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Firm orientation, community of practice, and Internet-enabled interfirm communication: Evidence from Chinese firms ☆

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ABSTRACT

What motivates firms to develop Internet-enabled interfirm communication? We draw upon the work of Alavi et al. (2005–2006) and propose that the use of the Internet in interfirm communication is influenced by a firm's firm orientation and its internal communities of practice. Based on data collected from 307 international trade firms in the Beijing area, we find that Internet-enabled interfirm communication is directly driven by internal community of practices and customer orientation, and indirectly by competitor orientation and learning orientation. The internal community of practice is affected by learning orientation and competitor orientation, but not by customer orientation. The present study contributes to the literature by providing empirical investigation on firm's strategic communications from the perspective of firm orientations, delineating how different firm orientations vary in impacting firm's strategic communications, and exploring the bridging effect of communities of practices on the influences of firm orientations on knowledge management initiatives.

1. Introduction

Because of the potential benefits of Internet technologies, firms have applied these technologies to conduct and support their business operations along the supply chain (Porter, 2001; Swaminathan and Tayur, 2003). Previous studies have consistently shown that Internet technologies can help firms enhance customer relationships (Saaed et al., 2005), facilitate supply chain coordination (Malhotra et al., 2007; Mishra et al., 2007), and streamline internal business processes (Swaminathan and Tayur, 2003).

There is accumulating evidence about why firms deploy Internet technologies and the consequences of doing so. Zhu et al. (2006) observe that a group of environmental factors, technological factors, and organizational factors influence the initiation, adoption, and routinization of e-business. Regarding the consequences of Internet technologies, Barua et al. (2004) reveal that firms which digitalize their business activities with customers and suppliers using Internet technologies have superior financial performance. Various other studies investigate the positive effect of the Internet on firm performance (Swaminathan and Tayur, 2003).

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However, we know relatively less about how firm orientation influences the firm's use of Internet-enabled communication with its supply chain partners. It is also important to understand how an internal community of practice (groups of professionals who informally share information amongst themselves – Brown and Duguid, 2000; Wenger, 2000) may foster the development of a community of practice beyond the focal firm (Wasko and Faraj, 2000; Zaheer and Bell, 2005). Thus, the purpose of this study is to examine how firm orientation and an internal community of practice determine Internet-enabled interfirm communication along the supply chain.

Our paper proceeds as follows. First, we review relevant literature. We then develop our theory and hypotheses outlining how the three firm orientations (learning, customer, and competitor) will drive Internet-enabled interfirm communication and the development of a community of practice internal to the firm. Next, we discuss our methods. We then turn to an examination of our results, followed by discussions of findings and the limitations thereof. Finally, we conclude with some recommendations for both scholars and practitioners.

2. Theoretical background

The fundamental question we address in this paper is: How do elements of firm orientation influence internal firm characteristics that subsequently drive valued knowledge management outcomes? To answer this question, we draw upon the work of Alavi and her associates (Alavi et al., 2005–2006), who argued that organizational values (a component of culture) drive knowledge management behaviors, which in turn drive knowledge management outcomes. In our paper, we extend the logic in Alavi et al. and examine how firm orientation influences the development of communities of practice within the firm (some authors have seen firm orientation as a way to characterize broader organizational culture – see, for example, Slater and Narver, 1994b; Slater and Narver, 2000) and how these in turn influence the important outcome of firm decisions to adopt Internet-enabled communication technologies.

Firm orientation is not an invariant construct. Indeed, there is a small but important body of literature examining the antecedents of firm orientation and whether and to what extent firms can change their orientation. Jaworski and Kohli (1993) identified a set of eight antecedents to market orientation. Kennedy et al. (2003) studied factors involved in implementing a customer orientation in a comparative setting of two schools, and observed two factors fostering the development of such an orientation: (1) leadership across all organizational levels, and (2) the centrality of customer requirements and performance feedback from customers that facilitates interfunctional coordination and alignment. Van Raaij and Stoelhorst (2008) undertook a comprehensive review of the literature on antecedents to market orientation, and developed a model based on their literature review suggesting seven enablers for market orientation (pp. 1284–1285). Beverland and Lindgreen (2007) took a somewhat different approach, adopting Lewin's (1951) three-stage change process model to develop a model of implementing market orientation. Finally, and most recently, Engelen et al. (2010) used organizational life cycle as a moderator of the antecedents of market orientation.

