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FACILITATING EMPLOYEE CREATIVITY: WHAT WE CAN LEARN FROM ONLINE WORK COMMUNITY?

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Abstract

Creativity has been recognized as vital to organization success. With the rise of the new creative class (Florida, 2002), scholars and organization practitioners have been seeking ways of changing organizational settings to better facilitate creativity production in organizations. Online work communities (OWC), a new type of organization, have been emerging around creative works in the last decade. In this paper, we investigate the potential effects that online communities may have on facilitating employee creativity in organizations. Drawing on prior research about creativity in organizations, we set up a conceptual framework for analyzing organizational contextual effects on individual creativity. The framework categorizes contextual factors into three categories, related to intrinsic motivation, knowledge, and social capital respectively. For each contextual factor in the framework, we discuss how it has been supported in online work communities, with illustrations using exemplar communities. Finally, we propose a model that summarizes how specific characteristics of online work communities might facilitate creativity production in organizations.

Keywords: Online work community, creativity management, social networking, job motivation, online community systems

Introduction

Creativity has been recognized as vital to organizational success because of its substantial contributions to organizational innovation, competence, and performance (Amabile, 1988, 1996). In a global economy, theorists suggest that employee creativity is critical to organizational survival (Florida, 2002; O'Toole and Lawler, 2006). Over the past two decades, creativity has been defined as the production of novel and useful ideas about products, services or practices (e.g., Amabile, 1983, 1996; Woodman, Sawyer, and Griffin, 1993). Creative ideas may be generated by employees at any organizational level. When ideas are adopted and successfully implemented by the organization, they are considered to be innovations. Employee creativity can be seen as the first step of organizational innovation (Amabile, 1983, 1996). In this paper, we focus on employee creativity, which is defined as the production of creative ideas by employees in any level of the organization.

The creativity literature suggests that employee creativity is affected by both employee's personal characteristics and contextual factors in their organizations (Amabile, 1996; Woodman, Sawyer, and Griffin, 1993; Shalley, Zhou, and Oldham, 2004). With the rise of the new creative class (Florida, 2002), scholars and organizations have been seeking ways of changing organizational settings to better match knowledge workers' needs, so as to facilitate creative outputs by organizations. Online work communities (OWC) are a new type of organization that has been emerging around creative activity (Zhao, Rosson and Purao, 2007). Examples include open source software development communities, and scientific research communities. High intrinsic motivation and satisfaction are common among members of these communities.

In this article, we investigate how online communities may facilitate creativity in organizations. We begin by conducting a literature review of creativity studies in organizations. Drawing on prior research, we offer an analytic

framework that categorizes organizational factors affecting creativity into three categories related to intrinsic motivation, knowledge, and social capital respectively. To investigate how online community settings may facilitate members' creative work, we discuss how online communities have supported these various organizational factors. We base our analysis on existing literature and illustrate our points with exemplar communities. We conclude with implications for future research in organizational creativity.

Theory background and analysis framework

Employee creativity is a complex behavior affected by both personal and contextual factors (Amabile, 1996; Woodman, Sawyer, & Griffin, 1993; Shalley, Zhou, and Oldham, 2004). Personal factors include personality and cognitive styles. Contextual factors are work environment characteristics that may influence employee activity, for example job characteristics, work settings, supervisor-worker relationships and relationships among co-workers. Intrinsic motivation and knowledge are two key elements of employee creativity (e.g. Amabile, 1988; Woodman, Sawyer, and Griffin, 1993;). Drawing on prior research and conceptual frameworks (e.g., Amabile 1988, Amabile et al. 1996; Woodman, Sawyer, and Griffin, 1993; Shalley, Zhou, and Oldham, 2004), we present a model of contextual factors on employee creativity (Figure 1). In this, we do not intend to propose a new conceptual model of employee creativity, but rather provide a framework for analyzing the potential impacts of online work community settings on individual creativity. This conceptual framework groups the organizational context factors into three categories — intrinsic motivation, knowledge, and social capital.

