Intention to adopt knowledge through virtual communities: posters vs lurkers

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Abstract
Purpose – This study aims to examine the social capital and technical determinants of knowledge adoption intentions in virtual communities and to explore the differences between posters and lurkers.
Design/methodology/approach – An online survey was conducted with a sample of 318 virtual community participants for a structural equation model test.
Findings – The structural and cognitive social capital, peer influence, and perceived usefulness positively contribute to virtual community participants’ attitudes and intentions toward knowledge adoption. Lurkers’ attitudes are more influenced by network ties, reciprocity norms, shared vision, and perceived usefulness, whereas posters are more affected by social trust and shared language.
Research limitations/implications – The results produced in the Chinese context may not fully apply to other cultures.
Practical implications – Devising effective strategies to increase social capital and content value is crucial for fostering virtual community members’ positive attitudes toward knowledge adoption.
Originality/value – This study is one of the first to combine and examine social capital and technology acceptance theories with regard to the knowledge adoption intentions of posters and lurkers in virtual communities.

Keywords Virtual communities, Knowledge adoption, Social capital, Technology acceptance model, Posters, Lurkers, Social networks, User studies

Paper type Research paper

Introduction
The internet has progressively changed our life and behaviour since its inception. Accompanied by rapid growth, the internet provides abundant information and virtual networks that create a virtual space allowing individuals to congregate and form a community (Wasko and Faraj, 2000) for activities such as knowledge exchange (Preece, 1999) and intellectual learning (Brazelton and Gorry, 2003). With vibrant practices of knowledge sharing and interflow, virtual communities facilitate knowledge creation through which members’ collaborative work is accumulated and becomes assets of the communities (Bourdieu, 1986). To assess the value of a virtual community’s knowledge

The authors would like to thank their two anonymous reviewers and the OIR Editor for their insightful comments.
assets, the outcomes of learning are key indicators which are principally determined by whether the recipients deem the contributed knowledge useful and credible and are willing to adopt the knowledge (Levin and Cross, 2004).

To encourage seeking and contribution of knowledge, sociability and usability of virtual communities in terms of members’ interactions and the technical system’s ease of use are crucial (Phang et al., 2009). Sociability refers to the extent to which a virtual community can facilitate members’ interactions in achieving shared goals (Preece, 2001). Usability assesses the degree of ease of use and interactivity of the community’s technical system (Shackel, 1991; Preece et al., 2002). These two dimensions constitute the socio-technical aspect of a virtual community system. Based on the socio-technical perspective, purpose (communication goal, common ground), people (roles, trust, tie strength), and policy (reciprocity norms) are keys to the sociability development of a virtual community, whereas usability performance is indicated by dialogue and social support, information design, navigation and access (Preece, 2001).

Although the socio-technical framework for explaining virtual community participation has been in existence for a decade, most of the research on it is conceptual (e.g. Preece, 2001; Preece and Maloney-Krichmar, 2003) or qualitative (e.g. Maloney-Krichmar and Preece, 2005). Few studies have attempted to empirically identify the antecedents of sociability and usability. Phang et al. (2009) investigated how perceived usability and sociability affect online community members’ knowledge-exchange behaviours by sourcing the explanatory constructs from several streams of literature and developing the measurement items. Although theoretically useful, the socio-technical perspective appears in need of more systematic and comprehensive conceptualisation and measurement to better evaluate sociability and usability and their impact on virtual communities. Therefore this paper proposes an integrative framework of social capital and technology acceptance and argues that social capital representing the perceived social trust, mutual bonds and shared beliefs of a community (Coleman, 1988) parallels the dimensions of purpose, people, and policy in the socio-technical perspective. When the sociability of an online community is established through articulation and transmutation of purpose, people and policy, it virtually develops community social capital and vice versa (Preece, 2003). Therefore we consider social capital perception adequate for assessing sociability. In addition the usability of a socio-technical system addressing user interactions with technology, indicating the system’s interface ease of use and task facilitation effectiveness (Preece, 2001), is similar to ease of use and usefulness in the technology acceptance model (TAM) (Davis, 1989). TAM is thus regarded as reasonable for measuring the usability of a virtual community.

Through members’ relational interactions, the connectedness of an online network is manifested in reciprocity and shared behavioural norms (Lesser and Storck, 2001). However the degree of connectedness may vary by participants’ involvement level so that it causes different perceived relevance of community social capital to personal interests (Dholakia et al., 2004). As the benefits of virtual community participation are evaluated differently by new and long-term members, Mathwick et al. (2008) and Ridings et al. (2006) have suggested examining the differences by participation levels; thus we further examine the moderating role of member type.

