Motivation and Innovation in Online Collaborative Community: An Application of Expectancy Theory

Completed Research Paper

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ABSTRACT

Nowadays, innovation is increasingly important for firms to build and/or sustain their competitive advantages, and thus they seek outside innovators to help them solve innovation problems. Online collaborative community, which can combine diverse intelligence across geographic borders and promote collaborative innovation effectively and efficiently, has been adopted by many leading companies in the past few years. As a new form of organization, however, collaborative community lacks theoretical guidance, especially in the community members’ motivation and its relationship with innovation performance. This study leverages expectancy theory to examine why community members (i.e. innovators) commit their efforts to collaborative projects, how their efforts influence innovation performance, and how this influence is moderated by their ability. Overall, this study suggests that practitioners manage their collaborative community through improving perceived valence and expectancy and that researchers further decompose, extend, or examine our conceptual model.

Keywords

Collaborative community, collaborative innovation, collaboration, expectancy theory, innovation

INTRODUCTION

Online collaborative community is emerging as a new organizational form (Adler, 2001, 2011; Adler and Heckscher, 2006; Adler, Kwon and Heckscher, 2008; Powell, 1990, 2002). Collaborative community encourages participants to continually apply their unique talents to group projects. Under such a new organizational form, participants are more “motivated by a collective mission, not just personal gain or the intrinsic pleasures of autonomous creativity” (Adler, 2011, p.4). Therefore, the new organizational form allows firms to mobilize participants’ (also called knowledge workers) talents and expertise in flexible, highly manageable group work efforts (Bøllingtoft, Müller, Ulhøi and Snow, 2012). Accordingly, Adler (2011) points out that such a new organizational form “fosters not only innovation and agility but also efficiency and scalability” (p. 4).

Collaborative community combines the intelligence from people with diverse backgrounds, expertise, and skills. Therefore, it excels at knowledge creation and sharing, and in turn promotes innovation (Adler et al., 2008). That is why many firms such as IBM and Dell use collaborative community for innovative solutions such as new product development. This new organizational form can bring many benefits, but practitioners, without a guiding framework, are confused with how to run a collaborative community in a manageable and effective way. Different from traditional organizational forms, collaborative community does not allocate power or authority across participants and members are free to quit without any reasons. Therefore, motivation and/or committed efforts are extremely critical for any collaborative community. Although many studies on collaborative community have been published in the past few years, the following research questions are still unresolved: What factors influence members’ effort in collaborative community? What is the relationship between the effort and collaborative innovation performance? Is this relationship moderated by some factors such as members’ ability?

All the three questions above are important for researchers and practitioners when they analyze and manage member behaviors in collaborative community. This study leverages expectancy theory to examine the motivation factors in collaborative community and their relationship with innovation performance achieved in the collaboration. In the next

1 At the rest of this study, we use the term “collaborative community (communities)” to refer to online collaborative community (communities), unless otherwise noted.
section, we review collaborative community from traditional economic theories and some recent findings. Then, we introduce expectancy theory, lay out our research model, and develop our hypotheses. The concluding section briefly discusses the significance of our research from both practitioners’ and academic perspectives.

LITERATURE REVIEW

Hierarchy, Market, and Community

The transaction cost theory (TCT), which was developed from Coase (1937), has been popularly used for almost seven decades. One of Coase's initial propositions is that firms and markets are alternative governance structures (i.e. organizing principles) that differ in their transaction costs. Later, Williamson (1975) continued this work and took an inter-disciplinary approach to studying transaction costs as a social science phenomenon. Basically, TCT holds the view that the two governance structures involve different transaction costs for a particular player, so the player can evaluate the transaction costs and then determine the optimal structure with fewer costs.

Recently, many scholars believe that, beyond firms and markets, another governance structure exists. For instance, Powell (1990) notes that network forms of organization represent a viable pattern of economic organization. He further indicates that “the case that certain forms of exchange are more social – that is, more dependent on relationship, mutual interests, and reputation – as well as less guided by a formal structure of authority” (Powell, 2002, p.315). Therefore, there is a form of exchange which is neither market nor hierarchy. Similarly, Adler (2001) argues that in addition to market and firm, a third increasingly significant coordination mechanism is emerging. Nieto and Santamaria (2007) highlight the importance of collaborative networks (with suppliers, clients or customers) for the novelty of product innovation in the firm level. All the studies above indicate that a third organizing principle is typified by relations, trust, and reciprocal patterns of communication and exchange.