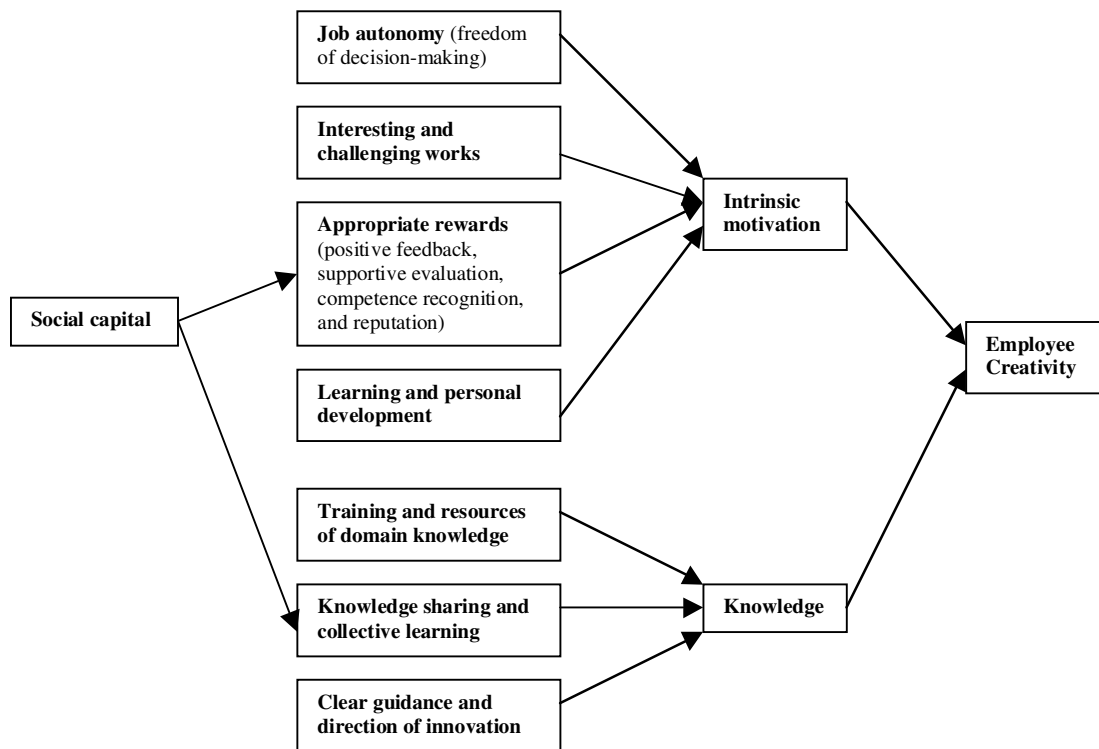


Figure 1. A conceptual model of contextual factors affecting employee creativity

Intrinsic motivation

Researchers have suggested that in general the organizational context factors affect creativity through the mediating effect of intrinsic motivation (e.g. Amabile, 1996; Deci and Ryan, 1985; Shalley, Zhou, and Oldham 2004). This mediating effect is often explained with Cognitive Evaluation Theory (Deci and Ryan, 1985). According to this theory, when the informational aspect of a contextual factor is more salient, individuals feel supported and encouraged, which therefore enhances intrinsic motivation. In contrast, when the controlling aspect is more salient,

individuals feel that their thoughts and behaviors are being controlled by the contextual factor, so as to diminish individuals' intrinsic motivation.

In our model, we have listed a set of contextual factors that have often been examined in prior research. Job design has been considered as an important contributor to employee creativity. Employees are more likely to have high levels of intrinsic motivation, when they work on interesting and challenging jobs and when they are given high degree of job autonomy and freedom of decision-making (Deci and Ryan, 1985). Appropriate rewards have been emphasized as a critical factor in developing and maintaining intrinsic motivation (Deci, Koestner, and Ryan, 1999). Scholars generally agree that rewards that contain informational value that recognizes an individual's personal competencies are likely to enhance intrinsic motivation. Examples of such rewards include supportive and positive feedback and encouragement from supervisors and coworkers (e.g., Amabile et al., 1996; Deci, Koestner, and Ryan, 1999), and recognition of individual creativity and competencies by coworkers and supervisors (e.g., Paolillo and Brown, 1978; Amabile et al., 1996).