The contributions of this paper are three-fold. First we provide an integrative framework combining social capital theory and TAM to comprehensively conceptualise
and measure the sociability and usability of virtual communities. Second we examine the socio-technical determinants of attitude toward and intention of knowledge adoption, which have received less attention in virtual community research. Third we investigate the role of member type in mitigating the socio-technical influences on knowledge adoption in virtual communities. This investigation sheds light on virtual community promotional strategies when different user segments are targeted.

Theoretical background

Social capital theory

Social capital presents the characteristics of social structure that facilitate action within the structure (Coleman, 1988). Social capital develops and accumulates with individuals’ engagement in relationships, which in turn creates the resources people can use to pursue their interests (Bourdieu, 1986). Nahapiet and Ghoshal (1998) classified social capital into three dimensions: the structural dimension delineates the intensity of structural interflow and interconnection among members; the relational dimension illuminates perceived interaction quality and consensus; and the cognitive dimension elucidates common beliefs and desired mental representations in terms of language, codes, and vision.

Social capital has been found to facilitate knowledge transfer; however most social capital studies involving knowledge sharing focus on the intra-organisational context (e.g. Adler and Kwon, 2002; Chow and Chan, 2008; Inkpen and Tsang, 2005; Nahapiet and Ghoshal, 1998; Tsai and Ghoshal, 1998) or inter-firm knowledge acquisition (e.g. Yli-Renko et al., 2001). Levin and Cross (2004) proposed that trust mediates between strong ties and the receipt of useful knowledge in organisations, yet what affects individuals’ intentions to adopt knowledge through virtual communities remains unknown.

Technology acceptance model

Accounting for factors that affect computer acceptance, TAM, which was adapted from the theory of reasoned action (see Fishbein and Ajzen, 1975) predicts individuals’ behavioural intention toward adopting an information system by suggesting a belief-attitude-intention-behaviour causal relationship (Davis et al., 1989). The prediction derives from two primary behavioural beliefs – perceived usefulness and perceived ease of use – which lead to attitude and behavioural acceptance (Davis et al., 1989). TAM is widely applied to various kinds of behavioural adoption, including information technology (e.g. Van der Heijden, 2003), online learning (e.g. Saadé and Bahli, 2005) and knowledge sharing (e.g. Bock et al., 2005). Although the above research has explored a variety of adoption behaviours, studies of knowledge adoption in virtual communities are still in their infancy. To refine TAM, Venkatesh and Davis (2000) suggested social influence may play a significant role in affecting behaviours (Venkatesh et al., 2003). Considering the group interaction nature of the virtual community in producing interpersonal influence (Zhou, 2011), we include peer influence to complement TAM.

In the knowledge sharing literature as it affects individuals, a socio-technical framework integrating social capital theory and TAM has not been attempted. Previous research separately applied these two theories in relation to knowledge sharing among members in non-organisational virtual communities. Chiu et al. (2006), Mathwick et al. (2008) and Wasko and Faraj (2005) explored the influence of social
capital on individuals’ knowledge contributions. Hsu and Lin (2008) investigated technology acceptance factors in determining intention to blog, and Phang et al. (2009) examined perceived usability including ease of use on knowledge seeking/contribution. Connecting these two lines of research, a joint framework of social capital and TAM that captures the key aspects of sociability and usability of a virtual community system would help to gain a more comprehensive picture of virtual community members’ knowledge adoption intentions.

Hypotheses

Structural social capital

Tie strength refers to the closeness and interaction frequency of a relationship between two parties (Brown and Reingen, 1987). Social ties with strength and equilibrium support healthy relationship building and consequently steer individuals to engage in more interpersonal activities (Nahapiet and Ghoshal, 1998). Such tie relationships enable information and resources to be exposed and circulate in an online network (Tsai and Ghoshal, 1998). Consequently, network ties not only provide a direct route in order to access social resources (Nahapiet and Ghoshal, 1998), but also create an opportunity to combine and exchange knowledge (Adler and Kwon, 2002) and thereby facilitate knowledge contribution and delivery activities in communities (McFadyen and Cannella, 2004; Wasko and Faraj, 2005).

Chiu et al. (2006) asserted that network ties in a virtual community give rise to broad and cost-efficient knowledge access. As strong ties more easily activate information flow than weak ties (Brown and Reingen, 1987), social tie strength in a virtual community may influence one’s value expectation for knowledge search (Tsai and Ghoshal, 1998; Wasko and Faraj, 2005). It is expected that network ties will positively affect attitude toward knowledge adoption in virtual communities:

H1. Network ties have a positive influence on the attitude toward knowledge adoption in a virtual community.

