portrayed as a plagiarist (Nguyen, 2006). Nevertheless, the socially enacted property itself is seldom the object of discussion, let alone its relation to other properties nor its relation to subsequent self-organizational capability. This is surprising, since informal social norms replace formal (social) norms in the case of online innovation communities, and are therefore responsible for the functioning and organization thereof. Socially enacted properties are the observable consequences of informal social norms. By synthesizing what we know from empirical accounts of online innovating communities, we offer insights into how the communities organize themselves through learning. In the next paragraph, we will discuss theoretical underpinnings regarding the role of social norms in communities. Further on, we will examine four socially enacted properties that we extracted from the literature: sociality, structure, support, and disclosure.

Social norms in online communities

Online innovation communities are often founded by hobbyists or users of certain products. Their main goal is to connect individuals with the same interests, and provide a platform for information, knowledge and social exchange. This differs from the goals of most traditional or formal organizations: these were often founded with the objective of making profit. This core difference is accompanied by a number of other differences

in the domain of social norms. Where traditional organizations frequently use formal rules, formal hierarchy, mission statements, codes of conducts and the like (March & Simon, 1958), online innovation communities hardly ever employ such regulations. They function in spite of a lack of formal hierarchy, formal rules – and the associated sanctions – and other formalized mechanisms. However, despite this seemingly accidental functioning, these communities do employ rules and norms, albeit informal and implicit ones that appear to be powerful and influential in the functioning of the community (Feldman, 1984).

In this paper, a social norm is defined as existing 'when a person perceives that a feeling, thought or action is appropriate, optimal, or correct (or inappropriate, suboptimal, or incorrect) for one or more persons in particular circumstances. (...) Most norms are shared norms by virtue of the process that links the development of normative content to the recognition that it is a shared perception.' (Friedkin, 2001: 169). For example, Ahuja & Carley (1998) found that virtual organizations are non-hierarchical and decentralized when considering the surface community structure. However, analysis of communication patterns revealed a certain degree of hierarchy and centralization. Thus, social interaction in the form of communication reveals an underlying hierarchy. This interaction and the resulting underlying hierarchy is perceived as correct and appropriate by community members, and is therefore based upon a social norm. It is the underlying social norms – the agreement about the way things are done in this particular community – that leads to the enactment of a certain hierarchical structure. In the following, four socially enacted properties – sociality, structure, support, and disclosure - are described that we have found to be typical for online innovation communities. These properties are based upon underlying social norms, which are enacted and agreed upon by community members. Table 1 summarizes the findings from the literature.

Reference	*Sort of community*	*Innovative/collaborative activity*	*Sociality*	*Structure*	*Support*	*Sharing*
Bagozzi & Dholakia (2006)	Linux user groups	Developing new software code	●	●	●	●
Cova & Pace (2006)	myNutella community in Italy	Developing new forms of business; product innovation, e.g. cakes made out of Nutella		●	●	●
Curtis (1997)	Community of MUD-users	Developing new objects (such as rooms, exits, things), and implementing facilities such as one for holding food fights, or a trainable frisbee.	●	●		
Dholakia et al. (2004)	264 different communities, including e.g. Linux, MUD's, newsgroups, company-sponsored venues	Depending on the community	●		●	
Ebner et al. (2009)	Community about software SAP	New solution and features for software	●	●	●	
Fang & Neufeld (2009)	OSS community phpMyAdmin	Developing new software code	●	●	●	●
Fauchart & von Hippel (2008)	eGullet community, a website for chefs and other serious 'foodies'; French chefs	New recipes	●		●	●
Fleming & Waguespack (2007)	Internet Engineering Task Force (IETF), open-technology community that develops standards for the Internet	Developing new software code		●		●
Franke & Shah (2003)	Four different communities, one online community (Canyoning)	Develop and promote a new sport	●		●	●
Franke & von Hippel (2003)	Apache software usenet forum and newsgroup	Developing new software code				●
Füller et al. (2007)	Online consumer communities for basketball shoes	Developing new innovative basketball shoes	●	●	●	●