Knowledge

Knowledge is an essential element for individuals to create new ideas (Amabile 1988). This paper considers three major factors contributing to an individual's knowledge – domain knowledge, idea sharing, and innovation guidance. Firstly, domain knowledge serves as the basic ground employees to be creative when doing their jobs (Amabile, 1988). It is the organization's responsibility to ensure that their employees obtain enough domain knowledge to do their job. Secondly, an organizational climate of knowledge sharing can enhance creativity (Amabile et al., 1996). Any invention is a social process of knowledge accumulation. A new idea can be an inspiration from others' ideas, or a further development of existing ideas. Therefore, sharing knowledge and ideas among employees can boost employee creativity (Fischer, Scharff, and Ye, 2002). Finally, employees' creativity needs to be guided and directed towards being useful for organizational innovation. Recent research suggests that both a bottom-up approach of gathering creative ideas from employees and a more top-down approach to guiding creativity can be used to facilitate creativity and innovation in organization (Ginzburg, Higgins, and Lichtenstein 2007).

Social capital

As shown in Figure 1, social capital is seen as related to many of factors we already mentioned; it affects employee creativity through its effects on both intrinsic motivation and employee knowledge. Social capital is defined by three operational dimensions (Nahapiet and Ghoshal 1998): the structural dimension (a relationship network that connects people and helps them to find assistance and cooperation); the relational dimension (the sense of trust that people have towards each other along the connections); and the cognitive dimension (shared understanding, beliefs, interests, or problems that hold the group together). Researchers have suggested that social capital is related to social creativity in organizations (e.g., Fischer, Scharff, and Ye, 2002; Wenger, McDermott, and Snyder, 2002; Florida 2002). For example, in the structural and relational dimension, supportive relationships among individuals are experienced as rewards for intrinsic motivation; these supportive social structures encourage people to take risks and do challenging work (Amabile et al., 1996; Deci, Koestner, and Ryan, 1999;). In the cognitive dimension, shared understandings and interests increase the effectiveness of knowledge sharing and collective learning (Brown and Duguid, 1991; Lave and Wenger, 1991; Wenger, McDermott, and Snyder, 2002).

Online work communities

The term online community has been used to refer to various types of Internet network-enabled communities. Examples include generic digital websites like AOL, local community networks (Carroll and Rosson, 2003), more global virtual communities (Rheingold, 2000), e-commerce websites like eBay's online community, and so forth. People's activities in online communities are various, and can include both social- and work-oriented activities. Here we focus on work-oriented online communities in order to study community effects on individual creativity in work settings. We are interested in understanding whether the addition of online community characteristics facilitates individual creativity production at work.

Online work community (OWC) is broadly defined here as: a group of individuals organized with shared interests and goals of producing something; their products are in digital format, such as software applications, scholarly

publications, or product designs; and their collaboration and social interactions rely on the online community systems. We now introduce two examples of online work communities so that we can use them as illustrations in the rest of paper.

Open source software (OSS) development communities emerge around individuals who are developing, sharing, and using free software. OSS developers publish their software with an OSS license, so that others can analyze it and contribute related software development projects (Feller and Fitzgerald 2001). As OSS projects evolve, developer communities are created, bonded together by the software's history and their shared experiences and goals. For instance, OSS communities have emerged around projects like GNU, Linux, Apache Server, and Mozilla Web Browser.

Online scientific research community is another example of an emerging online work community. Cyberinfrastructure (CI) is an NSF initiative aimed at creating scientific digital infrastructures for research communities; the goal is to enable a more ubiquitous knowledge environment and an increase in global research collaboration (Atkins 2003). In a CI-enabled scientific community, researchers produce collaborative research relying on technology for sharing data, information, tools, and instruments. This paper uses CI to illustrate how online community features can facilitate scholars' creative works and creativity production in research communities.

Literature in these online work communities shows potential impacts of OWC characteristics on the organizational factors affecting individual creativity. For example, scholars studying OSS communities have discussed the motivations for community members' voluntary behaviors of contributing to OSS project development (e.g., Hertel, Niedner, and Herrmann, 2003; Bonaccorsi, and Rossi 2004; Bonaccorsi, and Rossi 2006). Research studying communities of practice emphasize the natural relationship between community and collective learning (e.g., Wenger 1998; Lave and Wenger 1991; Hoadley and Kilner, 2005). Social capital is often suggested as a byproduct of online communities (Chewar, McCrickard, and Carroll, 2005; Lesser and Storck, 2001; Sproull and Patterson, 2004). In the next section, for each organizational factor introduced earlier, we discuss in more detail how OWC characteristics may help to facilitate creativity production.