Relational social capital

Social trust is viewed as an important determinant of volitional behaviours such as knowledge sharing in virtual communities (Inkpen and Tsang, 2005) and intellectual capital exchange (Nahapiet and Ghoshal, 1998). Their degree of trust in others may influence individuals’ engaging behaviour in virtual community activities (Chiu et al., 2006). When members trust others, they are less likely to worry about being taken advantage of (Tsai and Ghoshal, 1998) and more willing to participate in collaborative interaction (Nahapiet and Ghoshal, 1998). As trust develops over time, opportunities for knowledge transfer among virtual community members increase (Tsai and Ghoshal, 1998) and further develop a relationship of exchange (Chiu et al., 2006). As a whole, social trust among members is critical, as it affects the attitude toward social behaviours in a virtual community (Huyssen and de Wit, 2004) and may in turn affect members’ knowledge adopting intentions. Therefore:

H2. Social trust has a positive influence on the attitude toward knowledge adoption in a virtual community.

Reciprocity indicates that members within a community will give up personal benefits to achieve a community’s goal as a priority (Fountain, 1997). Reciprocity influences the
behaviours of engaging in knowledge sharing (Davenport and Prusak, 1998). When reciprocity becomes a norm, it represents the degree of one-minded agreement in a social system. In a community context a reciprocity norm indicates a fairness perception of knowledge exchange as a mutual privilege and obligation among members (Chiu et al., 2006). Norms of cooperation are useful in establishing a strong foundation for intellectual capital creation (Nahapiet and Ghoshal, 1998) and expedite knowledge sharing in virtual networks (Chiu et al., 2006; Wasko and Faraj, 2000, 2005). The greater the anticipated reciprocal relationships, the more favourable the attitude will be (Bock et al., 2005). Virtual community participants' expectations of reciprocity will positively drive their attitudes toward knowledge adoption in the community. Hence:

**H3.** The norm of reciprocity has a positive influence on the attitude toward knowledge adoption in a virtual community.

*Cognitive social capital*

When participants adopt common languages or codes within a virtual community, it indicates that members share similar perspectives or viewpoints (Wasko and Faraj, 2005). Shared language is important because it assists members in understanding community goals and behavioural adequacy in virtual communities (Tsai and Ghoshal, 1998). To the extent that individuals perceive a common language, it enhances the ability to reach out and acquire information, helps assess the quality of knowledge combination and exchange, determines individuals' perceptions of each other, and reduces misunderstandings of others in the community (Nahapiet and Ghoshal, 1998). Due to its direct and important function in social relations, shared language has the power to affect members' attitudes toward information sharing, discussing, and adopting, which all make knowledge combination possible (Wasko and Faraj, 2005). Under this premise language reflecting a common perspective becomes an important instrument employed by individuals to express and communicate effectively and efficiently (Tsai and Ghoshal, 1998). Accordingly shared language will consequently contribute to the desire to participate and adopt knowledge. Therefore:

**H4.** Shared language has a positive influence on the attitude toward knowledge adoption in a virtual community.

Shared vision represents the degree to which network members have a mutual understanding of community goals and approaches to goal achievement (Tsai and Ghoshal, 1998). A shared vision allows community members to find a common ground for mutual understanding and the exchange of ideas (Inkpen and Tsang, 2005). With a common vision, members can prevent possible miscommunication caused by misunderstanding and feel more free to exchange information (Tsai and Ghoshal, 1998). All of the above explain why a shared vision is able to bond people to willingly share information with each other. As a shared vision coheres individuals' mutual understanding and lays a groundwork for knowledge exchange, participants who share the vision within a virtual community should hold a positive attitude toward knowledge adoption in that community. Hence:

**H5.** Shared vision has a positive influence on the attitude toward knowledge adoption in a virtual community.
Peer influence

Group influence has been documented to affect individuals' information processing, evaluation of alternatives and decision making (Bearden and Etzel, 1982). Noting interpersonal influence, subjective norms in the theory of reasoned action indicate how an individual perceives important others’ expectations toward their own tendency to perform a behaviour (Fishbein and Ajzen, 1975). Subjective norms involve perceived social pressure on a person’s behavioural inclinations (Fishbein and Ajzen, 1975), which is seen as an important antecedent of behaviours (Taylor and Todd, 1995).

A peer group is one of the interpersonal sources that impose subjective norms (Ma et al., 2002) and has an impact on the individual’s attitude and behaviour (Padilla-Walker and Bean, 2009). As virtual communities provide a cyberspace where people can interact and exchange ideas, adopting knowledge through a virtual community would be susceptible to peer influence. It has been shown that individuals with a strong subjective norm are more willing to share their knowledge (Bock et al., 2005). Therefore we posit that participants who feel more influenced by peers should view knowledge adoption in a virtual community as more desirable:

H6. Peer influence has a positive influence on the attitude toward knowledge adoption in a virtual community.

Website perception

TAM postulates that an individual’s adoption of a new technology is premised on two beliefs:

(1) perceived ease of use, the perception of the effort required to use a new technology; and

(2) perceived usefulness, the judgment and evaluation of the benefits as a result of technology usage to improve performance (Davis, 1989).

