Title: Understanding knowledge outcome improvement at the post-adoption stage in a virtual community

1.INTRODUCTION

Virtual communities (or e-communities), referring to members (strangers) who communicate and interact, build relationships, and collectively and individually seek to achieve some goals in an information technology (IT)-supported virtual space, have posed a good question: how to improve members' knowledge outcome at the post-adoption stage (e.g., continuance) (Kim & Song, 2009; Kim et al., 2012; Ma & Agarwal, 2007; Zhou et al., 2012). Examples of knowledge outcomes include knowledge contribution and knowledge exploration. E-communities attract members because of leveraging resources (e.g., knowledge) contributed by other members for product development, learning, advertising, training, innovation, and goal achievement (Wasko & Faraj, 2005; Wan et al., 2012; Wei et al., 2011). Examples include facebook or expert specific locations like Quora. However, retaining members and motivating their knowledge contribution and exploration face challenges due to ineffective social interactions (lack of social cues such as body language), natural human tendencies to prevent knowledge contribution to and knowledge exploration from strangers, and insignificant influence of social norms on these tendencies (e.g., uncertainty engendered by lack of synchronicity and immediacy) (Bagozzi & Dholakia, 2006; Ren et al., 2007; Tsai & Bagozzi, 2014). Post-adoption phenomena play a key role in avoiding members' switch to a new e-community, motivating their knowledge contribution and knowledge exploration (e.g., innovation), and maintaining a long-term relationship with the e-community. However, studies on e-communities show that members have weak loyalty and low innovation, and make limited knowledge contributions, and the formation of a knowledge outcome is inconclusive, hindering the progress of e-communities (Ma & Agarwal, 2007; Tsai & Bagozzi, 2014). This present study focuses on the drivers of knowledge outcomes at the post-adoption phase, because they enrich understanding on how to increase e-community sustainability, facilitate knowledge initiatives (e.g., knowledge creation), and achieve both members' goal and e-community success (Bock et al., 2005; Kim & Son, 2009).

Prior work on e-communities has suggested that a social-technical perspective should be used combining individual, organizational, social, and technical factors (Daniel et al., 2013; Ma & Agarwal, 2007). Accordingly, some researchers have considered various antecedents of knowledge outcomes, including individual characteristics (e.g., cognition and behavior, learning orientation), organizational factors (goal orientation; group norms), technical factors (IT efficacy), and social factors (social norms, social identity) (Ma & Agarwal, 2007; Tsai & Bagozzi, 2014; Wan et al., 2012; Wei et al., 2011). However, less attention has been paid to the dynamic perspective of e-communities and how it affects member perception and behavior.

A dynamic perspective views individuals' cognition (e.g., motivation, commitment) and behavior when interacting with the e-community as changed conditions to react to a stimulus, which is guided by their evaluation on the stimulus. For example, e-community members' perceived quality (conceptualized as personal attitude and social influences) represents stimuli from e-community that affect their subsequent motivation (e.g., desires) and behavior (e.g., outcome improvement, knowledge contribution) (Tsai & Bagozzi, 2014). Studies on virtual settings conceptualize stimuli as personal control (e.g., online presentation self-efficacy, goal orientation) (Wan et al., 2012), social influences (Kim et al., 2012; Tsai & Bagozzi, 2014), perceived quality of the e-community (Ma & Agarwal, 2007). They emphasize the importance of individuals' perceived quality to create the motivational impetus (e.g., desire for online self-presentation), which in turn affects their outcome improvement behavior (e.g., knowledge contribution). Others focus on continuance and note that its formation relies on multi-dimensional motivational impetus, conceptualized as affective commitment and calculative commitment (Zhou et al., 2012). They draw on the dedication-constraint framework to highlight the importance of building a user-provider relationship (conceptualized as commitment) in affecting continuance. Similarly, others explain how a user-provider relationship influences continuance through dedication-based mechanisms (e.g., perceived benefits, affective commitment) and constraint-based mechanisms (e.g., investments, calculative commitment) (Kim & Son, 2009).

While an increasing number of studies have considered the formation of continuance in online settings, they are limited in capturing the unique features of e-communities for quality enhancement and how these features influence post-adoption phenomena and knowledge outcomes (Bhattacherjee, 2001; Kim & Son, 2009). Examples of these features include online image or identity (the establishment of individuals' own reputation and the recognition of others), relationship development between acquaintances, and self-presentation in e-community success. There is a strong need to extend the current literature by developing and testing a model that incorporates e-community features and addresses their challenges and uncertainty. Thus, this study poses the following research questions:

RQ1: how does e-community members' commitment (affective commitment, calculative commitment) affect knowledge outcomes at the post-adoption stage (continuance intention of both knowledge exploration and knowledge contribution)?

RQ2: how does members' perceived e-community feature (online self-presentation quality) affect their commitment?

This study draws on theories in several domains to enhance our understanding about post-adoption phenomena, including social exchange theory, knowledge management, self-presentation theory, and group behavior (Blau, 1987; Donath, 1999; Leary, 1996). The underlying premise of our work is that e-community members' post-adoption behavior is influenced by whether the e-community is perceived to improve online self-presentation

quality that increases their benefits and reduces their uncertainty, which in turn motivate them for continuance of knowledge outcome improvement. We build on self-presentation theory to explain how members' perceived e-community features, in terms of personal control over their image and their perceived influence from the social context (e.g., norms, social identity), motivate their relationship development (commitment) with the e-community (Leary, 1996). Besides, we draw on the dedication-constraint framework of social exchange theory to explain how online self-presentation quality affects members' motivational impetus (e.g., commitment) and subsequent post-adoption behavior (Bendapudi & Berry, 1997; Kim & Son, 2009). This study aims to integrate self-presentation theory and the dedication-constraint framework. This integration is critical to deepen our understanding on how online features motivate members' participation in online activities and how this motivation is related to post-adoption behavior through commitment. We highlight the role of commitment as an intervening variable connecting the causal relationship between the perceived self-presentation quality and post-adoption behavior. This study contributes to the research on post-adoption behavior in the e-community context by accounting for the influence of e-community features in self-presentation quality and dedication-constraint mechanisms on post-adoption phenomena.

2.THEORETICAL BACKGROUND

2.1. E-communities, knowledge exploration, and knowledge contribution

Brown and Duguid (2001) reveal that value creation from knowledge flows in a virtual community is best understood by viewing members' knowledge-related activities (e.g., use, contribution) at the post-adoption stage as an outcome and how to achieve this outcome through knowledge flow improvement. Others emphasize the need for social relationships between members and their practice (e.g., social identity, norms, and efficacy) for effective knowledge exchange and flows (Ma & Agarwal, 2007; Wan et al., 2012; Wasko & Faraj, 2005). Practice-related communities for learning and knowledge exchange primarily fall into two categories—communities of practice and networks of practice. The former includes a group of members with a close connection between them who know each other, share practice face-to-face, and work together to attain goals. In contrast, networks of practice consist of a larger group of members who have weak connections (e.g., strangers) and are geographically distributed to share knowledge and practice. These members may not know each other nor necessarily expect to meet face-to-face. This study focuses on networks of practice with IT features due to their popularity and potential for accessing vast knowledge resources for innovation. Thus, we define e-communities as networks of practice with Web-based foundation that enable members to extend their reach and interact with other members.

Researchers note that a foundation with IT-enabled features (e.g., information flow, storage for knowledge) can facilitate knowledge exchange and accumulation by processing and presenting information in a new and flexible way, and by providing the social context for

interaction and relationship development between members—leading to continuance and benefits (DeSantis & Gallupe, 1987; Ma & Agarwal, 2007). For example, reputation systems that rate contributors on the quality of their knowledge offer a readily available of expertise and experts to knowledge seekers. However, others report that e-communities face challenges for knowledge exchange and use, and loyalty due to lack of strong ties, status and demographic similarity, and a history of prior relationships that are critical to continuance of knowledge sharing (Cohen & Zhou, 1991; Wasko & Faraj, 2005). Because of the paradox for knowledge exchange in e-communities and limited theoretical understanding about how and why e-communities facilitate knowledge use and retain members, this study aims to fill this gap.

Extant research on information systems (IS) use has considered post-adoption use as one of the most important measures of IS success in general and online knowledge creation in particular (Bhattacherjee, 2001; Kim & Son, 2009; Ma & Agarwal, 2007). Some researchers emphasize the importance of multi-dimensional measures of post-adoption phenomena to capture the specific features of IT or context, including word-of-mouth (e.g., dedication) and retaining current popularity (e.g., constraint) in e-service, and skill development and IT exploration in e-learning (receiving and gaining knowledge) (Kim & Son, 2009; Maruping & Magni, 2012; Wan et al., 2012). Others view knowledge contribution as measures of knowledge outcomes at the post-adoption stage in e-communities based on members' reactions to stimuli (e.g., the influence of e-community features, facilitating the process to communicate one's identity) (Ma & Agarwal, 2007; Tsai & Bagozzi, 2014). Examples of reactions include perception, desire, perceived identity verification, and commitment. This stream of work generally agrees that the level of good e-community prospects relies on members' expectation of positive outcomes at the post-adoption phase, which are influenced by members' perceived e-community features for self-presentation (identity).

Building on knowledge management literature, this study measures e-community members' knowledge outcomes at post-adoption use as two dimensions--continuance intention for both knowledge exploration and knowledge contribution (Maruping & Magni, 2012; Wan et al., 2012). The former emphasizes members' propensity for using the e-community and other members' knowledge as a source to gain new insights—a "*receiving*" aspect, while knowledge contribution emphasizes members' provision of knowledge and expertise to other members—a "*providing*" aspect. They reflect two different but complementary aspects of post-adoption outcomes, thus broadening our understanding of post-adoption phenomena. For example, a receiving aspect focuses on individuals' needs of knowledge and innovation to enhance work performance, while a providing aspect underscores individuals' contribution and offering benefits to others. Both knowledge contribution and knowledge exploration face difficulties in networks of practice (e-community). This is because knowledge contribution benefits all others (strangers) except the contributor when she/he can easily free-ride on the

efforts of others. Knowledge exploration involves knowledge exchange and knowledge acquisition, and can cause difficulty because knowledge is often tacit and highly embedded, requiring good communication, individuals' confidence on the knowledge quality provided by others, and norms (e.g., reputation, reciprocity) to guide their behavior that are difficult to sustain through e-communities (Bock et al., 2005; Wasko & Faraj, 2005). Thus, recent theory seems to reveal that significant levels of knowledge outcomes are unlikely to achieve in the context of e-community. Without the minimal level of knowledge contribution and knowledge exploration, an e-community is deemed as failure. Understanding the formation of knowledge outcomes at the post-adoption stage is critical to e-community success because they reflect reduced uncertainty, increased benefits, member retention, and enhanced long-term community prospects. Thus, there is a strong incentive to understand the key drivers of post-adoption outcomes.