Online community impacts on individual creativity

Intrinsic Motivation

Job autonomy

Besides its effect on employee creativity, job autonomy and employees' freedom of decision-making have long been seen as an important issue in job motivation (Herzberg 1968; Deci and Ryan 1985; Malone 2004). The degree to which individuals are free to make their work-relevant decisions depends on the organizational structure and the coordination system. A traditional top-down management and rigid hierarchical structure presents challenging to allow job autonomy. In contrast to traditional labor work, creative work (e.g. software development) cannot be specified through rigid job descriptions. However, the *market-like system and loose hierarchical structures* that are common in online work communities are useful for enhancing individuals' intrinsic motivation as well as coordinating individuals' contributions (Malone 2004; Zhao, Rosson, and Puro 2007).

For example, OSS communities of large software development projects (e.g., Linux) resemble a market-like system that autonomously matches the needs of contributors to work on a variety of sub-projects and the supplies of self-motivated voluntary developers who are interested in contributing to these sub-projects (Lakhani and Hippel 2000). A loose hierarchical structure has emerged for such projects, where a group of core members decides on the development goals and publishes them online; other volunteers choose goals of interest and define specific projects based on the larger project requirements (Iannacci 2005). In a scientific research community, researchers act as both producers and consumers of research works. A committee structure is used for strategic decisions, such as when discussing the future research directions in workshops, conferences, and professional societies. Tools like digital libraries make it easier to publish and exchange knowledge. For example, Citeseer (Giles, Bollacker, and Lawrence, 1998) — a search engine and digital library in the fields of computer and information sciences — provides access to full-text of nearly 700,000 research papers, receives over half a million hits each day, and is accessed by 150 countries and 200,000 unique machines monthly.

Interesting and challenging work and learning

Organizations are finding it difficult to offer their employees interesting and challenging jobs in order to maintain their high job motivation. Current creative workers tend to move from project to project more frequently than before (Florida, 2002). Being able to experience and learn from new tasks and projects is an important motivator (Florida, 2002; O'Toole and Lawler, 2006). Thus, new tasks and jobs are perceived as interesting and challenging (Lawler, 2005; O'Toole and Lawler, 2006). Organizations face a dilemma of high training cost and high job turnover rate. Lawler (2005) suggested that it is not worthy of investing for employee loyalty in creativity-economy dominated industries.

This need by the current creative workforce is also found in online work communities. For example, learning new programming skills is one of the most highly-rated motivators by voluntary developers for participating in OSS projects (Ye and Kishida, 2003). To ensure a sustainable supply of motivated and capable contributors, online work communities usually have their online training resources free open to anyone within and outside the community who is interested in contributing. Online training resources are created by community members and continuously grow as members flow in and out. We will discuss more about this when we talk about the factors in the knowledge category later in the paper.

Appropriate Rewards

The reward system embedded in online work communities may play a critical role in providing positive incentives for individual creativity behaviors. Individuals' need for achievement is satisfied through the rewards from peer recognition and community reputation. The production of these rewards benefit from the use of *social networking tools* in online work communities. Social networking features are common in online communities, such as photo tagging (e.g., flickr), social bookmarking (Millen, Feinberg, and Kerr, 2006), and social commenting (Millen and Patterson 2002). Basically, social networking tools connect digital contents with their creators, so that people can track back to the creators from the content contributions; trace all contents contributed by a particular individual; and evaluate a community member's reputation based on the quantity and quality of the member's contribution. Given these possibilities, people start commenting on each other's work, domain experts can be easily traced according to specialized topics, and members become more interested in interacting with others by replying to comments regarding to their contributions and requests for their specific expertise.

For example, in OSS communities, developers gain reputation based on the quality and usefulness of the code they contribute (Lakhani and Hippel, 2000; Bonaccorsi and Rossi, 2003; Healy and Schussman 2003). The evaluation is based on peer comments on members' contributions, which may contain both positive and negative feedback. The more positive feedback a member receives, the better reputation he has in a particular domain. Members with stronger reputations are offered chances to be involved in more important development work in the OSS projects. In scientific research communities, researchers are self-motivated for research, driven by their own interests and career ambitions. With cybertools like Google Scholar, Citeseer, and the ACM digital library, scientists' reputations are quickly propagated, indicated by the number of citations of their publications. Other benefits, such as success with grants, are based on the quality of their published research.