In terms of models of change in firm orientation, Roberts (1990) examined technology-based firms, and found that those firms that experienced market success evolved to focus more on market issues and less on engineering. Narver et al. (1998) proposed a theoretical model that argued firms could adopt a market orientation using either a "programmatic" or a "market-back" approach. Harris (2000, p. 616) examined barriers to firms adopting market orientation in the context of UK retailers, and found that "over 77 percent of the variation of the measure of market orientation around its mean can be attributed to a combination of the eight organizational barriers" (three structural, two strategic, and three systematic). Addressing those barriers should help firms adapt a market orientation.

In sum, we observe a small, yet burgeoning, literature on the antecedents to market orientation and the extent to which firms can change their orientation. While scholars do not fully understand the antecedents to company orientation and the extent to which a firm can change its orientation, it is becoming apparent that firm orientation is at least somewhat controllable by the firm. Hence, while we do not fully understand what a firm needs to do to change its orientation, it is becoming increasingly clear that it is possible to do so.

While much of the prior literature examines the impact of firm orientation on performance, other studies examine and highlight other outcomes of firm orientation. For example, Celuch et al. (2002) examined and found a relationship between market orientation and learning orientation and firm capabilities. Similarly, Connor (1999, 2007) argued that the balance between a firm's customer orientation and market orientation will affect the firm's innovation. While innovation is related to performance (see, for example, Zaheer and Bell, 2005 amongst many), it is a distinct conception of "performance," one also related to knowledge-sharing behaviors (as demonstrated by Zaheer and Bell (2005)). Jaworski and Kohli (1993) found a positive relationship between market orientation and both employee commitment and esprit de corps.

Learning orientation and market orientation are distinct yet complementary constructs (Celuch et al., 2002; Hurley and Hult, 1998; Sinkula et al., 1997). Because customer orientation and competitor orientation are often regarded as two dimensions of market orientation (Narver and Slater, 1990), our current study "opens the box" of market orientation and directly examines its two dimensions.

2.1. Learning orientation

The concept of learning orientation was first examined at the individual level, and research at that level generally shows that a learning goal orientation is associated with adaptive behaviors and outcomes. Bunderson and Sutcliffe (2003) extend

the concept to the group level and find that group-level learning orientation goals are significantly related to important outcomes.

Scholars have further extended the concept of learning orientation to the firm level. Hult and his colleagues define a learning orientation as, "the degree to which the members of the... unit stress the value of learning for the long-term benefit of the... system" (Hult et al., 2003, p. 544). Garvin (1993, p. 80) defines a learning organization as "an organization skilled at creating, acquiring, and transferring knowledge, and at modifying its behavior to reflect new knowledge and insights." Learning orientation at the firm level is comprised of three underlying values: a commitment to learning, open-mindedness, and shared vision (Baker and Sinkula, 1999; Calantone et al., 2002; Celuch et al., 2002; Sinkula et al., 1997).

Firms that consciously attempt to learn – i.e., process information in a manner that expands its potential scope of operations (Huber, 1991) – and make learning a priority tend to do better than firms which do not (Baker and Sinkula, 1999; Hedberg et al., 1977). A learning orientation reflects an internal management focus on making organizational learning a priority for organizational participants (Baker and Sinkula, 1999; Bunderson and Sutcliffe, 2003; Celuch et al., 2002; Garvin, 1993; Senge, 1990). Organizational learning closely relates to the concept of knowledge sharing (Huber, 1991; Hult et al., 2002). Cohen and Levinthal (1990) tie together the constructs of knowledge and learning in their concept of absorptive capacity and argue that learning normally occurs proximate to existing knowledge.

2.2. Customer orientation

Business scholars have advocated that managers become more customer oriented, using terms such as customer-focused (Gulati and Oldroyd, 2005), close to the customer (Peters and Waterman, 1984), and customer-led (Slater and Narver, 1998). Since these terms may be used synonymously (Slater and Narver, 1995), we use the term "customer orientation" to describe this focus on customers. Customer-oriented firms "seek to understand customers' expressed and latent needs, and develop superior solutions to those needs." (Slater and Narver, 1999, p. 1165) Customer orientation involves taking actions based on market intelligence as opposed to verbalized customer opinions alone (Kohli and Jaworski, 1990). It means putting the interests of one's customers first to help build customer relationships, identify market opportunities, and sustain business growth (Kohli and Jaworski, 1990; Narver and Slater, 1990). Generally, the logic underlying these admonitions is that the more businesses are aware of their customers' needs, the better they will be in adapting to those needs. In turn, there is considerable evidence that adapting to customer needs results in superior performance (Narver and Slater, 1990).