Reference	*Sort of community*	*Innovative/collaborative activity*	*Sociality*	*Structure*	*Support*	*Sharing*
Goodsell & Williamson (2008)	Community based on rehabbing houses in a decaying inner city	Rehabbing and revitalizing a city	●	●	●	●
Haefliger et al. (2008)	six OSS communities	Developing new software code			●	●
Hall & Graham (2004)	Yahoo e-group about code-breaking ('CipherChallenge')	Developing new code-breaking techniques	●	●	●	●
Hemetsberger & Reinhardt (2006)	OSS community of KDE developers	Developing new software code		●	●	●
Hertel et al. (2003)	OSS community (Linux Kernel)	Developing new software code		●		●
Huffaker et al. (2009)	game players	Finding new ways to solve quests and kill monsters	●	●	●	●
Jeppesen & Frederiksen (2006)	Firm-controlled community about computer-controlled music instruments	Creating and improving computer-controlled music instruments		.	●	●
Lakhani & von Hippel (2003)	Apache field support system	Developing solutions to problems with Apache software			●	●
Kaiser & Müller-Seitz (2008	corporate blogoshpere (Microsoft)	Developing new software code	●	●	●	●
Lee & Cole (2003)	OSS community (Linux Kernel)	Developing new software code	●	●	●	●
Morrison et al. (2000)	manufacturer-sponsored library software group	Developing and adapting library software				●
Müller-Seitz & Reger (2009)	Online community to build a car	Develop a tangible product, a car, according to the principles of OSS			●	●
O'Mahony (2003)	Six OSS projects	Developing new software code	●			

Reference	*Sort of community*	*Innovative/collaborative activity*	*Sociality*	*Structure*	*Support*	*Sharing*
O'Mahony & Ferraro (2007)	OSS community	Developing new software code		●	●	●
Piller et al. (2005)	six online communities (LEGO, Adidas, fashion community, mobile phone games community	Depending on the community			●	
Reid (1995)	MUD	Creating new objects or descriptions of objects				
Reid (1999)	four MUD's	Developing new programming and system tools	●	●	●	●
Roberts et al. (2006)	Three OSS projects of Apache Software foundation (ASF)	Developing new software code		●		●
Ross (2007)	Online community of London cab drivers	Creating new routes through London, coming up with new tips, finding shortcuts	●		●	●
Shah (2006)	One OSS project, one gated source project	Developing new software code	●		●	●
Shah & Tripsas (2007)	Juvenile products industry communities	Designing and creating new juvenile products	●	●	●	●
Van Oost et al. (2009)	Local wireless network infrastructure	Developing a local wireless network		●	●	●
von Hippel (2007)	Apache server software	Developing new software code			●	●
von Krogh et al. (2003)	OSS community	Developing new software code		●		●
Waguespack & Fleming (2008)	Internet Engineering Task Force (IETF), open-technology community that develops standards for the Internet	Developing new software code and Internet standards		●		●

Reference	*Sort of community*	*Innovative/collaborative activity*	*Sociality*	*Structure*	*Support*	*Sharing*
Wasko & Faraj (2000)	three technical Usenet newsgroups	Developing new software code	●		●	●
Wasko & Faraj (2005)	electronic network of practice of a national legal professional association in the US	Contributing knowledge and finding problem solutions to professional problems	●	●	●	
Wiertz & de Ruyter (2007)	Firm-hosted commercial online communities	solutions to technical problems about computer hard- and software	●	●	●	●

Table 1: Socially enacted norms in accounts of online user innovation communities

Sociality

It seems that individuals often feel 'at home' in a particular community. Indeed, they sometimes spend a considerable amount of time with the community (Reid, 1995). This need to belong to a community forming around a certain topic that is important to the individual is a well-discussed phenomenon. At the beginning of the 20th century, Georg Simmel already elaborated on that subject: 'With progressive development each individual establishes a bond with personalities, who (...) through a factual similarity of assets, aptitudes and so forth have a relation with him.' (1958: 605, own translation). The technical advancements of recent years accelerated the development of online communities. Nowadays, more people than ever are connected to the Internet and therefore able to become part of a community of their own choice. Sociality originates in the perceived and shared feeling that pro-social behaviour is appropriate in community interaction.