Prior work on IS use in general and online behavior in particular has used social-psychological theories to explain the formation of post-adoption behavior. This stream of research invokes various individual, feature-related, social, and relationship building factors to explain post-adoption phenomena (Baumeister, 1999). For example, the dedication-constraint mechanisms are widely used in explaining how continuance at an online setting is affected by individuals' perception (e.g., commitment) and feature-related antecedents (e.g., value creation or benefits from the online environment) (Kim & Son, 2009; Zhou et al., 2012). Tsai and Bagozzi (2014) draw on a mind and action theory to describe the relationship between individuals' cognition on stimuli and their reaction to these stimuli, emphasizing the importance of online self-presentation and goal achievement in contribution behavior. Cognition on stimuli reflects a variety of perceived influences from social (e.g., social identity) and individual (e.g., personal control) aspects (Kim et al., 2012). Reactions are conceptualized as desires (transformative functions from cognition into subsequent behavior) and continuance. This body of work generally views one's cognition on stimuli as her/his motivation for subsequent perception and behavior (e.g., reasons for relationship development), while reactions as converting motivation into post-adoption behavior (e.g., reasons for continued behavior). While useful, they do not account for a set of factors that is likely to influence knowledge outcomes at the post-adoption phase in an e-community.

Studies on IS use have recognized the importance of commitment in predicting the outcome and continued use of organizational IS applications in general and online knowledge use in particular (Kim & Son, 2009; Wan et al., 2012). Commitment reflects a psychological state that provides motivational impetus for individuals' transformative functions from their perceived influence into outcome improvement (Meyer & Herscovitch, 2001). Thus, a second stream of research has begun to explore how various antecedents in virtual settings (e.g., e-shopping, e-learning, e-service) affect individuals' reactions and motivational impetus (e.g., motivation, desire for online self-presentation, commitment), and subsequent post-adoption

behavior (Chandra et al., 2012; Kim et al., 2012; Wan et al., 2012). However, an empirical work that focuses on comprehensive assessment of online stimuli and features, and how e-community members react to these stimuli for knowledge outcome improvement at the post-adoption stage remains absent.

2.2. **The research model: commitment and self-presentation quality**

This study expands theory of knowledge management and pro-social behavior to propose a model that delineates the relationship between perceived online presentation quality, commitment, and outcomes.

Literature on relationship marketing (Bendapudi & Berry, 1997) and organizational behavior (Meyer & Herscovitch, 2001) has viewed commitment as a key driver for continuance of IT applications in general and online relationship development in particular. Kumar et al. (1995) view commitment as a summative evaluation of stimuli that may guide subsequent behavior and conceptualize it as durability (a desire to continue a relationship), input (investment of effort), and consistency (confidence) on the relationship with an online dealer. Others draw on the dedication-constraint framework to explain the influence of commitment on post-adoption behavior (Bendapudi & Berry, 1997). Dedication refers to individuals' desire to maintain a relationship due to the prospects of long-term mutual benefits. Constraint reflects to the mechanism that imposes constraints on individuals to maintain relationships, emphasizing locked-in phenomena due to their economic, social, or psychological investments that are not easily transferrable to other partners. Examples of dedication-constraint commitment include members' perceived rewards (e.g., reputation, dedication) from identity and their effort (e.g., investment, constraint) on on-line self-presentation (e.g., characterizing and differentiating oneself in an online setting) (Chou & Chiang, 2013; Ma & Agarwal, 2007). Empirical studies on knowledge contribution emphasize members' commitment to the e-community in affecting their knowledge outcomes (Wasko & Faraj, 2005). Zhou et al's (2012) work on online service conceptualized commitment as affective commitment (dedication) and calculative commitment (constraint) and found that these two types of commitment play a key role in continuance intention. This body of work conceptualizes commitment as multi-dimensional factors and views them as motivational impetus to convert stimuli (e.g., antecedents of perceived benefits and investments) into post-adoption behavior (continuance intention).

Self-presentation theory explains how a person's perceived quality of images (identity) affects their cognition and subsequent behavior (Leary, 1996). This theory entails two issues to explain the reasons for this quality or self-presentation--"self" and "identity" (Owens, 2006). The former refers to a person's perception of "self" related to various characteristics, including personality, skills, and group membership. "Identity" refers to the defining characteristics of a person. Identity is subsumed within the broader concept of self and is viewed as a mechanism from which a person makes self-appraisal of a variety of attributes

along the dimensions of physical and cognitive abilities and the multiplicity of social roles, including experts and community citizens (Ma & Agarwal, 2007).

Self-presentation theory suggests two motives for improving the perceived quality of identity—obtaining rewards and building relationships with similar others (Schlenker, 2003). For example, an individual gains social rewards (e.g., reputation, reciprocity) from others because he/she tries to make them like him/her by presenting his/her positive images (Kim et al., 2012). High quality identity may allow the individual to gain benefits from those who like him/her. Studies provide evidence that good self-presentation helps e-community members find similar others with whom to develop relationships (Ma & Agarwal, 2007).

Self-presentation can take place in both offline and online settings. This study focuses on the latter and defines the perceived quality of online images as the extent to which individuals believe that online settings offer the features and facilitate the processes for goal achievement. Self-presentation theory posits that this perceived quality is evaluated and undertaken by an individual with a specific social situation (e.g., social interaction in an e-community) (Leary, 1996; Schlenker, 2003). They suggest that the extent to which the perceived self-presentation (or image) quality improvement depends on both members' control over their identity and their perceived influence from the social environment (e.g., compliance with norms). Accordingly, we draw on social cognitive theory and social influence theory to explain the phenomena of personal control and social influence respectively (Kim et al., 2012).

This study draws on social cognitive theory to conceptualize personal control as self-efficacy and learning goal orientation (Bandura, 1986). Social cognitive theory has been widely used to explain the influence of individuals' self-belief system on their control over cognitive processes, motivation, and behavior. The extent to which individuals' self-belief system can impose personal control depends on their ability to implement it and their goal orientation (criteria to measure the progress of the control implementation) (Bandura, 1997). The conceptualization of personal control (or self-belief) is based on the specific context and the target behavior involved, including computer self-efficacy (Wei et al., 2011), and goal orientation (Wan et al., 2012). Following prior work on e-community and e-learning, this study focuses on online presentation self-efficacy and learning goal orientation. The former emphasizes members' ability to self-present in virtual settings. Learning goal orientation motivates members to face uncertainty and adjust their behavior to meet goals (e.g., knowledge exploration to handle difficult tasks). They reflect two different aspects of personal control of perceived quality--*how* to do based on self-efficacy and *what* are critical issues for goal achievement, from which an individual gain rewards and develop relationships with other members.

Social influence theory aims to explain how one's perceived defining characteristics (e.g., perceived identity or defining attributes in a group) is influenced by three types of

processes from one's social setting, including compliance (i.e., influence exerted from rules on rewards or punishment), internalization (i.e., acceptance of others' beliefs), and identification (i.e., influence based on liking or respect of another person) (Kelman, 1974, 2006). Similarly, Bagozzi and Lee (2002) identify three factors of social influence to affect interpersonal and group behavior, including social compliance (normative responsiveness to obtain social approval and avoid disapproval), internalization (congruence between one's values or goals with group members') and identification (individuals' identification and awareness of their groups). While compliance involves conforming to the external norms of the group, internalization refers to the process in facilitating the congruence between the individual's own value system and the group's values (or norms). Thus, both compliance and internalization highlight the importance of norms in influencing a person's cognition and behavior (Kim et al., 2012). In the context of online social networks, formal rules are less likely to exist. Rather, informal norms are likely to exert influence on one's behavior. In this study, we use online norms to represent compliance and internalization of social influence, conceptualized as self-presentation norms and group norms respectively. The former emphasizes members' expectation to gain rewards through managing and presenting their online image—a compliance aspect. Group norms focus on members' adoption of common self-guides to meet goals shared by online groups, reflecting their willingness to build relationship with group members—an internalization aspect.

Social identity refers to one's acceptance and awareness of social influence, based on their cognition and feelings, to build a self-defining relationship with an e-community (Ellemers et al., 1999). Thus, social identity represents an identification aspect of social influence. Social identity also reflects individuals' positive perception on their identity quality, in terms of their feelings and awareness (Sluss, 2007). For example, social identity reflects individuals' cognitive sense, judgement about similarities with other members, and judgement of themselves based on their competence and contribution to the group (e.g., sense of self-worth) (Bock et al., 2005). This judgement affects individuals' motivation and behavior to build a self-defining relationship with similar others (Tsai & Bagozzi, 2014). Besides, this positive judgement (perception) reflects individuals' identification with, liking themselves based on their value to, involvement in, and emotional attachment to the focal group (Allen & Meyer, 1996). This study conceptualizes social identity as two different but related sub-constructs—involvement and sense of self-worth. This conceptualization is based on the theory of social identity that identifies the key components of social identity—awareness and affective commitment, and evaluation of self-worth (Ellemers et al., 1999). We theorize the former as involvement and evaluation of self-worth as sense of self-worth. Both involvement and sense of self-worth focus on building a self-defining relationship. Involvement emphasizes individuals' *behavior* (e.g., participation in knowledge contribution), while sense

of self-worth highlights their *judgement*. Thus, involvement and sense of self-worth represent two aspects of social identity and the perceived quality of online image.

In this study, we integrate self-presentation theory into the dedication-constraint framework to explain how stimuli from e-community affect members' commitment, which in turn serves as the motivational impetus for the subsequent behavioral intention. Building on these theories, we conceptualize stimuli as the perceived quality of identity derived from personal control and social influences (self-presentation theory), motivational impetus as affective commitment and calculative commitment (dedication-constraint framework). Once e-community members perceive high quality of online image (reflecting the stimuli from e-community features), they tend to gain positive motivational impetus, in terms of commitment, which in turn improves their post-adoption knowledge outcomes. Figure 1 lists the research model. Table 1 presents the definition of the constructs.