The use of social networking tools and content management systems also play important roles in producing supportive interpersonal relationships, motivating knowledge sharing, facilitating collective learning. We will discuss these effects in the next two sub-sections.

Knowledge

Domain Knowledge Training

Generating new creative ideas that are useful requires an understanding of domain knowledge. It is the organizations' responsibility to ensure that its members have this domain knowledge and understand the goals and directions of innovation. Given the goal of minimizing cost, organizations usually do short-circuit this requirement by selecting people who already have the necessary knowledge to perform specialized tasks. However individuals may lose interest in a task if asked to do the same tasks again and again. Today's knowledge workers tend to move

from project to project or from job to job much more frequently than before (approximately every 3 years; Florida, 2002; O'Toole and Lawler, 2006).

In contrast, online work communities use different strategies to cultivate potential contributors. As we argued earlier, an online work community works more like a market-based system, where community organizers initiate market needs (e.g. directions for developing new features to be included in the larger OSS projects), and community members are suppliers who contribute the knowledge and efforts needed to complete these projects. In order to maintain a sustainable human capital supply (e.g., members who are willing to contribute to OSS projects), a community cultivates its market through open access to the knowledge repositories by the larger society. For example, discussion forums and developer email lists in OSS development communities are free and open to anyone who wants to join the groups (Healy and Schussman 2003; Bonaccorsi and Rossi 2006). New members who have little domain knowledge or experience can catch up quickly by reading the online tutorials and historical records organized by topics (Ye and Kishida, 2003). Question-answer type of discussions and source code by others are found effective for transferring domain knowledge to new members.

Thus we suggest that *free and open access to domain knowledge training resources* is an efficient way of providing training with low cost as well as an effective means of developing and maintaining a sustainable supply of motivated and capable contributors. However this approach works only under the assumption that competition among communities is not salient (e.g. all OSS projects are free and open source under a free license of OSS). An interesting question is under what conditions this approach could be useful for training in profit-driven industries, where competition among firms is intense.

Knowledge sharing and collective learning

Collective learning and knowledge sharing is important for creativity because generation of creative ideas is always a social production process (i.e., no single person creates all the knowledge needed for generating his creative ideas). Community development is helpful for boosting creativity because of its natural relationship with collective learning. *Community provides a fertile ground for the development and continuous learning of enduring communities* (Lave and Wenger, 1991; Hoadley and Kilner, 2005).

Modern learning theories support the value of communities as a setting for learning. For instance, in the cognitive learning tradition, participating and sharing practices with others provides opportunities to generate new explanations that result in deeper cognitive processing and understanding of knowledge. From the perspective of behavioral learning, interaction with others in a community generates feedback that may stimulate new ideas (Hoadley and Kilner, 2005). Furthermore, learning is a byproduct of community development. To endure, communities need to replicate themselves by cultivating new members through learning. Newcomers get involved in community practices by beginning with peripheral participation. Over time, their participation becomes more central as they become more expert and their identities become more associated with the community membership (Kim 2000; Wenger, McDermott, and Snyder, 2002; Smith and Kollock, 1999)

Motivation of sharing knowledge and ideas

Motivation of knowledge sharing has been studied as an important issue in both organization and community literatures. Knowledge management systems often fail because people do not see the benefits for themselves through contributing to knowledge building (Alavi and Leidner, 2001; Malhotra and Galletta, 2004). In fact research finds that individuals with weak ties and distant relationships are more likely to share their knowledge with each other (Levin, Cross and Abrams, 2002).

Reward systems that are supported by social networking tools may play an important role in motivating knowledge-sharing behaviors in online work communities. For example, in scientific research communities, scientists are self-motivated to publish their latest research efforts, findings, or thoughts to their research communities. This is partially because sharing knowledge is critical to research scholars' careers. A scholar's career success (e.g., faculty positions, grant applications, and tenure) relies on the number of and the quality of her publications. With the support of Internet technologies, cybertools such as Google Scholar and digital libraries, scientists' publications can be broadcast to a world-wide audience quickly, and reputations can be quickly built up with the support of citation analysis tools (Lawrence, Giles, and Bollacker). In OSS communities, peer recognition of competencies and community reputation of expertise are primary incentives that motivate individuals to share

their knowledge and expertise. Senior members are willing to share their knowledge through answering questions of others, and telling their experiences as stories (Kim 2001; Ye and Kishida 2003). New members are looking forward to contribute valuable knowledge so that peers will recognize their competencies and they can identify themselves as core members in the community (Bonaccorsi and Rossi 2004; Bonaccorsi, A. and Rossi 2006).