Websites that help users achieve goals are considered very useful and generate a more favourable attitude (Lin, 2008). When members perceive a virtual community and its contents as useful, they tend to view its online materials more frequently (Koh et al., 2007). Conversely when individuals feel uncomfortable using an information technology system, the perceived ease of use and perceived usefulness of the system decline (Walczuch et al., 2007), which may cause negative attitudes toward using the system. As the affective reaction toward using an information system predicts the acceptance behaviour (Davis, 1989), attitude toward knowledge adoption through virtual communities is expected to affect knowledge adoption intention. Accordingly H7, H8, and H9 are proposed as follows:

H7. Perceived usefulness has a positive influence on the attitude toward knowledge adoption in a virtual community.

H8. Perceived ease of use has a positive influence on the attitude toward knowledge adoption in a virtual community.

H9. Attitude has a positive influence on the intention to adopt knowledge in a virtual community.
Types of participants
The individuals participating in virtual communities can be broadly divided into two types: posters and lurkers (Nonnecke and Preece, 1999). Posters are members who actively participate in the community’s discussions and are willing to help others (Huvila et al., 2010; Wasko and Faraj, 2000), whereas lurkers are silent participants who read the information contributed by posters but rarely post (Nonnecke and Preece, 2001). Self-interest and personal satisfaction are the reasons posters contribute to a virtual community (Wasko and Faraj, 2005). Self-confidence also determines whether a person posts, which is something lurkers may lack (Ridings et al., 2006). Conversely having less to share, finding it difficult to share, and lack of intention may explain why lurkers do not post (Nonnecke and Preece, 2001).

Lurkers and posters have distinct attitudes toward virtual communities (Preece et al., 2004). Posters believe that posting helps a community grow while lurkers prefer to satisfy themselves through observing and information skimming (Nonnecke et al., 2004). Overall lurkers reveal a higher need for information acquisition from a virtual community than do posters (Mathwick et al., 2008). Therefore we predict that lurkers will exhibit stronger tendencies than posters regarding the above-mentioned proposed effects:

H10. In a virtual community the predictions in H1-H8 will be more salient for lurkers than for posters.

Figure 1, illustrating the research model, summarises the hypothesised associations among the constructs. In TAM the link between behavioural beliefs and behavioural acceptance is said to be mediated by attitude (Davis et al., 1989). Drawing on the
belief-attitude-intention causal framework of TAM, we propose that attitude will mediate between the socio-technical antecedents (perceptions of social capital, usefulness and ease-of-use, and peer influence) and knowledge adoption intention.

Method
A questionnaire was developed for online surveying. A web-based data collection method was employed to explore online participation as it had been successfully used in similar research (e.g. Aldas-Manzano et al., 2009; Chiu et al., 2009).

Data collection
For external validity invitation banners posted on different bulletin board systems in Taiwan recruited diverse respondents. To ensure the survey’s internal validity, the respondents were asked to register with IP addresses recorded to avoid multiple responses from any one person. Next the individuals with virtual community participation experience were directed to the research website for the online survey.

After eliminating incomplete and ineligible responses, a total of 318 valid responses were obtained during a four-week period, consisting of 190 males (59.7 per cent) and 128 females (40.3 per cent). Most were 21 to 30 years old (82.1 per cent), and 85.9 per cent had a year or more of participation in virtual communities.

Measurement
Network ties evaluating interpersonal link strength and interaction frequency were measured by four modified items from Tsai and Ghoshal (1998) and Chiu et al. (2006). Social trust to reflect participants’ in-community trust-related behaviours was assessed with five items revised from Ridings et al. (2002) and Chiu et al. (2006). The norm of reciprocity was measured by five items to assess the degree to which participants believe in improving mutual relationships with others through reciprocal contributions (Bock et al., 2005). Shared language, i.e. common understanding of shared terms or codes, was measured by three items (Nahapiet and Ghoshal, 1998). Shared vision was measured by three items to assess the degree to which virtual community members share a common view of how to achieve collective goals, tasks and outcomes (Chiu et al., 2006).

Four peer influence items developed by Taylor and Todd (1995) were adopted to evaluate the degree of peers’ influence on individuals’ virtual community participation. The TAM constructs were measured with four items for perceived usefulness and ease of use (Davis, 1989), while the attitude toward knowledge adoption (four items) and the intention to adopt knowledge (three items) were assessed by revised items from Bock et al. (2005). All measures were assessed on a seven-point Likert scale (1 = extremely disagree; 7 = extremely agree). Finally, based on Preece et al. (2004), the respondents who reported never posting in a virtual community were classified as lurkers and those who reported having made postings as posters.

Results
Following the analytical procedures recommended by Anderson and Gerbing (1988) and Hair et al. (1998), a two-stage analysis was conducted for measurement model evaluation and structural model estimation. Due to a relatively large set of variables and formative factors in our proposed model, the component-based partial least squares method was employed to ease the restrictions on sample size and residual
distributions associated with the covariance-based modelling techniques such as LISREL (Chin et al., 2003; Pavlou and Gefen, 2005).