The social side of online innovation communities is often referred to in the literature (Dholakia, Bagozzi, & Klein Pearo, 2004; Fang & Neufeld, 2009; Ross, 2007). Ebner et al. (2009) indeed state that members of online communities interact socially, while adhering certain policies and sharing a common goal. McLure Wasko & Faraj (2000) discovered that two of the foremost reasons to participate in community activities are 'out of community interest' and 'pro-social behaviour': they enjoy learning and sharing together. McLure Wasko & Faraj (2005) found that members who enjoy helping others proved to be better advisors. Reid (1999) reports that community members spent almost 60% of their online time socializing. Social topics, such as jokes, and discussing personal feelings, are part of this community aspect (Wiertz & de Ruyter, 2007). This cognition of pro-social behaviour can be enacted in many different ways. Next to the pure enjoyment of collaborative activity and knowledge sharing (Curtis, 1997; Füller, et al., 2007; Kaiser & Müller-Seitz, 2008) sociality is sometimes expressed as a strong sense of what is the 'right thing to do' in the community. For example, Fauchart & von Hippel (2008) describe the strong sense of acknowledging other community members intellectual property. A similar property was observed in a community of software developers, who are obliged to cite other's work when extending or borrowing it (Lee & Cole, 2003). Sociality within communities often supports creativity. The community serves as an 'audience for each other's creativity' (Reid, 1999), that sometimes even takes exceptional forms, as in the open source community where haikus are posted on the website (Shah, 2006). Baym (1997) describes the community she studied as humorous, insightful, and considerate; a community that sustains relationships. Sociality often has a certain idealistic taste to it (Bagozzi & Dholakia, 2006; N. Franke & Shah, 2003; Goodsell & Williamson, 2008; Shah & Tripsas, 2007): 'This is simply what one does. How can the world improve, unless we improve it?' (McLure Wasko & Faraj, 2005: 171, quote of respondent).

Whenever social norms are violated, it is possible that sanctions occur. Reid (1999) describes that rule-breaking is punished and that vengeful attacks are possible. Community good is often protected by members: whenever it is threatened by anti-social or norm-violating behaviour, sanctions are imposed (Fauchart & von Hippel, 2008; O'Mahony, 2003). Within some communities, sociality is seen as a downside of community membership (Hall & Graham, 2004). Huffaker et al. (2009) report that the most efficient community members (in terms of performance) spend less time chatting with others. Some members feel that others should be more rational and less emotionally involved: '…I finally got sick and tired of XXX's insults to others and his

inability to respond rationally in arguments' (McLure Wasko & Faraj, 2000, quote of respondent).

As the learning process of *intuiting* is concerned with individual's recognition of ideas, it seems that this recognition is positively influenced by a pro-social environment: people tend to participate in communities that make them feel safe and welcome. Consequently, we formulate the first proposition:

> *Proposition 1a: A high degree of sociality positively affects the learning process of intuiting by offering a safe and caring environment.*

Apart from the safe environment that a high degree of sociality offers for individuals, it also partly determines how the community might be seen by others. For example, if a prospective member follows community discussions, she evaluates the way in which communication proceeds. The learning process of *including* is about the way in which institutionalized knowledge reaches the individual, and also about how individuals include this knowledge into their daily lives. The following proposition is formulated:

> *Proposition 1b: A high degree of sociality positively affects the learning process of including for individuals that value pro-social behaviour, and negatively affects the learning process of including for individuals that reject pro-social behaviour.*

As interaction is central to the idea of shared understanding, the learning processes of interpreting, interacting and integrating are affected. *Interpreting* is the first step to explain individual ideas to others in the community, and, therefore, to shared understanding. Enhanced sociality forms a sound basis that stimulates individuals to share ideas and knowledge. *Interacting* concerns interaction at the group level: the confirmation of a climate that allows for sharing knowledge might be enhanced by a high degree of sociality. Whenever individuals feel safe to share ideas, their interaction as well might profit from this. *Integrating* addresses the integration of knowledge into the community. Through joint action, which originates at the group level, knowledge is further integrated into the greater community context. This learning process of integration might be positively affected by a high degree of sociality through a climate that is enhancing knowledge-sharing and makes individuals feel safe. We therefore formulate the following propositions:

> *Proposition 1c: Sociality enhances the learning processes of interpreting, interacting and integrating by positively influencing individual's shared understanding.*

Structure

Often, online communities seem to be totally democratic in the sense that anybody may say anything at any time (Bagozzi & Dholakia, 2006; Hall & Graham, 2004; Waguespack & Fleming, 2008). They are sometimes described as loosely coordinated systems (Lee & Cole, 2003). However, already in early accounts of the then so-called usenets, a certain hierarchical structure has been observed, originating from behaviour, communication and participation (Baym, 1997). Ahuja & Carley (1998) also differentiate between a seemingly non-hierarchical structure on first glance, and an enacted hierarchy that is based on communication patterns.