Social Capital

Social capital has its effects on creativity through its three dimensions: structural, relational, and cognitive. A community with computer network support has been suggested as an engine for development of social capital (Chewar, McCrickard, and Carroll, 2005; Lesser and Storck, 2001; Sproull and Patterson, 2004). A defining feature of a successful community is the sense of community that is perceived by its members (Blanchard and Markus 2002).

With the support of online community technologies like social networking tools, online communities can help foster social capital. With respect to the structural dimension, connections among individuals are necessary for sharing knowledge and exchanging ideas. Ties (particularly weak ties) can be easily set up through various social networking tools, such as responding to others' discussions in the forum, and commenting on others' profiles and images (Snyder, Carpenter, and Slauson, 2006). The established weak ties are useful for establishing the trust needed to share knowledge and experiences (Levin, Cross and Abrams, 2002).

In the relational dimension, supportive relationships have a positive effect on individuals' intrinsic motivation. Online community systems provide individuals online places for their interactive behaviors with the support of social networking tools (e.g., social commenting, tagging, and bookmarking). These social networking software tools enhance the social awareness of individuals' behaviors and provide vessels for potential positive feedback and supportive messages among members (Millen, D. R. and Patterson, 2002).

In the cognitive dimension, common ground and shared understandings are important to ensure effective knowledge sharing among people. Online communities facilitate establishing common grounds through archiving and feeding back information to users. The use of content management systems helps to capture information exchanged and resources shared. This practice has been done with many professional forums in which systems are set up to capture and share expertise (e.g., Kelly, Sung and Farnham, 2002).

Summary

This section summarizes the impacts of online community characteristics on facilitating individual creativity in online work communities. As presented in Figure 2, a market-like organization ensures job autonomy and individuals' freedom of making decisions of their own work activities. The loose hierarchy helps coordinate individuals' contributions as well as allows the group of core members to guide the new development. Free open access to online knowledge resources is one of the important characteristics in online work communities. It satisfies the creative class needs of being able to learn from participating in new interesting and challenging projects. Online work communities are able to maintain a sustainable supply of motivated and capable contributors through the online knowledge resources free and open to anyone who is interested in participating. Community, as a defining characteristic of any online work communities, has its natural relationship with social learning and provides fertile ground for facilitating collective learning and social creativity.

With the support of social networking tools and content management systems, online work communities have demonstrated beneficial effects on producing the incentives needed to motivate individuals' creativity behaviors. We have talked about social networking tools' effects on individuals' intrinsic motivation to creativity and motivation to sharing knowledge. Peer recognition and community reputation are two important incentives that are produced and consumed by individuals within the community. Production of these incentives does not cost other resources from the organization. However, it is the use of computer-supported tools, such as CMS (content management systems) and social networking tools, that has the salient effects of producing these incentives. Without these technology supports, individuals' contributions cannot be easily linked to whomever would consider them valuable; individuals won't get feedback quickly from others in the community and their competencies won't be recognized by everyone who might be interested in their work; and individual reputations will be limited to the proximate group(s) with which they are closely associated.