**Measurement model evaluation**

The adequacy of the measurement model was assessed by evaluating item reliability, the internal consistency of variables associated with individual items, and discriminant validity between constructs. Items with a lower than 0.60 standardised loading value were dropped (Nunnally, 1978). In Table I the convergent validity to evaluate the internal consistency of constructs is indicated by standard factor loadings, composite reliability, and average variance extracted (AVE) (Fornell and Larcker, 1981; Hair et al., 1998). The composite reliability ranged from 0.86 to 0.96 and the AVE from 0.68 to 0.89, all meeting the suggested values for convergent validity (Bagozzi and Yi, 1988; Fornell and Larcker, 1981).

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Items</th>
<th>Factor loading</th>
<th>Mean</th>
<th>SD</th>
<th>Composite reliability</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intention to adopt knowledge (INT)</td>
<td>INT1</td>
<td>0.89</td>
<td>5.33</td>
<td>0.59</td>
<td>0.92</td>
<td>0.79</td>
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<td></td>
<td>INT2</td>
<td>0.93</td>
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<tr>
<td></td>
<td>INT3</td>
<td>0.86</td>
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<tr>
<td>Attitude toward knowledge adoption (ATT)</td>
<td>ATT1</td>
<td>0.94</td>
<td>5.52</td>
<td>0.68</td>
<td>0.94</td>
<td>0.83</td>
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<td></td>
<td>ATT2</td>
<td>0.93</td>
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<td></td>
<td>ATT3</td>
<td>0.87</td>
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<tr>
<td>Network ties (NT)</td>
<td>NT1</td>
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<td>3.93</td>
<td>0.78</td>
<td>0.92</td>
<td>0.79</td>
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<td></td>
<td>NT2</td>
<td>0.90</td>
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<tr>
<td></td>
<td>NT3</td>
<td>0.89</td>
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<tr>
<td>Social trust (ST)</td>
<td>ST1</td>
<td>0.92</td>
<td>4.63</td>
<td>0.82</td>
<td>0.93</td>
<td>0.81</td>
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<tr>
<td></td>
<td>ST2</td>
<td>0.90</td>
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<td></td>
<td>ST3</td>
<td>0.88</td>
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<tr>
<td>Norm of reciprocity (NR)</td>
<td>NR1</td>
<td>0.91</td>
<td>4.10</td>
<td>0.88</td>
<td>0.95</td>
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<td></td>
<td>NR3</td>
<td>0.90</td>
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<td>Shared language (SL)</td>
<td>SL1</td>
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<td>1.22</td>
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<td>0.89</td>
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<td></td>
<td>SL2</td>
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<td>SL3</td>
<td>0.94</td>
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<td>Shared vision (SVI)</td>
<td>SVI1</td>
<td>0.83</td>
<td>4.92</td>
<td>0.80</td>
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<td>SVI2</td>
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<td></td>
<td>SVI3</td>
<td>0.88</td>
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<tr>
<td>Peer influence (PI)</td>
<td>PI1</td>
<td>0.97</td>
<td>4.06</td>
<td>0.89</td>
<td>0.86</td>
<td>0.68</td>
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<tr>
<td></td>
<td>PI2</td>
<td>0.67</td>
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<td></td>
<td>PI3</td>
<td>0.81</td>
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<tr>
<td>Perceived usefulness (PU)</td>
<td>PU1</td>
<td>0.92</td>
<td>4.85</td>
<td>0.69</td>
<td>0.93</td>
<td>0.81</td>
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<td></td>
<td>PU2</td>
<td>0.91</td>
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<td></td>
<td>PU3</td>
<td>0.88</td>
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<tr>
<td>Perceived ease of use (PEU)</td>
<td>PEU1</td>
<td>0.78</td>
<td>4.63</td>
<td>0.66</td>
<td>0.87</td>
<td>0.77</td>
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<tr>
<td></td>
<td>PEU2</td>
<td>0.96</td>
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</table>

**Table I.**
Convergent validity
In Table II the diagonal figures representing the square roots of AVE for each construct are all larger than the inter-correlation between the two variables, suggesting good discriminant validity of the constructs (Fornell and Larcker, 1981). A 95 per cent confidence interval analysis for each inter-correlation showed none of the confidence intervals had a value of 1, providing further evidence of proper discriminant validity (Bagozzi and Yi, 1988).