This informal hierarchy is typically organized by certain reward policies (e.g., support is valued and sometimes rewarded), rules, norms, and communication (Hertel, et al., 2003; Shah & Tripsas, 2007). For examples, members receive experience points (Huffaker, et al., 2009), reward points (Wiertz & de Ruyter, 2007), or reputation for technical powers and strength or popularity (Reid, 1999), whereas in other communities ranks (Füller, et al., 2007; Roberts, Hann, & Slaughter, 2006) or seniority (von Krogh, et al., 2003) are used to distinguish between members. Communities often have leaders that emerge from among community members (Fleming & Waguespack, 2007). The leaders rely upon the community for support. Community members at times sort themselves into different groups, while it takes more effort to become a member of the core team of leaders (Lee & Cole, 2003). Structure originates in a shared understanding about the appropriate amount of hierarchy, and the way in which this hierarchy is enacted within the community. As opposed to the idealistic beginnings of some open source software communities, a certain degree of hierarchy is often observed in online innovation communities (Cova & Pace, 2006; Curtis, 1997; Fang & Neufeld, 2009; Goodsell & Williamson, 2008; Hemetsberger & Reinhardt, 2006; Kaiser & Müller-Seitz, 2008; van Oost, Verhaegh, & Oudshoorn, 2009). For example, within Baym's usenet group, a hierarchy was present but not very much insisted upon (Baym, 1997). Reid (1999) in contrast describes the strong enforcement of hierarchy by means of symbols in early interactive user platforms.

The learning process of *including* is concerned with the link between individual and community, in particular with the way in which institutionalized knowledge is transferred upon or absorbed by the individual. The degree of structure not only influences the way in which established community members interact. It also affects the way in which the community looks upon prospective members: a high degree of structure, e.g. hierarchy, might make it more difficult for prospective members to join the community, whereas a flatter structure might cause the opposite, namely an easy admission.

> *Proposition 2a: The emphasis that is placed on structure affects the learning process of including by increasing/lowering barriers to admit new members.*

Consequences of structure on everyday interaction, such as the influence of hierarchy upon community interaction, are closely related to the learning process of *institutionalizing.* Here, knowledge is embedded into the community, and rules, procedures and routines are established. Depending on the intensity and strictness of the structure, these rules, procedures and routines might become more or less firmly institutionalized: whereas a flatter structure might enhance institutionalization, it might not insist upon enforcement of the associated rules, procedures and routines. The reverse argument applies to a more hierarchical structure: here, institutionalized knowledge in the form of rules, procedures and routines might be strongly enforced by community members. Based on this reasoning, we formulate the following proposition:

> *Proposition 2b: The emphasis that is placed on structure affects the learning process of institutionalizing by amplifying the enforcement of rules, procedures and routines.*

Support

Support encompasses all actions that involve any form of assistance, help, or guidance that one member offers another. For many members this is one of the main reasons to engage in community activities (Hertel, et al., 2003; McLure Wasko & Faraj, 2005), and is accordingly often observed in empirical accounts (Bagozzi & Dholakia, 2006; Ebner, et al., 2009; Goodsell & Williamson, 2008; Haefliger, et al., 2008; Hemetsberger & Reinhardt, 2006; Lüthje, et al., 2002; McLure Wasko & Faraj, 2000; Müller-Seitz & Reger, 2009; O'Mahony & Ferraro, 2007; Piller, Schubert, Koch, & Möslein, 2005; Ross, 2007; Wiertz & de Ruyter, 2007). Reciprocity is an underlying mechanism of support: members who support others can expect to be supported in the future (Dholakia, et al., 2004; Fauchart & von Hippel, 2008; Füller, et al., 2007; Hall & Graham, 2004; Huffaker, et al., 2009; Shah, 2006). Aside from the practical reasoning of investing in future reciprocity (Bergquist & Ljungberg, 2001; Zeitlyn, 2003) – which is an instrumental approach- , altruistic reasoning can also be found in online innovation communities (McLure Wasko & Faraj, 2000; McLure Wasko & Faraj, 2005). Helping each other is often perceived of quality-enhancing (Fang & Neufeld, 2009; Huffaker, et al., 2009; Kaiser & Müller-Seitz, 2008; Lakhani & von Hippel, 2003; Lee & Cole, 2003; Shah & Tripsas, 2007) since the collective knowledge always exceeds individual capabilities and resources.