---Insert Figure 1 and Table 1 here---

3. RESEARCH HYPOTHESES

3.1. **Hypotheses between commitment and knowledge outcomes at the post-adoption phase**

Studies on online post-adoption behavior have used the dedication-constraint framework to explain how post-adoption phenomena (e.g., continuance intention, word-of-mouth, unwillingness to switch to a new service provider) are influenced by individuals' perceived value from the online setting (Kim & Son, 2009; Zhou et al., 2012). The perceived value incorporates dedication-based mechanisms and constraint-based mechanisms. These mechanisms have been conceptualized as a multi-dimensional factor, including affective commitment and calculative commitment to reflect individuals' affective evaluation (dedication) and cognitive evaluation (e.g., cost for discontinuance, constraint) of interacting with the IT applications respectively. Prior work has emphasized the role of commitment in explaining long-term relationships such as personal relationships (Stanley & Markman, 1992) and member-community relationships (Wasko & Faraj, 2005). Wasko and Faraj (2005) found that commitment in an e-community reflects members' obligation for the community and motivates their knowledge contribution.

This study defines affective commitment as a desire-based attachment that motivates an individual to maintain a long-term relationship with the e-community. According to commitment literature, the development of affective commitment is typically attributed to positive experiences that meet individuals' goals and psychological needs for confidence and comfort (Allen & Meyer, 1996). Affective commitment reflects not only individuals' loyalty but also their participation in (e.g., input, obligation) and belonging to a relationship because of a related rewarding experience (Zhou et al., 2012). For example, members' commitment to the e-community encourages them to provide useful knowledge (e.g., obligation) to and acquire knowledge (e.g., confidence on others' knowledge/ability) from the community.

Prior work consistently shows that affective commitment encourages individuals' continuance intention because of their positive perception and attitude based on a history of interacting with the e-community (Li et al., 2006; Zhou et al., 2012). This perception also helps members solve challenges associated with knowledge exchange between and knowledge acquisition from acquaintances. This is because positive experience based on past history of interaction facilitates more interaction in the future, and increases members' confidence on others' expertise/insights and their willingness to view the community as a source for knowledge exploration. Thus, we propose H1.

Affective commitment reflects members' loyalty, desires to continue the relationship with the e-community, and willingness to contribute to the community (Kim & Son, 2009; Kumar et al., 1995). Individuals who are dedicated to building a long-term relationship (e.g., members' affective commitment or loyalty to e-community) are willing to participate in the activities of the community (e.g., knowledge contribution) and establish a stronger relational bond with the community and other members (Kim & Son, 2009; Wasko & Faraj, 2005). For example, e-community members' affective commitment encourages a sense of responsibility (or obligation) to help other community members by providing useful knowledge. Affective commitment also addresses challenges (e.g., free-ride on a contributor's knowledge) related to knowledge contribution, because loyalty strengthens the bonds between members and perceived obligation and rewards encourage them to contribute knowledge to the community despite the free-ride of their knowledge and weak ties in an e-community. Thus, we posit that affective commitment motivates e-community members' continuance intention for knowledge contribution—leading to H2.

H1: Members' affective commitment to the e-community positively affects their continuance intention for knowledge exploration.

H2: Members' affective commitment to the e-community positively affects their continuance intention for knowledge contribution.

We draw on the constraint-based mechanism to explain the influence of calculative commitment in the context of an e-community (Bendapudi & Berry, 1997). Calculative commitment is defined as the extent to which e-community members recognize that they are locked in a relationship due to the potential costs from discontinuance (Allen & Meyer, 1996; Li et al., 2006). Relational marketing literature treats calculative commitment as a constraint-based force to bind the customer to the service provider, including their interaction and relationship development (Bansal et al., 2004). Studies on e-settings have recognized the role of constraint-based mechanisms in continuance intention and viewed these mechanisms as sunk costs (e.g., investments, switching costs, and the concern with discontinuance costs) (Kim & Son, 2009; Zhou et al., 2012).

The organizational behavior literature reveals that calculative commitment forces an individual to continue with a relationship due to the high cost associated with damaging the

relationship and withdrawal (Jaros et al., 1993). In the context of an e-community, members' calculative commitment is derived from their effort on improving identity quality and building a self-defining relationship with a group, and understanding and congruence on online norms (Kim et al., 2012; Tsai & Bagozzi, 2014). Thus, members' calculative commitment represents that their effort and understanding on online self-presentation are verified and confirmed by other members of the e-community—congruence between the member and others. Thus, the effort, understanding, and congruence are viewed as the member's investments devoted to a certain e-community that are not easily transferrable to other e-communities. Thus, calculative commitment serves as a key driver for members' continuance intention.

When members have high calculative commitment, their subsequent behavioral intention is based on their avoidance of terminating the current relationship and reducing the value of past investment (e.g., online self-presentation quality, social approval, congruence with norms). For a knowledge-intensive community, members with calculative commitment should attempt to overcome the difficulties in maintaining the same level of value creation and knowledge outcomes. Thus, they tend to continue interaction with other members and acquiring new knowledge and insights from them, and exploring opportunities for innovation and knowledge outcome improvement. Thus, we propose H3.

To avoid terminating the existing relationship and loss of investments, and to maintain the same level of social rewards (e.g., reputation, reciprocity), members with calculative commitment attempt to continue interaction with other members and providing good knowledge. This also implies that calculative commitment encourages the member to overcome difficulties in knowledge contribution, including lack of strong ties and unwillingness for other members' free-ride on knowledge. Thus, we hypothesize that calculative commitment plays a key role in members' continuance intention for knowledge contribution, leading to H4.

H3: Members' calculative commitment to the e-community positively affects their continuance intention for knowledge exploration.

H4: Members' calculative commitment to the e-community positively affects their continuance intention for knowledge contribution.

3.2. **Hypotheses between perceived quality of identity and commitment**

Self-presentation theory provides a theoretical lens to explain how individuals' perceived self-presentation quality affects their subsequent cognition (e.g., desire, commitment) and behavior (Leary, 1996). According to self-presentation theory, the extent to which individuals perceive online identity quality relies on the degree of control over the presentation. The control in online settings incorporates efficacy to use online features (e.g., personal Web pages, avatars, screen names) for self-identity and association with similar people, history of interaction with the e-community, and creating good reputations based on

goal orientation and social influences (e.g., compliance). Prior work mainly focuses on two types of self-presentation control--personal control and control exerted from social influences (Kim et al., 2012; Ma & Agarwal, 2007)

The relationship between personal control and commitment

Personal control refers to members' control over their self-presentation quality through the progress of quality improvement and the goals (or standards) to measure the progress (Schlenker, 2003). Progress of quality improvement emphasizes *"how"* individuals exert control over the progress through self-efficacy, while goal standards focus on *"what"* criteria are critical to goal achievement. In this study, we characterize self-efficacy as online presentation self-efficacy, and goal standards as learning goal orientation. We apply social cognitive theory to investigate the influence of personal control (e.g., how to improve quality in a specific e-community) on members' commitment to the e-community (Bandura, 1986).

Self-efficacy reflects individuals' confidence on their ability to present a preferred image that helps them communicate their identity with others and enables others to correctly understand "who am I?" in a specific environment (Ma & Agarwal, 2007). In this study, we define online presentation self-efficacy as e-community members' belief in their own ability to present image reasonably well that has the potential to yield benefits. For example, individuals' good self-efficacy enables others like them by presenting their good personal qualities. Besides, this self-efficacy also allows individuals to associate with similar people with whom to establish relationships (Kim et al., 2012). The influence of online presentation self-efficacy on members' commitment can be explained by social cognitive theory (Bandura, 1986, 1997). This theory posits that individuals' self-belief systems in a specific environment play a key role in influencing their affect, cognition, and motivation for subsequent behavior. Studies on this theory report that self-efficacy plays a crucial role in individuals' affect (e.g., desire for online self-presentation) and cognition (e.g., self-regulated strategies for learning process improvement) (Kim et al., 2012; Wan et al., 2012).

Self-efficacy beliefs serve as a key driver for individuals' self-regulation activities in which they are more willing and comfortable to participate in the activities that they view themselves capable of achieving (Bandura, 1997). Others report that individuals with high self-efficacy tend to achieve successful outcomes, increase benefits, and show strong commitment to the activities and environment that they choose to engage in (Bandura, 1986; Chandra et al., 2012; Wei et al., 2011). Still, others note that members' online presentation self-efficacy enables them to believe that they can create value from interaction and building a relationship with other members, which result in these members' commitment to the relationship (e.g., desire to engage in online activities) and their knowledge contribution (Kim et al., 2012; Tsai & Bagozzi, 2014).

When members have high online presentation self-efficacy in an e-community, they have great confidence to gain benefits and solve challenges (e.g., poor communication, lack

of shared history, dissimilarity) associated with building a relationship with the e-community. Thus, from a dedication perspective of relationship establishment, members' online presentation self-efficacy tends to increase their affective commitment to the e-community due to expectation of reaping benefits from the relationship with the e-community. Thus, we propose H5.

The quality of online presentation self-efficacy is context-specific. For example, this quality requires some features that are specific to the environment of the e-community, including familiarity with online features of the e-community, interaction with the e-community members over time, shared history between them, and similarity with the members of a specific e-community (Kim et al., 2012; Ma & Agarwal, 2007). Improving online presentation self-efficacy in a specific e-community reflects members' effort and investment specific to this setting and difficulty to recover this investment in other e-communities, which result in locked-in phenomena (or constraint). Given calculative commitment represents a constraint-based mechanism for building relationships, we hypothesize that online presentation self-efficacy influence calculative commitment—resulting to H6.

H5: members' online presentation self-efficacy positively affects their affective commitment.

H6:members' online presentation self-efficacy positively affects their calculative commitment.

According to social cognitive theory, individuals have a self-belief system that allows them to exercise control over their cognitive processes, motivation and behavior (Bandura, 1986). Goal orientation is a manifestation of such control and focuses on criteria against which to measure the progress in goal achievement. The specific form of goal orientation relevant to this study is learning goal orientation, which refers to individuals' belief that efforts in learning and knowledge exploration lead to improvement in outcomes. Learning goal orientation serves as a self-regulation system to motivate individuals to develop ability and to improve processes and outcomes (Ford et al., 1998; Wan et al., 2012). People with high degree of learning goal orientation have a strong desire in handling difficult tasks, addressing challenges, innovation, and new skills and knowledge acquisition. A low degree of learning goal orientation implies little concern for mastering tasks or ability improvement.