**Structural model estimation**

Table III indicates that network ties positively predicted attitude ($\beta = 0.16, p < 0.05$), supporting $H1$. Social trust and reciprocity were insignificant for attitude toward knowledge adoption, thus $H2$ and $H3$ were unsupported. Shared language ($\beta = 0.23, p < 0.01$) and shared vision ($\beta = 0.18, p < 0.01$) both positively affected attitude toward knowledge adoption, supporting $H4$ and $H5$. Peer influence positively explained attitude ($\beta = 0.18, p < 0.01$), supporting $H6$. Perceived usefulness showed a positive influence on attitude ($\beta = 0.24, p < 0.01$), yet perceived ease of use had an insignificant effect on attitude ($\beta = 0.06, p > 0.10$). $H7$ was supported but $H8$ was not. As expected, intentions were positively predicted by attitude ($\beta = 0.68, p < 0.01$),

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Structural path</th>
<th>Standardised coefficient</th>
<th>Results</th>
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</thead>
<tbody>
<tr>
<td>$H1$</td>
<td>Network ties</td>
<td>→ Attitude</td>
<td>0.16*</td>
</tr>
<tr>
<td>$H2$</td>
<td>Social trust</td>
<td>→ Attitude</td>
<td>0.01</td>
</tr>
<tr>
<td>$H3$</td>
<td>Norm of reciprocity</td>
<td>→ Attitude</td>
<td>0.03</td>
</tr>
<tr>
<td>$H4$</td>
<td>Shared language</td>
<td>→ Attitude</td>
<td>0.23**</td>
</tr>
<tr>
<td>$H5$</td>
<td>Shared vision</td>
<td>→ Attitude</td>
<td>0.18**</td>
</tr>
<tr>
<td>$H6$</td>
<td>Peer influence</td>
<td>→ Attitude</td>
<td>0.18**</td>
</tr>
<tr>
<td>$H7$</td>
<td>Perceived usefulness</td>
<td>→ Attitude</td>
<td>0.24**</td>
</tr>
<tr>
<td>$H8$</td>
<td>Perceived ease of use</td>
<td>→ Attitude</td>
<td>0.06</td>
</tr>
<tr>
<td>$H9$</td>
<td>Attitude</td>
<td>→ Intention</td>
<td>0.68***</td>
</tr>
</tbody>
</table>

Note: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$
confirming H9. Overall the predicting constructs explain 33 per cent of the variance of attitude toward knowledge adoption and 47 per cent of the intention to adopt.

Moderating influence of member type
The effect of member type was examined using the Chow test (Chow, 1960) to compare the regression equations (H1-H8) for both posters and lurkers. The Chow test determines whether the prediction effect of the independent variable(s) in a regression equation varies between different sub-groups (Hardy, 1993). A significant F-value indicates a significant difference between the regression equations of the two sub-groups and hence supports a moderating effect of member type. For each sub-group the significance of individual parameter estimates (β coefficient) for the independent variables were examined using t-tests.

As seen in Table IV the Chow test results show that the lurkers performed significantly differently from the posters in the regression equations predicted by H1, H2, H3, H4, H5, and H7, yet the two groups exhibited no significant differences in peer influence and perceived ease of use (H6 and H8). As posited the lurkers had stronger tendencies than the posters in H1, H3, H5, and H7. However, contrary to our expectation, the posters displayed a more significant inclination than the lurkers in H2 (social trust → attitude) and H4 (shared language → attitude). Thus H10 is partially substantiated.

Discussion
The goal of the present study was to examine the attitude and intention toward knowledge adoption as consequences of virtual community participants’ social capital perceptions, technology perceptions and peer influence. The moderating influence of knowledge recipients’ participation level was also investigated. Our results render empirical support for social capital’s capacity to improve attitudes toward knowledge adoption. The positive effects of peer influence and perceived usefulness are also corroborated. In addition participation types show interesting differences. The following discusses our findings in detail.

The influence of social capital and peers
Our study reveals that social capital exerts a multifaceted influence within virtual communities. First network ties enhance participants’ attitudes toward knowledge

<table>
<thead>
<tr>
<th>Paths</th>
<th>Posters Standardised coefficient</th>
<th>Posters t-value</th>
<th>Lurkers Standardised coefficient</th>
<th>Lurkers t-value</th>
<th>Chow test (F-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NT → ATT</td>
<td>0.20</td>
<td><strong>2.65</strong>*</td>
<td>0.25</td>
<td><strong>3.02</strong>*</td>
<td>6.06*</td>
</tr>
<tr>
<td>ST → ATT</td>
<td>0.26</td>
<td><strong>3.63</strong>*</td>
<td>-0.01</td>
<td>-0.07</td>
<td>7.29**</td>
</tr>
<tr>
<td>NR → ATT</td>
<td>0.10</td>
<td>1.32</td>
<td>0.24</td>
<td><strong>2.82</strong>*</td>
<td>5.94*</td>
</tr>
<tr>
<td>SL → ATT</td>
<td>0.33</td>
<td><strong>4.63</strong>*</td>
<td>0.28</td>
<td><strong>3.35</strong>*</td>
<td>5.53*</td>
</tr>
<tr>
<td>SVI → ATT</td>
<td>0.07</td>
<td>0.90</td>
<td>0.38</td>
<td><strong>4.83</strong>*</td>
<td>10.28**</td>
</tr>
<tr>
<td>PI → ATT</td>
<td>0.18</td>
<td><strong>2.50</strong>*</td>
<td>0.13</td>
<td>1.51</td>
<td>1.45</td>
</tr>
<tr>
<td>PU → ATT</td>
<td>0.05</td>
<td>0.69</td>
<td>0.34</td>
<td><strong>4.24</strong>*</td>
<td>10.54**</td>
</tr>
<tr>
<td>PEU → ATT</td>
<td>0.08</td>
<td>1.03</td>
<td>0.02</td>
<td>0.18</td>
<td>0.43</td>
</tr>
</tbody>
</table>