Collaborative Community

Adler and Heckscher (2006) summarize and compare the three primary principles of social organization: hierarchy, market, and community. Abstractly speaking, hierarchy employs “authority to create and coordinate a horizontal and vertical division of labor” (p.15), market uses “the price mechanism to coordinate competing and anonymous suppliers and buyers” (p.15), whereas community relies on shared values and norms to promote interaction and cooperation among community members. They contend that community is more important than ever in an increasingly complex, knowledge-intensive economy. Therefore, the demand for complex, knowledge-based and solutions-oriented production in the modern capitalist economy has stimulated significant progress towards a new form of community, that is, collaborative community. Collaborative community forms when participants work together to create shared value, and coordinate their activities through their commitment to common, ultimate goals. Although collaborative community could be set up online or offline, this study only considers the first one.

Participants in collaborative community could be any individual or organization, including employees, customers, suppliers, stakeholders, and even competitors. Due to a huge diverse backgrounds and expertise as well as common interests or passion, participants could cooperate with each other in collaborative community. Accordingly, collaborative community excels at combing knowledge of diverse specialists and it is simultaneously innovative and efficient, agile and scalable. Accordingly, collaborative community can harness knowledge workers’ creativity in a flexible as well as highly manageable fashion (Adler, 2011).

In practice, the new form of organization has been used and proved its advantages at many leading-edge enterprises such as IBM, Citibank, NASA, and Kaiser Permanente (Adler, 2011). Actually, a similar term "collaborative enterprise" has been used in some recent studies (e.g., Adler, 2011; Halal, 2001; Heckscher, 2007; Tencati and Zsolnai, 2009). All these studies indicate that a tendency of firm to transform from a traditional hierarchical structure to collaborative community, as described in the Figure 1.

Here, it is worth distinguishing between collaborative community and open community, although they two overlap to a certain extent. The two terms are associated with two innovation approaches, collaborative innovation and open innovation, respectively. Open community is free to the public and any individual can enter this community without any restrictions. Therefore, it emphasizes the openness of a community, whereas collaborative community stresses the collaboration among participants. In an open community, after a seeker posts a problem or request, participants might be allowed to solve the problem either in isolation from both other solvers and the seeker (e.g., Innocentive.com or Zooppa.com), or through collaborating or interacting with other participants (e.g., Wikipedia). The first case is not a collaborative community, while
the second case is. In the same way, a collaborative community might be open to all people without any restrictions (an open community), or only restricted to some particular parties (a closed community). Figure 2 depicts the difference between the two types of online communities.

![Figure 1. Transformation from Hierarchical Organization to Collaborative Community](image1)

![Figure 2. Difference between Open Community and Collaborative Community](image2)

**Collaborative Innovation**

Collaborative community can achieve all the four dimensions of the PAIR model raised by Holsapple and Singh (2001): productivity (P), agility (A), innovation (I), and reputation (R). For instance, Adler (2011) reports that Computer Sciences Corporation reduces error rates by 75% over six years (i.e., R) and achieves a 10% annual increase in productivity (i.e., P), while making products more innovative (i.e., I) and technologically sophisticated. However, in this study, we only focus on innovation in collaborative community not only because its initial purpose is to promote innovation (Bollingtoft et al., 2012), but also because innovation is increasingly critical in today’s hyper-specialized and hyper-connected business world. In today’s world, adaptability, creativity, innovativeness, and knowledge appear to be preconditions for organizations and individuals to thrive and meanwhile these preconditions can come from anyone, anywhere, at any time (Benkler, 2011).

Innovation includes both sustaining (or incremental) innovations and disruptive (or radical) innovations (Gloor, 2006; Popadiuk and Choo, 2006). Both Christensen (2003) and Von Hippel (2007) find that, unlike sustaining innovations, disruptive innovations are usually attained outside the formal hierarchies of large enterprises, while are rarely embedded into large enterprises themselves. That is why big companies such as IBM and AT&T use online innovation community, in which individuals, small companies, and innovation networks can create innovations (Chesbrough, 2003).