In an e-community context, members with learning goal orientation have more positive attitude toward improving identity quality through online features, knowledge exploration, innovation, and learning (Hurtz & Williams, 2009; Klein et al., 2006; Leary, 1996). They are interested in the process of learning and exchange of knowledge with others, and believe that ability is important and can be developed through communication and building relationships with others for more knowledge exploration and innovation. To meet specific standards (goals), these members are more likely to judge their identity quality, make the necessary

adjustment, and learn to increase quality. Thus, learning goal orientation reflects members' effort to improve identity quality and facilitate interaction and relationship development with similar others—leading to increased level of shared history through interaction and other rewards (e.g., reputation).

Members with learning goal orientation have more confidence on their ability to gain benefits (e.g., social rewards, positive image) from the e-community due to their perceived identity quality. They are more likely to solve challenges associated with knowledge outcome improvement because of shared history and building relationships with similar others. Thus, according to a dedication perspective for relationship development, we hypothesize that members' learning goal orientation positively affects their affective commitment to the e-community, because of their positive attitude of reaping benefits and overcoming challenges—leading to H7.

E-community members' self-belief systems are context-specific. For example, the required ability and standards (e.g., needed skills and knowledge) in a specific group that improve processes and outcomes for knowledge-intensive activities are not the same as those in other groups of an e-community. The perceived identity quality and control reflect one's investment (e.g., learning and adjustment to enhance identity quality) through interaction and relationship development with similar others in a specific group of an e-community. Members' investments devoted to a specific e-community (group) and similar others are unlikely to transfer to other e-communities (or groups)—leading to a constraint phenomenon for increasing the members' commitment. Thus, we posit that learning goal orientation exerts positive influence on members' calculative commitment to the e-community. Thus, we propose H8.

H7: members' learning goal orientation positively affects their affective commitment.

H8: members' learning goal orientation positively affects their calculative commitment.

The relationship between social influence and commitment

In the earlier description of the process of social influences, we identify the online norms and social identity as the conceptualization of online social influence that serves as the key driver for individuals' motivation impetus of their subsequent reaction. This is consistent with prior e-community literature that norms (e.g., self-presentation norms, group norms) play a key role in individuals' motivation for participation in e-community activities (e.g., knowledge contribution)(Kim et al., 2012; Tsai & Bagozzi, 2014). In this study, online norms are defined as the perceived norms or social pressure that members should perform. Online norms are conceptualized as two related but different components based on existing literature--self-presentation norms and group norms (Kim et al., 2012; Tsai & Bagozzi, 2014). We define self-presentation norms as the perceived norms that members should comply and present their online identity in the interest of the e-community, reflecting the need for approval through members' compliance with identity quality—compliance. Group norms

highlight the congruence between members' own value system and that of other members in a small group (e.g., online friends) in larger e-communities—internalization. Norms (e.g., subjective norms or perceived social influence for compliance) serve as a key factor for individuals' IT use intention in general (Venkatech et al., 2003), and attitude and intention for knowledge contribution in particular (Bock et al., 2005). In the context of e-communities, Ren et al. (2007) report that members adapt their cognition and behavior according to online norms (conceptualized as self-presentation norms) with the expectation to enhance one's image and gain benefits. Others view group norms as good communication and consensus among members regarding when and how to participate in group activities and relationship establishment (Tsai and Bagozzi, 2014). Their work found that group norms serve as a key driver for members' motivation for reactions (e.g., desire, commitment to the group relationship).

In this study, we model online norms as a second-order factor that accounts for shared variance in the self-presentation norms and group norms. When self-presentation norms are strong, members view improving self-identity quality as critical, implying that they are more willing to participate in self-presentation activities (e.g., expending effort and time for knowledge outcome improvement). The compliance of self-presentation norms enables members to believe that they can gain rewards (e.g., identity confirmation, good knowledge exchange, relationship development) and solving challenges in knowledge acquisition due to good communication and shared norms (e.g., reciprocity, association with similar others, shared history). Thus, from a dedication perspective of establishing relationships, we expect that self-presentation norms exert positive influence on members' affective commitment to the e-community. Group norms are derived from information exchange and communication (e.g., good quality of knowledge provision) among group members and reflect their broad interpretation of values to guide their cognition and behavior, leading to their confidence on others' knowledge and shared values. Members with the group norms are more likely to develop group relationships because their congruence with the shared values and goals, and their expectation of reaping benefits from the shared goals (e.g., more knowledge exchange and communication). Besides, the challenges associated with knowledge-intensive activities (knowledge exchange) are more likely to be addressed due to shared history of interaction, confidence on group members' knowledge quality, and norms. Thus, we expect that group norms play a crucial role in affective commitment based on the dedication viewpoint. Based on the above arguments, we expect that online norms play a key role in increasing affective commitment—leading to H9.

Online norms reflect the extent to which the process of social influences affects one's perceived identity quality and such perception is context-specific. For example, members' compliance with a specific social situation (e.g., expected rewards for improving their online image based on self-presentation norms) and their congruence with the reference group's

norms (internalization, acceptance of group norms) reflect their investment on increasing identity quality. This investment is not easily transferable to other e-communities with different norms—leading to locked-in phenomena according to the constraint perspective of maintaining a relationship. Thus, we hypothesize that online norms serve as the key determinant of calculative commitment—leading to H10.

H9: members' online norms positively affect their affective commitment.

H10: members' online norms positively affect their calculative commitment.

In this study, social identity reflects members' identification processes to build a self-defining relationship with a group of an e-community. Social identity represents a key means to improve online image quality through members' emotional involvement in and evaluations of self-worth from communication and relationship establishment with the e-community (Ellemers et al., 1999; Sluss et al., 2007). The conceptualization of social identity in e-communities falls into two broad categories--involvement and sense of self-worth (Kim et al., 2012; Tsai & Bagozzi, 2014). They reflect two related but distinct aspects of social identity. Involvement focuses on members' participation in e-community activities, including knowledge contribution and exploration to reflect both their awareness (cognition, judgement of similarities with others) for and feelings of attachment (affect) to the e-community. Sense of self-worth highlights members' evaluative significance of social identity and self-esteem (e.g., one's knowledge contribution) from the e-community relationship. We model social identity as a second-order construct to incorporate involvement and sense of self-worth.

Identification reflects individuals' acceptance of social influences to guide their behavior (e.g., involvement in e-communities) and perform self-evaluation from which they judge their quality of online image. When members perceive themselves as members of a social group, their identification facilitates their involvement in online activities and exhibits pro-social behavior (e.g., reciprocity, evaluations of behavior based on self-worth derived from membership) (Sluss et al., 2007). Empirical studies reveal that involvement is linked to various outcomes, including personal investment, communication between members, attachment to the community, and desire to follow group behavior (e.g.., presentation of self-identity) (Kim et al., 2012; Ren et al., 2012). Others note that social identity (conceptualized as evaluative significance of group membership) positively affects members' desire for contribution to the group in the e-community (Tsai & Bagozzi, 2014). Similarly, Bock et al. (2005) report that individuals' perceived sense of self-worth plays a key role in their attitude toward knowledge contribution.

When members' involvement in e-community activities is increased, they are more likely to gain benefits from this community because of more communication, reciprocity, and knowledge exchange with other members. Members' involvement also implies that they have more opportunities to overcome challenges associated with knowledge exchange and contribution due to their communication and connection, shared history, and shared identity

and group values with other similar members. For example, people with involvement in e-community have accepted similar social influence to maintain the relationship. Members with high sense of self-worth imply that their online identity quality is verified, which engenders their confidence on other members' positive perception on the focal member's competence and performance (e.g., knowledge contribution, effective communication). This verified sense of self-worth (e.g., the member is valuable and important to the e-community) enables her/him to believe that she/he can gain rewards (e.g., reputation, reciprocity). Besides, members' sense of self-worth helps them overcome challenges associated with knowledge exploration and knowledge contribution, because their good identity quality facilitates communication and relationship development with similar others (e.g., shared history with similar others). Thus, from a dedication viewpoint, we posit that social identity serves as a key driver for their affective commitment to the e-community, leading to H11.

Members' contribution to the specific e-community through involvement in knowledge-intensive activities reflects their effort and investment on the e-community. If these members choose to leave the e-community, their investment cannot recover and the expected benefits (e.g., reputation, reciprocity) from investment are unlikely to transfer to a new e-community. Similarly, members' sense of self-worth implies their effort on enhancing quality of self-presentation through knowledge contribution. This effort and related benefits (e.g., obtaining social rewards, developing relationships with similar others) become useless and the member's effort cannot pay off in other e-communities. Thus, social identity is viewed as lock-in phenomena based on the constraint aspect. Therefore, we expect that social identity exerts a positive impact on calculative commitment—leading to H12.

H11: members' social identity positively affects their affective commitment.

H12: members' social identity positively affects their calculative commitment.

4.METHOD

This study aims to understand the formation of post-adoption knowledge outcomes in the context of e-communities. Building on the dedication-constraint framework and self-presentation theory, we develop a research framework to explain the relationship between online self-presentation quality, commitment, and post-adoption knowledge outcomes. The proposed hypotheses were tested through a survey method. We designed the questionnaire by selecting the variables that have been validated by prior studies.

4.1. Sample and data collection

We collected data from members of a large e-community in Taiwan with more than 100,000 registered members belonging to over three thousands e-communities in December 2013. Most members come from China, Taiwan, and Hong Kong. To become a member of the e-community, she/he must register by selecting a user name and password. The information shared by members is diverse, including travel, entertainment, healthcare, sports, or other life experiences. This information is visible to every other member in real time and obtained

through a searchable archive. Similar to members in other voluntary social settings, their level of participation and contribution is different.

We collected data using Web-based surveys in two stages. In the first stage (T1), we used questionnaire items to measure commitment and its antecedents. Two weeks later (T2), we employed a second survey to examine the influence of commitment on post-adoption knowledge outcomes. We gained permission from both the service provider and mangers of the e-community before distributing survey. The e-community mangers forwarded our e-mails with the explanation of the survey purpose, encouragement of participation, and the guarantee of response confidentiality. The e-community platform provider also offered a banner (hyperlink to our Web survey) that was posted at the entrance of the Web site (login page). The respondents were instructed to answer all of the questions based on their knowledge initiatives (e.g., knowledge exchange, knowledge contribution, obtaining insights from other members). We provided NTD $100 as the incentive to respondents who completed the questionnaires at both T1 and T2.