Table IV.
Results of Chow test

Note: *p < 0.05; **p < 0.01; ***p < 0.001
adoption. Similar to previous studies, ties among members facilitate and promote knowledge transformation activities in a community (McFadyen and Cannella, 2004). By having more interaction and connection with others, network ties encourage members to adopt knowledge. Second, shared language positively affects the attitude toward knowledge adoption, a shared vocabulary making the exchange of information more possible in a community (Boland and Tenkasi, 1995). Third, congruent with Chow and Chan (2008), this study demonstrates that a shared vision improves virtual community participants' attitudes toward knowledge adoption. It is believed to reduce misunderstandings in communication (Tsai and Ghoshal, 1998). Likewise, members who share a vision find it easier to form associations and co-operation for knowledge transference (Inkpen and Tsang, 2005), and therefore display a positive attitude toward knowledge adoption. The result of peer influence also fulfils our expectation, indicating that virtual community participants affected by interpersonal influence have stronger attitudes and intentions to adopt knowledge, as peer influence frequently guides social behaviours (Lippert and Forman, 2005).

The influence of technology perceptions
As expected, the positive effect of perceived usefulness on attitude was validated. Conversely, perceived ease of use failed to predict attitude toward knowledge adoption, yet our finding is not unique. A number of studies (e.g. Bhattacharjee, 2001; Davis et al., 1989) indicate that perceived usefulness predicts attitude better than ease of use, mainly because adopting a technology is more benefit-driven and directed by performance outcome evaluation (Taylor and Todd, 1995). Our findings show that usefulness is more important than ease of use regarding a virtual community’s knowledge resources.

Two other variables, social trust and the norm of reciprocity, both indicating the relational social capital, did not perform as expected. Such findings are consistent with Chow and Chan (2008), who discovered that social trust makes no direct contribution to attitude. It is argued that trust is a lubricant but not necessarily a requirement when knowledge is adopted through close and intensive interaction laden with positive feelings toward a virtual community (Chow and Chan, 2008). Additionally, trust may play a minor role in less risky relationships such as knowledge adoption (Coleman, 1988). In the same vein, a reciprocity norm affecting trust has no influence on attitude either.

Posters vs lurkers
Our study uncovers the different cognitive habits of the two types of members. Lurkers have more pronounced associations when attitude is explained by network ties, reciprocity norm, shared vision, and perceived usefulness; whereas posters' attitudes have stronger relationships with social trust and shared language. Compared to posters, lurkers, who are considered less confident in posting (Mason, 1999) appear to place greater value on adopting knowledge from people they feel connected to (Nahapiet and Ghoshal, 1998). In addition, lurkers’ stronger reciprocity beliefs regarding knowledge exchange indicate favourable attitudes toward knowledge adoption. Although lurkers satisfy needs mostly through observing rather than active participation (Nonnecke et al., 2004), it is reported that they feel a strong sense of community while lurking (Nonnecke and Preece, 2001). This may explain why shared vision and attitude toward knowledge adoption have a stronger relationship for lurkers. As lurkers have a greater need for information than posters do (Mathwick et al.,
2008), it seems to outweigh the perceived usefulness of a virtual community for their knowledge adoption intention.

By contrast social trust and shared language are associated more closely with attitude for posters than for lurkers. This may occur because posters share to gain rewards of status and respect (Wasko and Faraj, 2005). They will certainly expect others to be trustworthy and not to intrude when engaging in intellectual capital exchanges. Moreover, compared to the silent participants, posters who actively participate in the community are more familiar with the shared language and the manner in which knowledge is delivered in words (Nonnecke and Preece, 2000). This possibly explains why posters exhibit a stronger relationship between shared language and attitude.

**Implications**

While prior studies have focused on knowledge accumulation and transfer (e.g. Bock et al., 2005; Chiu et al., 2006), our study contributes to a related domain centring on knowledge adoption intention in online informal communities from different participants’ (posters vs lurkers) perspectives. The integrative framework combining social capital theory and TAM not only conceptualises the concepts of sociability and usability more inclusively, but also illustrates the socio-technical influences on attitude and intention for knowledge adoption in virtual communities.