Innovation is formed “through a deep interaction among people in environments that have the conditions to enable knowledge creation” (Popadiuk and Choo, 2006, p.309). Gloor (2006) uses the term “collaborative innovation networks” to describe a form of organization in which knowledge workers can collaborate and share in internal transparency and communicate directly rather than through hierarchies. With a rapid development of information technology, there are more
and more collaborative communities such as Wikipedia. Some traditional firms also use this form to attain innovative solutions. For example, after discovering the advantages of collaborative community, IBM invested more than $60 million into the open source tool set Eclipse and achieved many innovative products (Gloor, 2006). Therefore, collaborative community provides a good platform to collect and create new knowledge and in turn to promote collaborative innovation (Bøllingtoft et al., 2012).

MODEL DEVELOPMENT

Expectancy Theory

As an important theory of motivation and work behavior, expectancy theory has been widely used to predict job performance. The basic rationale of this theory is that the force to perform an act, along with other factors such as abilities and role perception, determines the job performance (Heneman and Schweb, 1972; Lawler and Porter, 1967). Expectancy theory “posits that human behavior is to a considerable extent a function of the interactive processes between the characteristics of an individual and his or her perceived environment” (Steers and Porter, 1975, p.180-181). Due to uncertainty from the environment which is beyond an individual’s control, before conducting some action, he or she will evaluate how likely an outcome is fulfilled by his or her action and how much satisfaction he or she can attain from the particular outcome. If she or he give a high evaluation score, she or he will be highly motivated to take such an action and otherwise not (decision making process) and then produce particular performance and outcomes. Figure 3 offers a clear illustration of expectancy theory.

![Decision Making Process](image-url)

**Figure 3. An Illustration of Expectancy Theory**

Vroom (1964), who is recognized as one critical founder of expectancy theory (Pinder, 1984), describes the force of a person to perform an act as “the products of the valences of all outcomes and the strength of his expectancies that the act will be followed by the attainment of these outcomes” (p.18). In this formulation, valence and expectancy are two major variables. The first one refers to “affective orientation toward particular outcomes” (Vroom, 1964, p.15) and relates to “the anticipated satisfaction from an outcome” (p.15); whereas the second one refers to “momentary belief concerning the likelihood that a particular act will be followed by a particular outcome” (Vroom, 1964, p.17). In other words, expectancy is equal to subjective probability (Wahba and House, 1974).

Expectancy theory has been widely used as a general framework to facilitate the study of employee motivation, behavior, performance, and satisfaction (e.g. Chiang and Jang, 2008; Chiang, Jang, Canter and Prince, 2008; Hackman and Porter, 1968; Lawler and Porter, 1967; Pritchard and Sanders, 1973; Zaniboni, Fraccaroli, Truxillo, Bertolino and Bauer, 2011). In addition, expectancy theory is both a process theory as “it attempts to identify relationships among variables in a dynamic

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2 In Vroom (1964), the valence of a particular outcome (the first level) is a product of the valance of other outcomes (the second level) and the perceived instrumentality for the attainment of these outcomes. This study only considers the first-level valence, and therefore we will not discuss the variable instrumentality. Future research could go further and decompose the first-level valence into the second-level valence and instrumentality.
state as they affect individual behavior” as well as a cognitive theory of motivation because “individuals are viewed as thinking, reasoning beings who have beliefs and anticipations concerning future event in their lives” (Steers and Porter, 1975, p.180). In collaborative community (i.e., a dynamic environment), members or even leaders cannot control many external factors such as another member’s motivation or behavior, and therefore their behaviors depend on interactive processes between their characteristics and their perception of the dynamic environment. Therefore, expectancy theory is appropriate to study individual motivation in collaborative community.

**Hypotheses Development**

In order to simplify our model, we only consider individual participants in collaborative community although organizational participants such as small firms may participate in some projects. Our conceptual model (see Figure 4) includes five constructs, which will be measured by multiple items adapted from prior studies (Chiang & Jang, 2008; Hackman & Porter, 1968; Kominis & Emmanuel, 2007; Pritchard & Sanders, 1973; Wang & Ellinger, 2007; Zaniboni et al., 2011). In addition, we put forward four hypotheses, which will be tested by survey data (not included in this study). The first two (H1 and H2) and the other two (H3 and H4) examine participants’ motivation in collaborative community and the relationship between motivation and innovation performance, respectively.