Support is in the first place concerned with the group level (which are be *interpreting, interacting,* and *integrating*): individuals help each other. However, the processes of *intuiting, institutionalizing* and *including* are affected as well, because the learning processes are interrelated. A high degree of support might have a positive influence upon individual's willingness to develop and share ideas (intuiting). Furthermore, it might enhance the process of institutionalizing by improving the knowledge that is embedded into the community. As well, the process of including might be positively affected by a high degree of support: when individuals help each other, they might also help to include prospective members into the community, and to explain community social norms to these individuals. Hence, we formulate the following proposition:

> *Proposition 3a: A high degree of support positively affects all learning processes by stimulating reciprocity, innovative activity and enhancing the quality of knowledge.*

Support is often regulated in ways that protect community interest. For example, it is typically taken for granted that shared information will either not be passed on without having consulted the giving member (Fauchart & von Hippel, 2008) or that the source of information will be mentioned (Haefliger, et al., 2008). This mechanism points toward competition that may exist among community members (Cova & Pace, 2006; N. Franke & Shah, 2003; Jeppesen & Frederiksen, 2006). Sometimes, the competition appears as giving credit to each other (Huffaker, et al., 2009; Reid, 1999; Wiertz & de Ruyter, 2007), which relates to the structural properties of the community. Although competition obviously serves community interests, it might also hinder some of the learning processes. *Interpreting* is about individuals explaining ideas to themselves and to others, leading to a shared meaning. When individuals also compete with each other, this sharing and explaining might be somewhat inhibited. Accordingly, we formulate the following proposition:

Proposition 3b: Competition limits the learning process of interpreting by deterring individuals to share ideas and reach a shared understanding within the group.

Sharing

Central to most online innovation communities is the public sharing of knowledge, as is often reflected in the literature (e.g., Bagozzi & Dholakia, 2006; Cova & Pace, 2006; Fang & Neufeld, 2009; Fleming & Waguespack, 2007; N. Franke & Shah, 2003; Nikolaus Franke & von Hippel, 2003; Füller, et al., 2007; Goodsell & Williamson, 2008; Hall & Graham, 2004; Hertel, et al., 2003; Lakhani & von Hippel, 2003; Lee & Cole, 2003; Roberts, et al., 2006; Shah & Tripsas, 2007; von Krogh, et al., 2003). In the domain of user innovation, this 'free revealing' (Baldwin, et al., 2006; Haefliger, et al., 2008; von Hippel, 2006) also belongs to the core ideas. Although members know that 'lurkers' and 'free riders' can profit from their ideas and innovations, it is not preventing them from publicly disclosing information. This connects to the concept of 'sticky information' (Lüthje, et al., 2002): it is not possible to transfer information in its totality in an instrumental and abstract way. There is always a part that will remain intractable. Lave & Wenger (1991) argue that only situated learning enables individuals to absorb information in its entirety. Additionally, some communities feature protection mechanisms (Fauchart & von Hippel, 2008; O'Mahony, 2003; van Oost, et al., 2009) or access restrictions (Reid, 1999; Shah, 2006), that enable members to control information disclosure up to a certain degree. Following this argumentation, the problem of free riders wouldn't be such a problem, since they will never gain access to all dimensions of particular information and knowledge: this can only be achieved by full community membership, actively engaging in activities, and complying with the norms that are in use within the particular community. However, sharing does promote activities in the community (Ross, 2007): the more information that flows around, the more members might take up ideas and reassemble them into something new (Jeppesen & Frederiksen, 2006). It is here that the learning process of *intuiting* is affected: the recognition of ideas might be closely related to (the amount of) other ideas that are available. Consequently, we formulate the following proposition:

Proposition 4a: A high degree of sharing positively affects the learning process of intuiting by maximizing the input an individual member can receive from the community.