With the help of the e-community service provider, we used the key informant method to identify respondents—when a respondent typed in her/his user name, the second Web page of the questionnaire created a list of 10 possible friends, acquired from the database. This database is managed by the e-community service provider and collected data from members who had recently offered response to a member's post. The participants can also provide the names of members with whom they usually communicated. The key informant method was proposed by Seidler (1974) and has been used in studies on group behavior in e-communities (e.g., Tsai & Bagozzi, 2014). This method relies on "a small number of knowledgeable respondents, who observe and articulate social relationships for the researcher" (Seidler, 1974).

The total number of responders who completed the first stage (T1) survey was 645, and those for both T1 and T2 were 484. Of the 484 respondents, 16 members came from common groups (five in this case). Besides, we also eliminated those respondents who never have experience in knowledge contribution or knowledge acquisition from e-community members. The data for the final analysis were collected from 278 respondents who belong to a total of 54 different e-communities, according to the database. Table 2 lists the sample characteristics. The number of respondents per e-community ranged from 1 to 33 (mean = 5.18, standard deviation = 5.42). 159 of them were male (57.2%) and the respondents' average age was 26.5. In general, these respondents were well-educated--95% of them held college or more. More than 50% of the respondents have more than 4 years or more experience in e-communities. The working areas of respondents were diverse (e.g., information and communication, health care).

---Insert Table 2 here---

To assess the potential non-response bias, we compared the early and late responding date of the questionnaires on the study variables. We compared the difference between the early respondents (return of completed questionnaires within five days; N = 42; 15.1%) and late respondents (return of them in the last five days; N = 30; 10.8%). The results based on the independent sample t-test (χ^2 = 4.67, p = 0.15) show insignificant differences between the early and the late respondent groups on key measures, presenting evidence that nonresponse bias was not an issue in our data.

4.2. Measurement

We developed an English version of the survey first from prior work, and then we translated it into Chinese by a bilingual research assistant. Three MIS professors and two senior doctoral students who have good knowledge on virtual communities and social behavior verified and refined the Chinese version of the survey to ensure its translation accuracy. Next, we undertook back-translation that incorporates the translation back of Chinese version to the English version, and the comparison between them. We modified the wording of the Chinese version to maintain the consistency in the two versions of survey. Three people with experience of virtual communities and knowledge management pretested the refined survey. Based on their suggestion after pretest, we modified the wording of some survey items to make their meaning clear.

The survey items were measured by using a seven-point Likert scale ranging from 1 (completely disagree) to 7 (completely agree). Table 3 demonstrates the items of each measure. The items to measure continuance intention for knowledge exploration were adapted from Maruping and Magni (2012) and Zhou et al. (2012), and continuance intention for knowledge contribution from Ma and Agarwal (2007). Variables related to online relationship development, including affective commitment and calculative commitment, were adapted from Zhou et al. (2012). Measurements regarding online self-presentation quality include online presentation self-efficacy (Kim et al., 2012), learning goal orientation (Wan et al., 2012), self-presentation norms (Kim et al., 2012), group norms, (Tsai & Bagozzi, 2014), involvement (Kim et al., 2012), and sense of self-worth (Bock et al., 2005; Tsai & Bagozzi, 2014).

---Insert Table 3 here---

Control variables

In line with prior work (Bock et al., 2005; Kim et al., 2012), we used e-community experience and gender as control variables to rule out the possibility that empirical results were caused by covariance with other variables.

4.3.**Data analysis and results**

This study used partial least squares (PLS) to handle a simultaneous assessment of both measurement model and structural model. PLS that uses ordinary least squares as the

estimation technique performs an iterative set of factor analysis and a bootstrap procedure to validate the significance of the paths (Chin, 1998).

Common method biases (CMV)

We assessed CMV that may occur in survey-based research collecting data for the independent and dependent variables from the same source (Podsakoff et al., 2003). CMV is safeguarded through changed scale endpoints for independent and dependent variables, employing different scale types, and different scale length. Following this safeguard approach, as described in data collection procedure (section 4.1), we used Web-based surveys to collect data in two stages—T1 with measure of commitment and its antecedents, and T2 with measure of post-adoption knowledge outcomes. Next, we used Harman's single factor test to evaluate the ten conceptually crucial constructs of our model, including KE, KC, AC, CC, OPS, LGO, SPN, GRN, INV, and SSW. Results of this test generated ten factors and the first factor captured only 23.8% of the total variance. Thus, we conclude that CMV is not a concern in this study.

Measurement model

Content validity aims to ensure the consistency between the prior literature and the measurement items (Johnson & Wichern, 2002). This was produced by interviewing experienced e-community users and pilot-testing the instrument. Discriminant and convergent validity were performed to examine perceptual questions that were used to measure constructs. Convergent validity captures the extent to which multiple questions measuring the same construct agree. Convergent validity was assessed by checking composite reliability and average variance extracted (AVE) from the measures (Chin, 1998). Reliability value for a reliable construct should be greater than 0.7 and the AVE value should be greater than 0.5. Table 4 demonstrates that Cronbach's alphas, composite reliability, and AVE are all above the acceptable values. As shown in Table 5, the weights and loadings on the measures are significant on their path loadings at the level of 0.01. Discriminant validity is confirmed based on the results in Table 6—the square root of AVE for each construct is greater than the levels of correlation involving the construct (Fornell & Larcker, 1981). Table 7 demonstrates the results of both loadings and cross loadings, showing that each construct shares larger variance with its own measures than with other measures, confirming discriminant validity. Based on these findings, we conclude that the constructs in our model have acceptable convergent and discriminant validity. Besides, we also assessed multicollinearity among constructs. The variance inflation factor (VIF) of our constructs ranged from 2.29 to 4.96, which are acceptable.

---Insert Table 4, 5, 6, 7 here---

Structural model

To test the proposed model, we used PLS to assess the significance of paths in the structural model. The PLS results are depicted in Figure 2 and summarized in Table 8. H1, which

examined the influence of affective commitment on e-community members' continuance intention for knowledge exploration, was supported ($\beta = 0.623$; $p < 0.001$). Similarly, H2 that posits the impact of affective commitment on continuance intention for knowledge contribution was supported ($\beta = 0.410$; $p < 0.001$). As to the influence of calculative commitment on continuance intention for knowledge exploration (H3) and continuance intention for knowledge contribution (H4), our findings supported both of H3 ($\beta = 0.157$; $p < 0.05$) and H4 ($\beta = 0.311$; $p < 0.01$). Our findings regarding the relationship between personal control and commitment were mixed. The influence of online presentation self-efficacy (H5) and learning goal orientation (H7) on affective commitment was supported—H5 ($\beta = 0.174$; $p < 0.01$) and H7 ($\beta = 0.175$; $p < 0.01$). However, our results did not support that online presentation self-efficacy (H6) or learning goal orientation (H8) exerted a positive impact on calculative commitment—H6 ($\beta = 0.031$; p = n. s.) and H8 ($\beta = 0.026$; p = n. s.). Regarding the influence of online norms on affective commitment (H9) and calculative commitment (H10), H10 ($\beta = 0.546$; $p < 0.001$) was supported but H9 ($\beta = 0.082$; p = n. s.) was not. Our results showed that social identity affected both affective commitment (H11; $\beta = 0.543$; $p < 0.001$) and calculative commitment (H12; $\beta = 0.283$; $p < 0.01$). One of the control variables, community experience ($\beta = 0.099$; $p < 0.05$) had positively impact on continuance intention for knowledge exploration. This indicated that members learn from their experience in interaction with other members, from which they understand how to improve online self-presentation quality and how to build online relationships, leading to their continuance intention for knowledge exploration.

---Insert Figure 2 and Table 8 here---

5.**DISCUSSION**

The goal of this study is to understand how e-community members' knowledge outcomes are affected by relationship development with the e-community (or similar others), which in turn is influenced by members' perceived quality of online self-presentation. This study uses a dynamic perspective to analyze how members' evaluation of stimuli from an e-community (e.g., image quality) affects their motivation for establishing online relationships and subsequent post-adoption outcomes. We integrate self-presentation theory into the dedication-constraint framework to explain members' continuance intention for knowledge outcome improvement. Our findings confirm that members' perceived self-presentation quality (conceptualized as personal control and social influence) serves as a major stimulus for motivating their relationship development with the e-community (i.e., commitment), which in turn affects their knowledge outcomes. Our results are consistent with prior studies on contribution behavior in virtual settings that members' continuance of knowledge outcomes (e.g., knowledge contribution to and knowledge acquisition from acquaintances) relies on both members' relationship development with similar others and their perceived image quality that help the members solve challenges associated with knowledge outcome

improvement (Ma & Agarwal, 2007; Tsai & Bagozzi, 2014). Our model extends current theorization that has focused in isolation on the influence of perceived image quality and relationship development on knowledge contribution behavior. To the best of our knowledge, this is the first empirical research to consider how knowledge outcomes are motivated by members' relationship development with an e-community, which in turn is affected by their evaluation of stimuli from the e-community (i.e., perceived self-presentation quality).

Nine of the twelve proposed hypotheses are supported, which presents ample evidence to strengthen many of our theoretical arguments. First, our results indicate that commitment serves as a key motivator for knowledge outcomes at the post-adoption stage. Besides, members view perceived benefits (affective commitment, dedication) as a more important driver than potential cost for discontinuance (calculative commitment, constraint) for their subsequent knowledge outcomes. These findings confirm that dedication-constraint framework is suitable to explain the relationship between commitment and continuance of knowledge outcomes. Acknowledging the different influence exerted from dedication and constraint provides new insights into post-adoption phenomena in different settings. Our results enhance understanding about measurements of dedication-constraint mechanisms that have been examined in other online settings (e.g., social virtual world services, online personalization service) (Kim & Son, 2009; Zhou et al., 2012). Our results imply that given the challenges associated with knowledge exploration and knowledge contribution in the context of e-communities, motivating members to participate in knowledge-related activities requires relationship establishment between them.

Second, the hypotheses regarding the impact of perceived self-presentation quality on commitment are largely supported, indicating that affective commitment is mainly driven by members' personal control over their image quality and social identity (H5, H7, H11). The level of calculative commitment relies on social influence (online norms and social identity) (H10, H12) rather than personal control (H6, H8). As hypothesized, a member with high perceived control over their self-presentation quality, in terms of "how to achieve" (online self-presentation efficacy) and "what goals are important" (learning goal orientation), has a greater perceived benefits (affective commitment) from relationship development with the e-community, confirming the impact of self-efficacy and goal achievement on one's motivation and behavior (Bandura, 1986). The significant impact of social influence (online norms, social identity) on calculative commitment (or constraint mechanisms) are consistent with and extend prior work that explains the impact of compliance, internalization, and identification on offline self-presentation behavior (Kelman, 1974). Their findings together with ours imply that building a self-defining relationship with an e-community (identification), facilitating congruence with the shared norms of a group, and gaining rewards (i.e., compliance) represent members' effort and investments to a specific social

context that are not easily transferable to other e-communities with different processes of social influence (constraint mechanisms).