![Figure 4. The Conceptual Model](image)

**From Valence and Expectancy to Collaboration Effort in Collaborative Community**

In Vroom’s (1964) original model, motivation force (also called effort) on a person to perform an act is the product of valence of all perceived outcomes derived from the act and the strength of expectancy that the act will be followed by the attainment of these outcomes. Therefore, both valence and expectancy influence effort. Many empirical studies have support this relationship. For instance, Pritchard and Sanders (1973) investigate 146 employees in post office and find that expectancy, valence, and their interaction were good predictors of effort, either self-reported or supervisory. Recently, Chiang et al. (2008) and Chiang and Jang (2008) use expectancy theory to investigate employee motivation in a hotel setting and present that both expectancy and valence predict employees’ job motivation. Zaniboni et al. (2011) apply expectancy theory to the employee training and find both expectancy and valence lead to positive training intentions. In aggregate, these empirical studies support that both expectancy and valence drive motivation force, that is, effort.

However, none prior research has examined the relationship between valence or expectancy and collaboration effort in collaborative community. Nevertheless, we can attain helpful insight from relevant studies. Boudreau and Lakhani (2009) summarize 11 motivations why outside innovators participate in an open project, all of which are related to valence. For instance, fun and enjoyment, professional and personal identity, reputation, and money are affective orientation toward a successful collaboration, and therefore could be considered as valence according to the definition. They point out that all those motivations encourage innovators to make their efforts. In a crowd sourcing community, perceived valence is a good predictor of members’ effort level (Archak and Ghose, 2010; DiPalantino and Vojnovic, 2009; Yang, Adamic and Ackerman, 2008; Zheng, Li and Hou, 2011) find. Furthermore, Benkler (2011) finds the importance of rewards (positive valence) and punishment (negative valence) in the effort invested in cooperation.
In collaborative community, a member’s perceived valence refers to all the benefits s/he expects to achieve from a collaboration project. If a member expects to attain higher valence in a collaborative project, s/he is more likely to invest efforts. Otherwise, s/he may avoid that project. Therefore:

**H1:** Members’ perceived valence of collaboration success positively affects their collaboration efforts in collaborative community.

In addition to perceived valence, perceived expectancy also affects the collaboration effort. Due to different levels of project difficulty, individual expertise, and team members, community members may have varying evaluation of how likely particular outcomes will be followed by their effort. Their evaluation, in turn, impacts their collaboration efforts. Yang et al. (2008) find that in a crowdsourcing community, users tend to select tasks with fewer opponents (high perceived expectancy) to increase their chances of winning.

In collaborative community, perceived expectancy refers to the expected likelihood that a collaboration project could be accomplished and followed by rewards. Typically, members’ perceived expectancy in collaborative community is smaller than that in traditional organizations because they are faced with more uncertainty in online environments. In order to reduce such an uncertainty, Alder (2011) presents four keys to create a culture of trust and teamwork: defining and building a shared purpose, cultivating an ethic of contribution, developing scalable processes for coordinating people’s efforts, and creating an infrastructure in which collaboration is valued and rewarded. All these four keys could increase participants’ expectancy, which in turn encourage them to make greater efforts in collaboration. Thus, we posit:

**H2:** Members’ perceived expectancy of collaboration success positively affects their collaboration efforts in collaborative community.

**From Collaborative Effort to Collaborative Innovation Performance**

Extant Research using expectancy theory has supported the relationship between effort and performance. Some early studies, including Lawler and Porter (1967), Hackman and Porter (1968), and Pritchard and Sanders (1973) find a significant relationship between an employee’s effort (either self-reported or supervisor-rated or peer-rated) and job performance or work effectiveness. Using the survey of 200 middle managers in a large and successful financial firm, Kominis and Emmanuel (2007) find motivation force (i.e. effort) predicts job performance very well. Brown and Peterson (1994) and Christen et al. (2006) find effort has a positive influence on job performance in the setting of retailing. Recently, some research on open innovation community indicates that a member’s effort is usually treated as a key component to predict performance (Archak and Sundararaj, 2009; DiPalantino and Vojnovic, 2009).