Social interaction at the group level is captured within the learning process of *interacting.* Here, shared understanding is affirmed and strengthened at the group level. Presuming a high degree of sharing resulting in a high degree of possible collaboration, it follows that this might be beneficial for the community and its innovative output. Thus we argue:

Proposition 4b: A high degree of sharing positively affects the learning process of interacting by increasing the opportunities to work together.

Conclusion and discussion

In this paper, the focus lies on the role that social norms - expressed through socially enacted properties - play in the learning processes of self-organizing online user innovation communities. The contribution of the paper is twofold. First, we review the

literature on online innovation communities along four social norms that function as organizing mechanisms. By doing so, we integrate recent research on online innovation communities in diverse fields such as sports, cooking, open source software, or consumer products. We find that the various communities often feature similar mechanisms with regard to self-organization, and exhibit socially enacted properties – sociality, structure, support, and sharing -, that are based on comparable social norms. The insights from this paper might help scholars to further their understanding of the phenomenon of online innovation communities in general, and the concept of self-organization in particular, especially in an online context.

Second, we formulated a number of propositions that each address the meaning and significance of one of the four socially enacted properties, which were found to be relevant in online user innovation communities, in relation to one or more of six learning processes. We adapted and extended the 4I model of organizational learning as introduced by Crossan et al. (1999) in order to fit the context of online innovation communities. Socially enacted properties are assumed to have a positive as well as a negative influence on learning processes. Based on a review of literature on online innovation communities, we find that learning processes are influenced by four socially enacted properties: sociality, support, structure, and sharing. It is presumed that sociality possibly stimulates the learning processes of intuiting, including, interpreting, interacting and integrating, and possibly hinders the process of including. Structure is theorized to have an effect on the learning processes of including and institutionalizing; the direction of the effect depends on the emphasis that is placed on structure. Support positively affects all learning processes. It stimulates reciprocate behaviour, which in turn enhances innovative activity. Competitive behaviour, that is related to support, limits the learning process of interpreting. Finally, it is presumed that sharing positively affects the learning processes of intuiting and interacting. Summarizing, we posit that community learning is influenced by underlying social norms, which are expressed as socially enacted properties. Through the norm-governed processes of learning, the community is able to organize itself and to come up with innovative ideas, both in the high- and low-tech domain.

The socially enacted properties that we discuss in this paper originate in social norms that form the basis of community interaction. In order to fully comprehend community behaviour, it is necessary to understand where these norms come from, how they emerge and develop in the community context, and how they change over time. The community and its norms are not isolated from the environment. Subsequently, it has to be investigated in future research how social norms find their way into an online community, that is supposedly ‘virtual’ and not depending on time and space. However, individuals bring their own experiences with them when joining a community. These might originate in clearly defined, non-virtual contexts such as a village or a region, and thus be subject to spatial and temporal boundaries. Furthermore, it is unclear how larger contexts, such as society, nationality, or culture, influence online communities. Especially in the case of international online communities, the question of where social norms originate becomes interesting, since community members might not even share the same mother tongue, let alone the same culture or ethnicity.

Furthermore, the current research extracts socially enacted properties from literature on online innovation communities. However, this extraction does not consider different configurations of these properties. For example, what is the difference between a community that mostly values support, and a community that mostly values a hierarchical structure? What is the influence of property configuration upon the

innovative output of that community? Is it possible to map out an ideal configuration of properties? Results from future research might shed light on these compelling questions, and open up possibilities that might be put to practical use. For example, organizations that employ more traditional organizational set-ups might benefit from this knowledge. If it is found that a high degree of sociality positively influences innovative output in the case of online innovation communities, other organizations might consider this opportunity as well, and possibly adapt their organization. In addition, the socially enacted properties of online innovation communities, as described in this paper, might be featured by other community types that were not discussed here. For example, in which ways do social networking sites (such as support or hobby groups) apply social norms, and which socially enacted properties do they feature? Similarly, do the mechanisms proposed here apply to offline communities, such as communities of practice, as well? Answers to these questions might extend the findings from our research to the domain of social networking sites and offline communities.

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