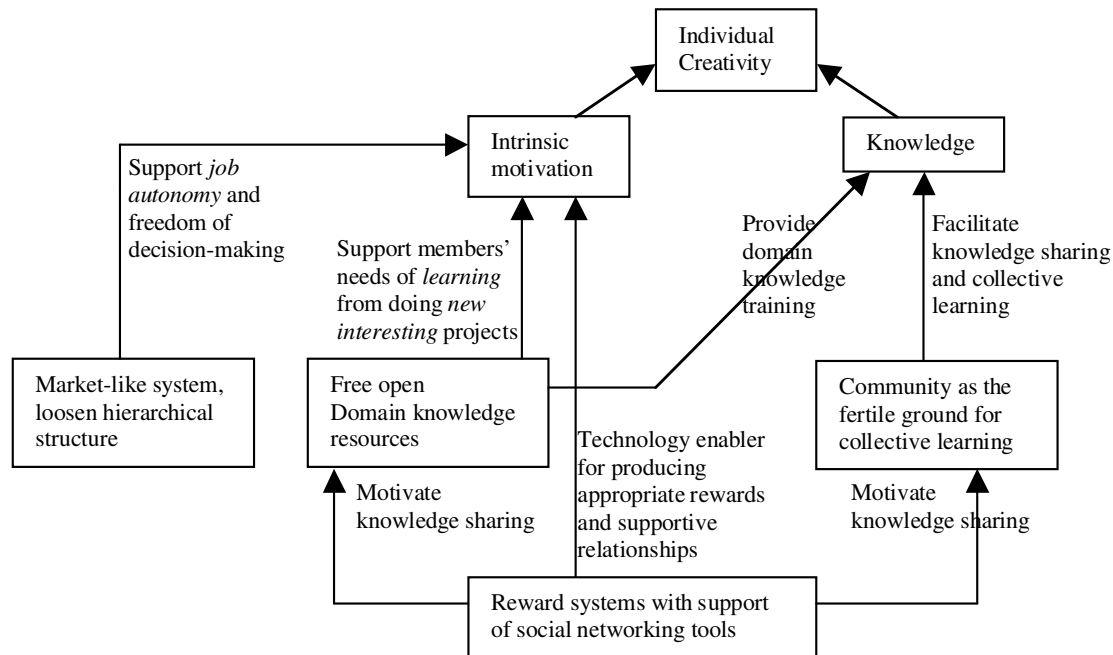


Figure 2. A model of how OWC characteristics affect individual creativity in online work communities

Conclusion and implications

In this article, we investigated the potential effects that online communities may have on facilitating creativity in organizations. Drawing on prior research on creativity in organization, we offered a conceptual framework for analyzing contextual effects of organization characteristics on individual creativity. To investigate how online community settings may affect individual creativities, we used online work communities as examples, discussing for each contextual factors how they have been supported through the settings of online work communities. We proposed a model to summarize how individual creativity can be facilitated through specific OWC characteristics. We hope this work can shed some lights for scholars who are interested in studying organization change and facilitating employee creativity in organizations.

Implications and future works

Given the likely positive effects of OWC characteristics on individual creativity, an important and interesting question is how we might leverage the benefits from online work communities in more traditional organizations. For example, one relatively direct implication of our discussion here is that online work communities could be introduced into corporations whose business positions largely depend on creativity and innovation, such as large software firms and IT service companies. Large companies that contain a great variety of types of works have the potential of matching every employee's emerging interests in doing new interesting and challenging work. By introducing online work communities inside firms, we could envision that every employee would be encouraged to play two different roles in organizations. One of these would be to perform their assigned (paid) jobs, but the other could be to participate in voluntary projects and initiatives of personal interest. If such a process could be articulated and initiated, traditional business managers and executives might be willing to explore the benefits of online work communities in their organizations.

Another set of implications concerns the information and communication technologies that might be most useful in supporting online communities in work settings. Many of our example communities have emerged with little attention to the infrastructural support, although in a few cases a deliberate evolutionary process has been followed (e.g., Kelly, Sung and Farnham, 2002). We cannot assume that the same features that support knowledge sharing

and social networking in largely volunteer communities like OSS or CI will also be appropriate in for-profit business settings, where management will have a more central role. For examples, issues related to employee activity tracking and to the mapping of employee contributions to monetary incentives will almost certainly become more central in a business setting.

There are many questions that must be addressed before businesses will be willing to invest in online work communities as an organizational practice. These include questions of how to balance employees' participation time on paid job and voluntary projects; what the specific requirements of building social networking tools by taking considerations of both facilitating employees' intrinsic motivation and monitoring and measuring creativity performance; and what it may take to modify the existing evaluation and reward systems since inappropriate rewards may dismiss employees intrinsic motivation on participating for both roles. In addition, we have not yet considered the potential interaction effects between personal and contextual factors suggested by researchers (e.g. Woodman, Sawyer, and Griffin, 1993; Shalley, Zhou, and Oldham, 2004). For example, one question for future research is whether individuals working in online work communities tend to be primarily those who are self-motivated and have positive attitudes, regardless of contextual factors. We hope to address these questions in future work, as we continue to articulate and evaluate our proposition that online work communities can aid creativity production by organizations.

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