As more users rely on reviews and information provided in online networks, the influence of virtual communities cannot be overlooked (Mathwick et al., 2008). This study offers meaningful insight for virtual community managers in the following aspects. First social capital development and accumulation through relationship building is pivotal for encouraging individuals to seek and adopt knowledge in virtual communities. To attract visitors and promote lurkers making use of virtual communities for knowledge, online community managers need to devise effective strategies for cultivating a structural bond, a common communication method, and a shared vision to foster positive attitudes toward knowledge adoption in the communities (Hersberger et al., 2007). As suggested by Dholakia et al. (2004) virtual communities are “only likely to grow in importance, influence, and the activities for which they are used as consumers become more comfortable and acclimatised to these environments and marketers learn how to forecast, monitor, and design their communication programs to take advantage of such opportunities” (p. 261). Hosts of virtual communities need to learn how to nourish and present community social capital to attract newcomers while maintaining existent members’ patronage.

Successful virtual learning entails effective and compelling communication (Sobrero, 2008). Managers of knowledge communities interested in promoting e-learning practices through virtual networks may focus more on increasing technical usability (usefulness), network ties, and cognitive-based social capital (i.e. shared language and vision) to facilitate co-learning. For posters, recognising their status and reputation coupled with assurance of members’ trustworthy behaviours could encourage them to not only continue contributing but also utilise knowledge resources in a virtual community (Wasko and Faraj, 2005). To encourage lurkers’ engagement, both content usefulness and social connection through social-cultural awareness of the virtual community (i.e. network ties and group identity) would help to enhance their knowledge awareness in accessing and employing knowledge resources in the community (Daniel et al., 2003).
Limitations and future research
Although our study provides valuable insight into determinants of knowledge adoption intention in virtual communities, it has several inherent limitations. First the data collected from online surveys through bulletin board systems in Taiwan confine the generalisability of the conclusions to this specific instrument and region. Second this study investigates participation in virtual communities in general. Future studies may explore the same research agenda by separating non-profit online communities from commercial virtual communities (Casaló et al., 2007). Moreover the functions of virtual communities with regard to types of knowledge to be adopted for behavioural change in specific areas, such as education and health promotion, can be further examined to extend research applicability. Third the sample is divided into posters and lurkers using a relatively broad criterion. Future studies can further classify virtual community members into groups based on finer participation levels such as always lurking, occasionally contributing, regularly contributing, and leading discussions to more accurately reflect the involvement and devotion levels of participants (Bagozzi and Dholakia, 2002).

References


Appendix. Measurement

Network ties

NT1. I maintain close social relationships with some members of the virtual community.
NT2. I spend a lot of time interacting with some members of the virtual community.
NT3. I know some members of the virtual community on a personal level.

Social trust

ST1. Members of the virtual community will not take advantage of others even when the opportunity arises.
ST2. Members of the virtual community will always keep the promises they make to one another.
ST3. Members of the virtual community are honest in dealing with one another.

Norm of reciprocity

NR1. My behaviour would help me get to know new members of the virtual community.
NR2. My behaviour would expand the scope of my association with other members of the virtual community.
NR3. My behaviour would lead to cooperation from outstanding members in the future.

Shared language

SL1. The members of the virtual community use common terms or jargon.
SL2. Members of the virtual community use understandable communication patterns during discussions.
SL3. Members of the virtual community use understandable narrative forms to post messages or articles.

*Shared vision*

SVI1. Members of the virtual community share the vision of helping others solve their professional problems.

SVI2. Members of the virtual community share the same goal of learning from each other.

SVI3. Members of the virtual community share the same idea that helping others is pleasant.

*Peer influence*

PI1. I want to do what my friends think I should do in the virtual community.

PI2. My friends would think that I should use the virtual community.

PI3. I want to do what my classmates/colleagues think I should do in the virtual community.

*Perceived usefulness*

PU1. Using the virtual community in my work would enable me to accomplish tasks more quickly.

PU2. Using the virtual community would improve my work performance.

PU3. I would find virtual community useful in my work.

*Perceived ease of use*

PEU1. I would find it easy to use the virtual community to do what I want it to do.

PEU2. My interaction with the virtual community would be clear and understandable.

*Attitude toward knowledge adoption*

ATT1. Adopting knowledge in the virtual community is always good.

ATT2. Adopting knowledge in the virtual community is always beneficial.

ATT3. Adopting knowledge in the virtual community is always a wise move.

*Intention to adopt knowledge*

INT1. I plan to adopt knowledge in the virtual community.

INT2. I intend to adopt knowledge in the virtual community.

INT3. My intentions are to adopt knowledge in the virtual community rather than through any alternative means.
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