However, our results do not support that personal control affects calculative commitment—positive but insignificant (H6, H8). The possible reason is that compared to social influence, personal control is more transferable—individuals' self-efficacy and learning goal orientation can be applied to different groups of an e-community and help them gain benefits (dedication) in different settings. Thus, members tend to treat their personal control as a dedication-related driver rather than sunk costs, because their personal control in increasing image quality enables them to easily communicate and develop relationship with similar others in different groups of an e-community.

Finally, we do not find support of the influence of online norms on affective commitment (H9). The possible reason is that most respondents have considerable e-community experience, which weakens the influence of online norms on affective commitment. Online norms entail the compliance (normative responsiveness to obtain social rewards) processes and internalization (congruence between one's value with group members') processes of social influences. Once individuals' are familiar with the online norms of a specific group in the e-community, they can easily achieve the compliance and the internalization. Thus, these members do not view the online norms as "benefits." Future work may examine the contingent effect of experience on the relationship between online norms and commitment.

Theoretical implications

This study expands the dedication-constraint framework by integrating the self-presentation theory. This integrated model seeks to explain how and why individuals are motivated by the perceived self-presentation quality, which in turn encourages them to develop a relationship with an e-community. We theorize the mechanisms related to relationship development as affective commitment and calculative commitment, which explain how members evaluate the perceived image quality based on the expectation of gaining benefits, resolving knowledge initiative challenges, and cost for discontinuance. This evaluation in turn serves as the driver for subsequent intention for knowledge outcome improvement. Overall, our empirical findings offer strong support for the importance of perceived online self-presentation quality in relationship development and knowledge outcomes. Prior work shows limited understanding on how to shape knowledge outcomes at the post-adoption stage in an e-community context through relationship development and what is the role of a member's perceived image quality in motivating the relationship development (Ma & Agarwal, 2007; Tsai & Bagozzi, 2014). This study contributes new knowledge by proposing a model that delineates the relationship between online self-presentation quality, relationship development, and knowledge outcomes at the post-adoption stage. This model explains how perceived online image quality is manifested through personal control and social influences, which

motivate online members to develop relationship with the e-community and similar others, conceptualized as affective commitment and calculative commitment. Besides, this model also examines how commitment to the e-community relationship influences subsequent knowledge outcomes, in terms of continuance for both knowledge exploration and knowledge contribution. Our results shed light on the role of members' perceived self-presentation quality in motivating their commitment to the e-community and continuance for knowledge contribution and knowledge exploration. Building on solid theories, we seek to develop a parsimonious model that explains knowledge outcomes at the post-adoption stage in the context of e-communities. Future work should focus on validation of the parsimony of the proposed model.

This study contributes to the self-presentation theory by broadening the conceptualization and measurement of perceived online image quality that entails both members' self-believe system to control over work towards the goal and motivation (personal control), and their perceived influence from social environment (social influence). Prior work has used self-presentation theory to explain one's reasons for and process of increasing image quality in various offline settings (Leary, 1996; Schlenker, 2003). This study develops a theory to understand e-community members' motivation for knowledge outcome improvement at the post-adoption stage. We offer fresh insights by showing how different perspectives, including social cognitive theory and the social influence theory, can be combined to explain commitment to the relationship between a member and similar others in the context of an e-community. Self-presentation theory serves as the theoretical underpinning for our explanation of continuance for knowledge outcome improvements in terms of a member's commitment to the relationship with the e-community. Social influence theory explains how members' perceived identity quality is influenced by their social setting (e.g., similar others) and social cognitive theory considers how this quality is affected by their control over cognitive processes through their ability (e.g., online self-efficacy) and learning goal orientation. These theories consider e-community members' contribution behavior, social influence, and control separately. In contrast, our model integrates them to provide a more comprehensive perspective of explaining knowledge behavior at the post-adoption stage.

This study contributes to the commitment literature by broadening the applicability of the dedication-constraint framework of commitment to the context of virtual communities to explain members' knowledge outcomes at the post-adoption stage. Prior work has used this framework as the theoretical foundation to explain relationship development in different settings, including virtual social world and online services (Kim & Son, 2009; Zhou et al., 2012). While their conceptualization of relationship development emphasizes the role of dedication (e.g., perceived value) and constraint (perceived service-specific investments, learning) to improve commitment, our model views commitment as the driver to covert perceived identity quality to continuance of knowledge outcomes. Thus, commitment serves

as reasons for continued behavior, which is affected by members' perception on image quality (reasons for relationship development). Contextualizing commitment at different social settings to identify the antecedents and consequences of a dedication-constraint framework extends its applicability.

Practical implications

This study shows that members' perceived online self-presentation quality affects both affective commitment and calculative commitment, which in turn affect knowledge outcomes, suggesting the important role of the perceived quality in stimulating a member's post-adoption reactions. Thus, it is worthwhile for an e-community to encourage members' relationship development. Our results suggest that improving the e-community relationship requires increasing both members' perceived benefits and their nontransferable investments, which rely on members' perceived identity quality, in terms of personal control and social influences.

Personal control emphasizes members' online presentation self-efficacy and learning goal orientation. For example, members with learning goal orientation have positive attitude toward improving identity quality through learning and innovation, and are more likely to make the necessary adjustment to reach standards for goal achievement. Thus, e-community managers should identity the members with good learning goal orientation and encourage them to help those with less online self-presentation ability. Besides, e-community managers should help members enhance their online self-presentation ability, including facilitating peer-to-peer help, encouraging new ideas, offering members advice on how to leverage the design features of the e-community for better identity quality, and providing self-presentation template to members who can readily modify it to increase identity quality (Kim et al., 2012; Ma & Agarwal, 2007).

This study also shows that online norms and social identity play a key role in motivating members' relationship development with similar others and knowledge outcome improvement. Online norms include self-presentation norms and group norms. To create self-presentation norms, an e-community manager should focus on increasing members' identity through more self-presentation activities and the manager should both encourage those members who expend effort for knowledge initiatives (e.g., rewards for both active participants and members offering helpful responses to others) and put pressure on those who do not contribute knowledge. This is because self-presentation norms reflect individuals' compliance, emphasizing the need for approval and avoidance of punishment. The establishment of group norms requires managers to help members organize the small group with similar interest in which they frequently participate. Besides, mangers should also develop viable strategies to improve group communication because setting group norms relies on information exchange and communication among group members (Tsai & Bagozzi, 2014).

Social identity incorporates involvement and sense of self-worth. To increase involvement, managers should focus on improving members' feelings of attachment, increasing the value of the e-community, and offering members enjoyable and rewarding experience (Kim et al., 2012). Sense of self-worth is a manifestation of a member's identification processes based on her/his evaluation of self-worth derived from the membership (Bock et al., 2005). To enhance members' sense of self-worth, managers should publicly announce members' positive behavior, including performance, competence, helpfulness for other members, and knowledge outcome improvement. This is because this announcement enables members to both feel proud to engage in e-community activities and believe that they have socially valued features (e.g., reputation, positive images) (Ellemers et al., 1999).

Limitation and future research

This study has the following limitations. First, while e-communities in Chinese society offer a good opportunity for understanding online self-presentation quality and its influence on knowledge outcome at the post-adoption stage, the generalization of our findings in other social settings (e.g., different culture, different countries) deserves a detailed investigation. Second, additional determinants may affect the commitment of an e-community relationship. For example, Zhou et al. (2012) reveal that perceived value (e.g., utilitarian value and hedonic value) and personalization play a key role in commitment. Thus, future research could explore various dedication-constraint related variables that may affect commitment in online settings. Third, while this study has made big effort on alleviating CMV concern, including Harman's single factor test and data collection safeguard, the marker variable approach was not examined in this study. Future work should consider the marker variable approach. Fourth, most respondents in the sample were relatively young, well-educated, and experienced users. This introduces a potential threat to the external validity of the research findings. We urge future work to improve generalizability of our findings by replicating the proposed model in other e-community settings with more diverse respondents. Fifth, while this study controlled e-community experience and gender, age is critical to individuals' cognition and subsequent behavior (e.g., the perceived control over their self-presentation, commitment). Future work may control age and examine the moderating effect of age on the relationship between perceived self-presentation quality and commitment. Finally, cross-sectional surveys offer limited understanding on attributing and substantiating affirmative causality. Thus, future work may use process-oriented methods based on self-presentation theory to enrich our understanding about post-adoption phenomena at different levels of knowledge outcome improvement.

6.CONCLUSIONS

The study aims to explain knowledge outcome improvement at the post-adoption stage in e-communities by integrating self-presentation theory into the dedication-constraint

framework. Our results show that members' continuance intention for knowledge outcome improvement is determined by two types of commitment-based mechanisms--affective commitment and calculative commitment that reflect dedication mechanisms and constraint mechanisms respectively. Besides, the study reports that members' perceived online self-presentation quality, in terms of personal control and social influence, is critical to motivate e-community members to develop the relationship with the e-community. We believe that the conceptual model proposed in this study is not necessarily limited to e-communities but is largely applicable to other contexts in which IT application of interest both helps users reap benefits and results in nontransferable investments (e.g., personalization, online retailing, and online service). We hope that our model provides new insights on the conversion from "reasons for relationship development" to "reasons for continued intention on knowledge outcome." These results serve as a starting point for more in-depth understanding on post-adoption phenomena in e-communities.