2.3. Competitor orientation

There has also been a similar admonition to focus on competitors and their strategies. As firms become more aware of the competitive moves of rival firms, they will be able to develop effective counter-moves (or anticipatory moves) that should also enhance firm performance. Competitor orientation refers to a firm's ability to identify its competitors, understand and respond to the strengths, weaknesses, capabilities and strategies of those competitors, and constantly collect competitor information from the marketplace (Han et al., 1998; Im and Workman, 2004; Narver and Slater, 1990). It involves identifying the firm's main competitors, their strengths and weaknesses, and their long-term capabilities and strategies (Slater and Narver, 1994b).

Scholars recognize that firm executives may be unable to monitor both customer needs and competitor moves simultaneously because executives face cognitive limits regarding how much they can attend to at any given time, and customer needs and competitor moves force managers to attend to different types of information (Day and Wensley, 1988; March and Simon, 1958; Ocasio, 1997). Consequently, executives engage in processes of selective attention and simplification (March and Simon, 1958; Slater and Narver, 1994a).

Both customer-focus and competitor-focus tend to be externally oriented, or "outside-in" (Baker and Sinkula, 1999; Celuch et al., 2002). That is, they tend to focus the firm's attention on factors *external* to the firm. However, there has been increasing realization in the strategy literature that a preoccupation on external factors overlooks vital internal firm factors (Barney and Zajac, 1994; Henderson and Mitchell, 1997). Recently, the strategy literature has turned its attention to an "inside-out" orientation (Baker and Sinkula, 1999; Celuch et al., 2002), focusing on internal firm factors – notably a "learning orientation" (Bunderson and Sutcliffe, 2003; Garvin, 1993; Senge, 1990).

2.4. Internal community of practice

Communities of practice are individuals who both share similar organizational roles and face similar issues and challenges within the organization. Communities of practice cut across internal organizational boundaries, and reflect the common interests of the participants (Lesser and Prusak, 2000). Individuals in communities of practice are united in their actions and in the meanings they attribute to those actions (Liedtka, 2000).

One important purpose of communities of practice is to share information, create a common understanding of the world, and share knowledge. Lesser and Prusak (2000, p. 124) argue that communities of practice are "the major building blocks in creating, sharing, and applying organizational knowledge" because communities of practice facilitate the development of social capital which is "a necessary condition for knowledge creation, sharing, and use." McDermott (2000) asserts that "Knowledge belongs to *communities*... We learn by participating in these communities... *Knowledge flows through*

professional communities, from one generation to the next." (p. 26) "We acquire knowledge by participating in a community." (p. 28) "*Increasing an organization's ability to leverage knowledge typically involves finding, nurturing, and supporting the communities that already share knowledge about key topics*... The key to nurturing communities is to tap into their natural energy to share knowledge... People naturally seek help, share insights, and build knowledge in areas they care about." (p. 29) In all of these quotes, the italics are in the original. The flip side of this is that members of the same community of practice can more easily share knowledge than can persons operating in different communities of practice, or not part of a community of practice (Hakanson, 2004). Thus, there exists a close and tight relationship between communities of practice and knowledge sharing, such that knowledge sharing indicates and evidences the presence of a community of practice, and knowledge sharing will occur within a community of practice.

Thus, the presence of communities of practice fosters knowledge sharing across the boundaries of different functional departments and locations. Hence, it is a manifested explanation of an organization's emphasis on learning, collecting and disseminating knowledge of customers and competitors. That is, when organizations have a strong competitive orientation, one may expect that their communities of practice will focus on sharing knowledge about the competitive components of the environment. In addition, when the firm has a customer orientation, organizational communities of practice will discuss customer needs and how better to meet them. In firms where organizational learning is supported, knowledge sharing can be a routine business process of operationalizing the firm's learning culture (Slater and Narver, 1995), induce the firm's innovative behavior (Hurley and Hult, 1998), and knowledge management initiatives (Alavi et al., 2005–2006). Similarly, one expects that as internal organizational communities of practice form, organizational members will be increasingly interested in exchanging information and knowledge with others outside the firm. One important manifestation of that will be communications with customers, especially those enabled by Internet technologies.

3. Research model and hypotheses

In this section, we develop our research model wherein we propose that a firm's orientations – learning orientation, customer orientation, and competitor orientation – will affect its Internet-enabled interfirm communication, as well as its development of internal community of practice. In turn, we examine the effect of an internal community of practice on the firm's use of Internet-enabled interfirm communication. We present the model in Fig. 1.