In traditional organizations, managers can catch and punish or train poor performers. However, in collaborative community, without traditional managers, it can be much harder to do that. Silverman and Linebaugh (2012) provide some evidence that team members who supervise themselves can outperform those workers in traditional hierarchies. Actually, a collaboration project usually requires various and everlasting efforts made by its members. In order to achieve a successful collaboration, members not only deliberate the project requirements and develop their own ideas or solutions, but also interact with other members to improve their solutions or find consensus. All these tasks require members to continuously contribute to the team. Therefore, the project performance depends on collective efforts, which come from all community members.

When a member is highly motivated in collaborative community, s/he will put more efforts to the project, which can increase the project performance. On the other hand, his/her effort is also a positive signal of trust and teamwork for other members in the community, which can motivate other members to put more efforts into the project, and then increase innovation performance. As Alder and Heckscher (2006) described in their book, members in collaborative community “must trust that the other has useful competence and knowledge that will help in their joint effort; that the other can understand her own ideas well enough to engage them productively; and that the other is motivated to help her and contribute to the joint effort” (p.30). In aggregate, a member’s effort could drive innovation performance. Thus, we present:

**H3:** Members’ collaboration effort positively affects their innovation performance in collaborative community.

**Moderation Effect of Individual Ability**

In Vroom’s (1964) model, job performance is the product of employee’s ability and motivation force. In his work, ability is defined as characteristics of the individual that represent “a potential for performing some task which may or may not be utilized” (p.198). Similarly, Porter and Lawler (1968) define ability as “relatively stable, long-term individual characteristics that represent the individual’s currently developed power to perform” (p.22) and use ability as an important parameter of job
performance. Their model indicates that ability is more like a moderator between effort and performance. In addition, the two definitions above reveal that ability is an exogenous variable, and therefore is more appropriate to treat as a moderator. Actually, this moderation effect has been supported in some early field studies (Lawler, 1966; Locke, 1965; Terborg, 1977) through testing the interaction effect. Recently, Ellingson and McFarland (2011) specifically use ability as the moderator between motivation and performance.

In collaborative community, a member’s ability includes both expertise to acquire, to assimilate, and to generate new knowledge and capability to collaborate with other members. Different from other performance measures, innovation emphasizes knowledge creation and reprocessing. Accordingly, a member’s ability is critical for innovation performance. His/her ability not only determines her/his innovation performance, but also affects the influence of effort on the innovation performance. Team members with high ability may achieve more with equal effort or use less effort than others for an equal performance, and therefore, the influence of collaboration effort on their innovation performance might be smaller. That is why Nicholls (1984) presents that an employee’s capacity limits the effect of effort on performance. Therefore, we argue that:

H4: Members’ ability negatively moderates the influence of their collaboration effort on their innovation performance in collaborative community.

CONCLUSIONS AND DISCUSSIONS

This study raises a conceptual model by the lens of expectancy theory to study online collaborative community and innovation. Our conceptual model lays out the determinants of effort or motivational force of community members and the determinants of collaborative innovation performance. Our study will be valuable for both researchers and practitioners. First of all, this study could offer researchers enlightening insight into motivation of collaboration and it relationship with innovation performance in collaborative community. Second, how to effectively run a collaborative community and how to become a collaborative leader still perplex practitioners. Splitting motivation factors into valence and expectancy, our model could help practitioners improve their collaborative community through increasing members’ perceived valence and/or expectancy. In addition, practitioners may classify members to several groups according to their ability and help them achieve better innovation performance.

This study has several limitations, which could be alleviated by future research. First, our model presents factors in the individual level, ignoring those in the team or community level. Future research could examine how team-level and interpersonal-level factors influence members’ motivation and performance. In addition, our model lays out motivation factors to perceived valence and expectancy, rather than further decomposes or explores what particular factors influence perceived valence and expectancy. Actually, expectancy theory reveals that perceived valence and expectancy may be influenced by task factors (e.g., project difficulty), individual factors (e.g., personality and goal orientation), interpersonal factors (e.g., social capital), and team factors (e.g., team support) (Steers and Porter, 1975; Vroom, 1964; Wahba and House, 1974). If these prerequisite factors are identified, our research model will be further extended. Furthermore, although this study is first one to present a conceptual model for members’ motivation in collaborative community, more empirical tests are required to examine this model.

REFERENCES