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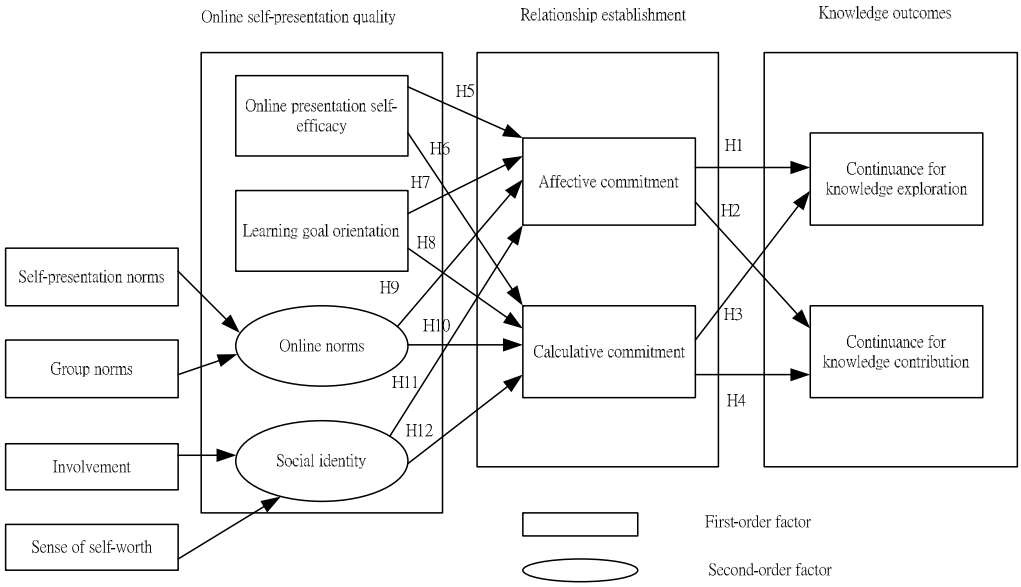

Figure 1. Research model

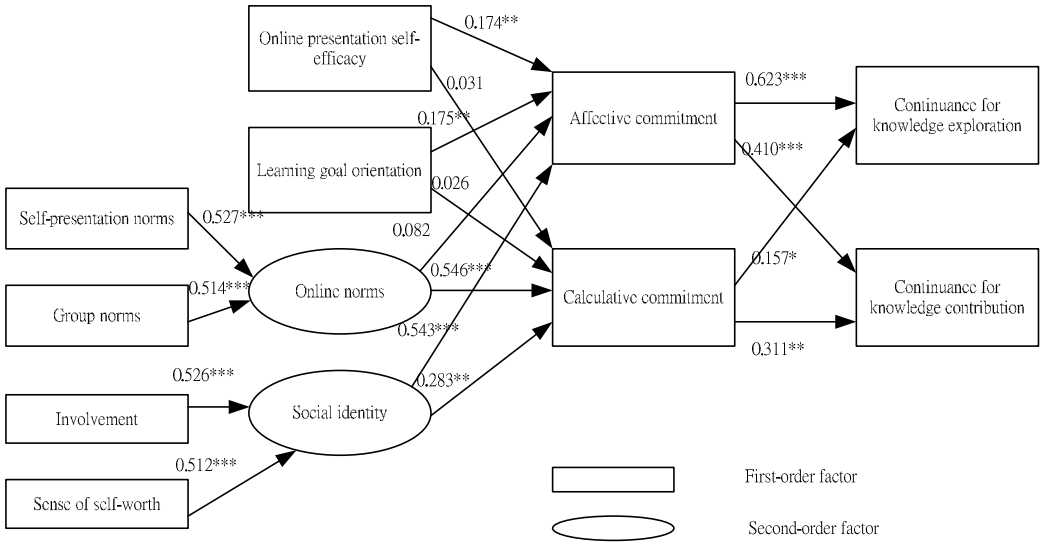

Figure 2. Results of PLS analysis ($^{*}p \leq 0.05$; $^{**}p \leq 0.01$; $^{***}p \leq 0.001$)

Table 1. Definitions of the constructs

Construct	Definition	Reference
Continuance Intention for knowledge exploration	The extent to which a member is willing to continue receiving and acquiring knowledge from the e-community in the future.	Maruping & Magni, 2012; Zhou et al., 2012;
Continuance Intention for knowledge contribution	The extent to which a member is willing to continue providing and contributing knowledge to the e-community in the future.	Ma & Agarwal, 2007; Zhou et al., 2012
Affective commitment	A desire-based attachment that motivates a member to maintain the long-term relationship with the e-community.	Zhou et al., 2012
Calculative commitment	The extent to which members recognize that they are locked in a relationship due to the potential cost from discontinuance.	Zhou et al., 2012
Online presentation self-efficacy	Members' belief in their own ability to present images reasonably well that has the potential to yield benefits.	Kim et al., 2012
Learning goal orientation	Members' belief that efforts in learning and knowledge exploration lead to outcome improvement.	Wan et al., 2012
self-presentation norms	The perceived norms that members should comply and present their online identity in the interest of the e-community.	Kim et al., 2012
Group norms	Members' adoption of common self-guides for the congruence between members' own value system and other members' of a small group in larger e-communities.	Tsai & Bagozzi, 2014
Involvement	A state of motivation and interest for participation in e-community activities.	Kim et al., 2012
Sense of self-worth	Evaluative significance of social identity and self-esteem (e.g., knowledge contribution) from the e-community relationship.	Bock et al., 2005; Tsai & Bagozzi, 2014

Table 2. Demographic information of respondents (N= 278)

Measure	Item	Frequency	Percentage
Gender	male	159	57.2
	female	119	42.8
Age	<25	179	64.4
	25-30	54	19.4
	31-35	29	10.4
	35-40	8	2.9
	>40	8	2.9
Education	High school	15	5.4
	University/junior college	151	54.3
	Graduate school	112	40.3
Work areas	Information and communication	58	20.9
	Banking	27	9.7
	Government	28	10
	Health care	42	15.1
	Manufacturing	25	9
	Retailer and service	34	12.2
	Education	55	19.8
	Entertainment and others	9	3.2
Community experience (in Year)			
	< 0.5	4	1.4
	0.5-2	25	9
	2-4	103	37.1
	4-10	102	36.7
	>10	44	15.8

Table 3. Measurements

Scale items	Description
	Continuance intention for knowledge exploration (KE) (Maruping & Magni, 2012; Zhou et al., 2012)
KE1	1. I intend to continue using this community for knowledge acquisition and innovation in the next few months.
KE2	2. I expect my use of this community to continue knowledge creation and gaining new insights in the next few months.
KE3	3. If I could, I would like to continue my use of this community for knowledge acquisition in the next few months.
KE4	4.I intent to increase my use of this community to gain knowledge in the future.
	Continuance intention for knowledge contribution (KC) (Ma & Agarwal, 2007)
KC1	1. I continue knowledge contribution to this community.
KC2	2. I will continue to contribute knowledge in the next few months.
KC3	3. I will increase my knowledge contribution in the future.
KC4	4. I intent to increase my knowledge contribution to this community in the future.
	Affective commitment (AC) (Zhou et al., 2012)
AC1	1. When I use this community, I feel that I am part of it.
AC2	2. I feel emotional attached to this community.
AC3	3. Using this community meets my goals and increases my sense of belonging
AC4	4. This community has big attraction for me.
	Calculative commitment (CC) (Zhou et al., 2012)
CC1	1. My investment on this community is unlikely to recover if I leave it.
CC2	2. It would be too costly for me to leave the community.
CC3	3. Leaving the community causes considerable personal sacrifice.
CC4	4. Stopping using this community increases my concern about costs and other problems.
CC5	I would lose a lot if I leave this community.
	Online presentation self-efficacy (OPS) (Kim et al., 2012)
OPS1	1. I know how to present my own image reasonably well in the e-community.
OPS2	2. I have confidence on presenting my own image well in this e-community.
OPS3	3. I know how to create my own image well in the e-community.
OPS4	4. I feel comfortable presenting my own image in the e-community.
	Learning goal orientation (LGO) (Wan et al., 2012)
LGO1	1. I treat the e-community as a good opportunity to do challenging work.
LGO2	2. When I fail to complete a difficult task, I view the e-community as a key means

	to overcome task difficulties.
LGO3	3. I view the e-community as a key source for learning new things and innovation.
LGO4	4. The e-community provides good opportunities for me to learn new things.
LGO5	5. I try my best to use this e-community to handle difficult tasks.
LGO6	6. I try hard to use this e-community to improve my work performance.
	Self-presentation norms (SPN) (Kim et al., 2012)
SPN1	1. Many members think it is important to maintain their image in this e-community.
SPN2	2. The presentation of self-image is common among members in this e-community.
SPN3	3. Many members think that it is important to manage their image in this e-community.
SPN4	4. Many members agree that managing their image is a key source for gaining rewards and avoiding punishment.
	Group norms (GRN) (Tsai & Bagozzi, 2014)
GRN1	1. E-community members of our group adopt common self-guides to meet goals that are shared with other members in this group.
GRN2	2. Our group in the e-community has a shared goal.
GRN3	3. Our group emphasizes the congruence between self-goal and the group goal.
GRN4	4. Our group members accept other group members' belief in this e-community.
	Involvement (INV) (Kim et al., 2012)
INV1	1. Participation in this e-community is enjoyable.
INV2	2. Participation in this e-community is important to me.
INV3	3. Participation in this e-community is pleasurable to me.
INV4	4. Participation in this e-community means a lot to me.
	Sense of self-worth (SSW) (Bock et al., 2005; Tsai & Bagozzi, 2014)
SSW1	1. My participation in this this e-community helps other members increase performance.
SSW2	2. My participation in this this e-community is important to others.
SSW3	3. My participation in this this e-community helps others improve knowledge outcomes.
SSW4	4. My participation in this this e-community helps others gain new insights.