3.1. Internet-enabled interfirm communication

The outcome of our research model is Internet-enabled interfirm communication. Internet-enabled interfirm communication in business operations can be considered an inseparable part of a firm's overall e-business strategy (Chatterjee et al., 2002; Porter, 2001; Swaminathan and Tayur, 2003; Zhu et al., 2006). While the Internet can be used to implement different aspects of a firm's operations in order to achieve competitive advantage (Chatterjee et al., 2002; Swaminathan and Tayur, 2003; Zhu et al., 2006), in this study, we focus on the use of the Internet to enhance interfirm communication. We define Internet-enabled interfirm communication as the extent to which a firm uses the Internet to enable interactions with current and prospective customers. We begin by considering the impact of community of practice on Internet-enabled interfirm communication. We then turn to examine firm orientation as antecedent to community of practice. Finally, we consider the impact of firm orientation on Internet-enabled interfirm communication.

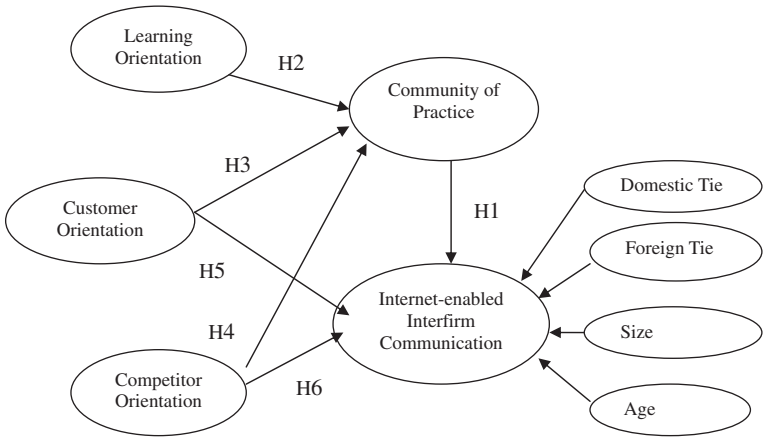

Fig. 1. The basic model.

3.2. The effect of community of practice on Internet-enabled interfirm communication

One of the primary purposes underlying the development of community of practice is the sharing of job-relevant information (Wenger, 2000). While these communities of practice were originally conceived as existing primarily inside a given organization, recent research indicates that they may extend beyond firm boundaries (Zaheer and Bell, 2005). Further, while much of the extant research has conceived of communities of practice as being primarily face-to-face activities, recent research also shows that they can develop and be supported electronically (Brown, 1998; Wasko and Faraj, 2000). Therefore, it would not be surprising to see that strong internal community of practice would be extended beyond firm boundaries to encompass important firm stakeholders, notably firm customers. As internal members of the firm realize the value of their community of practice, they will seek to include others inside it. Given that many firm customers will not be located geographically proximate to the firm, the firm will utilize Internet technologies to extend communications and their community of practice to their customers. Hence, we expect:

H1. Community of practice is positively associated with Internet-enabled interfirm communication.

3.3. The effects of firm orientation on internal firm community of practice

Learning organizations tend to have a cooperative attitude (Slater and Narver, 1995) that is likely to foster a willingness to share information and knowledge among firm employees. Firms that possess high levels of learning orientation tend to be characterized by shared vision (Baker and Sinkula, 1999; Calantone et al., 2002; Celuch et al., 2002) which both promotes and is fostered by, communication and information sharing in the organization.

Indeed, Calantone and his colleagues (2002, p. 517) argue that a definition of learning orientation should include knowledge and information sharing explicitly, because, "learning does not really occur unless an organization has an effective and efficient system for sharing and reexamining information." Similarly, Hult and his colleagues (2002, p. 378) argue that organizational learning (as opposed to a learning orientation) is a three-step process, one of which is information (or knowledge) dissemination. They argue that information dissemination is an outcome of an organizational learning culture. Later, Hult (2003, p. 192) argued that a learning culture (which likely underlies a learning orientation) provides the ideologies, values and beliefs to support knowledge management activities. Thus, there is a tight-knit relationship between learning orientation and knowledge sharing, and one expects that levels of learning orientation will be positively associated with knowledge sharing. Again, while the organization could choose to rely on its formal communication channels to foster this knowledge sharing, developing a community of practice of learners may be a much more efficient means of so doing, especially when important and relevant information may reside in different sections of the organization. Because communities of practice are centered around common areas of interest, they can better focus organizational learning efforts, as organizational members can choose to identify with communities of practice dealing with the issues they themselves are facing. Thus, we expect:

H2. Learning orientation is positively associated with internal community of practice.