Table 4. Results of reliabilities and AVE

Construct	Composite Reliability	AVE	Cronbach's Alpha
Knowledge exploration (KE)	0.934	0.781	0.907
Knowledge contribution (KC)	0.936	0.785	0.908
Calculative commitment (AC)	0.963	0.868	0.949
Calculate commitment(CC)	0.959	0.825	0.947
Online presentation self-efficacy (OPS)	0.948	0.822	0.928
Learning goal orientation (LGO)	0.965	0.824	0.957
Self-presentation norm (SPN)	0.975	0.907	0.966
Group norm (GRN)	0.970	0.892	0.959
Involvement (INV)	0.939	0.795	0.913
Sense of self-worth (SSW)	0.954	0.839	0.936

Table 5. Weight and loading

Construct	Item	Mean	Stdev	Weight	Loading	t-Value
Knowledge exploration (KE)	KE1	4.64	1.576	0.260	0.873	51.440
	KE2	4.58	1.564	0.257	0.872	49.585
	KE3	4.58	1.669	0.306	0.900	51.677
	KE4	4.81	1.634	0.307	0.891	73.280
Knowledge contribution (KC)	KC1	4.77	1.451	0.277	0.867	54.364
	KC2	4.45	1.604	0.295	0.887	65.293
	KC3	3.88	1.745	0.275	0.905	66.922
	KC4	3.67	1.673	0.281	0.886	65.094
Affective commitment (AC)	AC1	4.52	1.609	0.272	0.917	76.769
	AC2	4.39	1.592	0.260	0.946	105.334
	AC3	4.31	1.591	0.270	0.940	90.964
	AC4	4.66	1.613	0.271	0.924	86.815
Calculate commitment (CC)	CC1	3.84	1.570	0.214	0.903	44.305
	CC2	3.85	1.604	0.220	0.912	73.777
	CC3	4.11	1.551	0.234	0.906	73.327
	CC4	3.88	1.674	0.218	0.898	61.060
	CC5	3.91	1.688	0.215	0.922	62.093
Online presentation self-efficacy (OPS)	OPS1	4.79	1.547	0.270	0.899	61.758
	OPS2	4.61	1.482	0.279	0.930	107.172
	OPS3	4.47	1.468	0.281	0.908	67.544
	OPS4	4.63	1.465	0.272	0.891	62.696
Learning goal orientation (LGO)	LGO1	4.68	1.455	0.183	0.896	58.370
	LGO2	4.40	1.478	0.189	0.911	73.836
	LGO3	4.74	1.473	0.178	0.916	82.981
	LGO4	4.67	1.473	0.182	0.927	94.296
	LGO5	4.78	1.449	0.188	0.911	77.481
	LGO6	4.60	1.482	0.181	0.885	48.856
Self-presentation norms (SPN)	SPN1	4.27	1.543	0.264	0.955	137.041
	SPN2	4.27	1.560	0.263	0.960	169.686
	SPN3	4.13	1.535	0.260	0.949	125.295
	SPN4	4.38	1.560	0.263	0.947	103.715
Group norms (GRP)	GRN1	4.39	1.442	0.271	0.937	116.389
	GRN2	4.59	1.380	0.267	0.955	135.454
	GRN3	4.57	1.349	0.264	0.951	124.186
	GRN4	4.67	1.387	0.257	0.937	98.738

Involvement (INV)	INV1	4.41	1.640	0.267	0.855	37.873
	INV2	4.26	1.595	0.285	0.922	86.934
	INV3	4.29	1.620	0.277	0.874	51.883
	INV4	4.49	1.594	0.291	0.915	84.725
Sense of self-worth (SSW)	SSW1	4.32	1.651	0.284	0.920	87.229
	SSW2	4.26	1.589	0.275	0.935	86.982
	SSW3	4.47	1.561	0.261	0.886	51.033
	SSW4	4.32	1.597	0.271	0.924	71.708
Community experience	COM	3.56	0.912	n/a	n/a	n/a

Table 6. Descriptive statistics and correlation between constructs.

	Mean	S.D.	KE	KC	AC	CC	OPS	LGO	SPN	GRN	INV	SSW	COM
KE	4.65	1.611	0.884										
KC	4.19	1.678	0.579	0.886									
AC	4.47	1.604	0.609	0.525	0.932								
CC	3.91	1.619	0.525	0.508	0.658	0.908							
OPS	4.63	1.493	0.574	0.549	0.662	0.557	0.907						
LGO	4.65	1.471	0.573	0.517	0.631	0.549	0.680	0.908					
SPN	4.26	1.550	0.574	0.532	0.664	0.670	0.581	0.610	0.952				
GRN	4.55	1.391	0.607	0.546	0.664	0.653	0.637	0.643	0.696	0.944			
INV	4.36	1.612	0.604	0.543	0.658	0.673	0.642	0.590	0.684	0.695	0.892		
SSW	4.34	1.599	0.546	0.505	0.632	0.595	0.575	0.510	0.684	0.650	0.504	0.916	
COM	3.56	0.912	0.150	0.046	0.053	0.106	0.081	0.091	0.075	0.082	0.060	0.113	1.000

COM: Community experience

Table 7. Cross-factor loading.

Construct	Item	KE	KC	AC	CC	OPS	LGO	SPN	GRN	INV	SSW	COM
Knowledge	KE1	0.873	0.551	0.508	0.461	0.538	0.547	0.529	0.556	0.507	0.511	0.126
exploration (KE)	KE2	0.872	0.575	0.503	0.468	0.508	0.510	0.512	0.540	0.535	0.489	0.101
	KE3	0.900	0.529	0.626	0.528	0.549	0.535	0.566	0.594	0.613	0.561	0.138
	KE4	0.891	0.530	0.628	0.522	0.563	0.564	0.549	0.583	0.599	0.498	0.161
Knowledge	KC1	0.592	0.867	0.508	0.464	0.555	0.538	0.491	0.545	0.500	0.469	0.044
contribution (KC)	KC2	0.592	0.887	0.538	0.486	0.550	0.558	0.560	0.543	0.530	0.501	0.018
	KC3	0.503	0.905	0.468	0.484	0.494	0.432	0.476	0.486	0.480	0.466	0.059
	KC4	0.494	0.886	0.476	0.497	0.475	0.432	0.487	0.493	0.509	0.485	0.042
Affective	AC1	0.612	0.566	0.917	0.677	0.653	0.650	0.673	0.686	0.715	0.627	0.007
commitment (AC)	AC2	0.577	0.500	0.946	0.646	0.657	0.604	0.648	0.627	0.740	0.614	0.080
	AC3	0.588	0.541	0.940	0.669	0.648	0.634	0.676	0.663	0.775	0.645	0.038
	AC4	0.650	0.507	0.924	0.618	0.667	0.621	0.635	0.655	0.753	0.628	0.075
Calculate	CC1	0.487	0.491	0.626	0.903	0.527	0.517	0.620	0.618	0.619	0.532	0.095
commitment (CC)	CC2	0.516	0.494	0.656	0.912	0.542	0.528	0.646	0.599	0.668	0.573	0.099
	CC3	0.578	0.523	0.697	0.906	0.569	0.563	0.664	0.656	0.704	0.631	0.079
	CC4	0.487	0.490	0.597	0.898	0.545	0.546	0.658	0.650	0.621	0.581	0.083
	CC5	0.493	0.486	0.587	0.922	0.524	0.516	0.635	0.622	0.621	0.559	0.126
Online presentation	OPS1	0.575	0.547	0.636	0.510	0.899	0.618	0.529	0.598	0.637	0.556	0.054
self-efficacy (OPS)	OPS2	0.583	0.558	0.660	0.532	0.930	0.656	0.568	0.622	0.651	0.562	0.072
	OPS3	0.553	0.515	0.636	0.573	0.908	0.680	0.599	0.622	0.615	0.579	0.153
	OPS4	0.516	0.516	0.613	0.548	0.891	0.656	0.553	0.613	0.571	0.531	0.014
Learning goal	LGO1	0.592	0.617	0.616	0.523	0.701	0.896	0.582	0.647	0.587	0.510	0.138
orientation (LGO)	LGO2	0.544	0.513	0.636	0.549	0.690	0.911	0.611	0.629	0.586	0.513	0.042
	LGO3	0.512	0.471	0.592	0.506	0.626	0.916	0.573	0.598	0.553	0.459	0.042
	LGO4	0.534	0.521	0.588	0.548	0.640	0.927	0.590	0.607	0.552	0.491	0.074
	LGO5	0.573	0.483	0.630	0.543	0.662	0.911	0.584	0.638	0.585	0.497	0.111
	LGO6	0.582	0.527	0.587	0.536	0.599	0.885	0.600	0.598	0.568	0.522	0.091
Self-presentation	SPN1	0.606	0.559	0.688	0.704	0.610	0.621	0.955	0.713	0.712	0.721	0.075
norms (SPN)	SPN2	0.577	0.554	0.671	0.675	0.606	0.628	0.960	0.700	0.694	0.688	0.087
	SPN3	0.565	0.531	0.642	0.661	0.568	0.619	0.949	0.692	0.667	0.665	0.026
	SPN4	0.610	0.555	0.700	0.684	0.601	0.628	0.947	0.717	0.706	0.705	0.098
Group norms	GRN1	0.625	0.578	0.687	0.682	0.646	0.661	0.746	0.937	0.727	0.669	0.082
(GRN)	GRN2	0.630	0.582	0.669	0.662	0.653	0.643	0.701	0.955	0.708	0.657	0.095
	GRN3	0.608	0.537	0.669	0.645	0.655	0.655	0.692	0.951	0.674	0.653	0.048
	GRN4	0.598	0.532	0.649	0.645	0.619	0.636	0.654	0.937	0.682	0.644	0.087

Involvement (INV)	INV1	0.501	0.457	0.582	0.566	0.568	0.482	0.575	0.594	0.855	0.628	0.041
	INV2	0.604	0.523	0.725	0.683	0.607	0.563	0.658	0.681	0.922	0.661	0.059
	INV3	0.583	0.524	0.634	0.661	0.644	0.623	0.677	0.655	0.874	0.655	0.046
	INV4	0.597	0.531	0.694	0.625	0.608	0.571	0.664	0.681	0.915	0.702	0.066
Sense of self-worth	SSW1	0.577	0.508	0.693	0.638	0.596	0.531	0.704	0.663	0.744	0.920	0.096
(SSW)	SSW2	0.536	0.533	0.611	0.576	0.571	0.532	0.677	0.625	0.674	0.935	0.083
	SSW3	0.511	0.459	0.582	0.550	0.549	0.463	0.638	0.637	0.642	0.886	0.127
	SSW4	0.525	0.500	0.575	0.562	0.538	0.490	0.637	0.607	0.666	0.924	0.108
Community experience (COM)	COM	0.150	0.046	0.053	0.106	0.081	0.091	0.075	0.082	0.060	0.113	1.000

Table 8. Results of hypothesis testing

Hypothesis	Results
H1: affective commitment → continuance intention for knowledge exploration	Supported
H2: affective commitment → continuance intention for knowledge contribution	Supported
H3: calculative commitment → continuance intention for knowledge exploration	Supported
H4: calculative commitment → continuance intention for knowledge contribution	Supported
H5: online presentation self-efficacy → affective commitment	Supported
H6: online presentation self-efficacy → calculative commitment	Not Supported
H7: learning goal orientation → affective commitment	Supported
H8: learning goal orientation → calculative commitment	Not Supported
H9: online norms → affective commitment	Not Supported
H10: online norms → calculative commitment	Supported
H11: social identity → affective commitment	Supported
H12: social identity → calculative commitment	Supported

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