We anticipate that customer orientation will be associated with the development of an internal community of practice. Customer-oriented organizations will need to share what they find about their customers throughout the organization to make a difference in terms of valued outcomes (Gulati and Oldroyd, 2005). Over time, customer-focused organizations will find ways to improve internal coordination and manage the flow of information, so as to enhance knowledge sharing across the organization (Gulati and Oldroyd, 2005). The customer focus that lies at the heart of market orientation inherently involves both the generation and dissemination of customer intelligence (Kohli and Jaworski, 1990), so firms high in customer orientation will seek to disseminate the intelligence they develop about their customers across organizational units (Jaworski and Kohli, 1993). However, all this is very formal, and one of the challenges facing organizations is overcoming the formal organizational barriers to inter-unit communication. One of the tools organizations employ to do so is the development of informal communities of practice, which allow similarly-positioned employees to share information and knowledge across organizational boundaries. Communities of practice may be much more efficient at transmitting relevant customer-related information across the organization. As a consequence, we expect that customer orientation will be positively associated with the development of communities of practice within the organization, and hypothesize that:

H3. Customer orientation is positively associated with internal community of practice.

Similarly, an important element of competitor orientation is that firm employees across functions share their information about competitors with each other (Slater and Narver, 1994b), and effective communication underlies competitor orientation (Celuch et al., 2002). Market intelligence involves gathering and disseminating knowledge about competitor actions (Jaworski and Kohli, 1993; Kohli and Jaworski, 1990). Firms that are focused on their competitors will seek to understand and respond to competitor moves. Again, as with customer-based information exchange, firms may find that it is more efficient to develop a community of practice to share competitor-related information than relying on formal organizational channels, especially when the intensity of competition increases, and firms have reduced time to respond to competitive

threats (D'Aveni, 1995). Increasing competition is especially likely to occur in recently liberalizing markets like China, which are moving from central control to market forces. As a result, we expect firms to develop communities of practice to respond to that competitive threat, and predict:

H4. Competitor orientation is positively associated with internal community of practice.

3.4. The effects of firm orientation on Internet-enabled interfirm communication

Customer orientation considers both current and projected customer needs (Kohli and Jaworski, 1990; Narver and Slater, 1990). Because of its focus on projected needs, customer orientation involves a long-term focus (Connor, 1999; Slater and Narver, 1999) that requires firms to continuously design and introduce innovative products and services to meet the changing requirements of customers (Kohli and Jaworski, 1990; Narver and Slater, 1990), thereby producing long-term customer value (Slater and Narver, 1998).

The long-term focus inherent in customer orientation will lead customer-oriented firms to develop and/or seek out innovative technologies and business initiatives on the Internet that will solve long-term customer problems. Strategy implicitly considers the long-term direction of the firm (Collins and Porras, 1996; Hamel and Prahalad, 1989), so development of business strategy utilizing Internet technologies as business initiatives will be fostered by the long-term customer focus implicit in customer orientation. Additionally, strategy implicitly considers ways to enhance customer value (Kaplan and Norton, 1999), which is a fundamental element of customer orientation (Kohli and Jaworski, 1990; Narver and Slater, 1990). The advantages of Internet technologies which have reached customers on a global basis should be more valued by firms which have strong customer orientation. This suggests:

H5. Customer orientation is positively associated with Internet-enabled interfirm communication.

Firms which are competitor-oriented seek competitive advantage over their rivals. They try to identify and develop new strategic initiatives such as employing Internet-enabled technologies that exploit their own strengths and their rivals' weaknesses. This may be especially important in cases where first-mover advantages exist (Porter, 1980). It is often argued that in the Internet, firms which move first and fast develop insurmountable market share that increase their competitive power (Porter, 2001).

Reactively, highly competitor-oriented firms will constantly be monitoring their environment to seek out competitors' new strategic initiatives (Slater and Narver, 1994b), such as employing the Internet to facilitate communications and coordination with their business partners. They will try to respond by adopting their own way of utilizing the Internet to counter those of their rivals. Competing on the Internet for customers and gaining the edge over rival firms by utilizing Internet technologies would be more appealing to firms with a strong competitor orientation. Thus, for both proactive and reactive reasons, we anticipate:

H6. Competitor orientation is positively associated with Internet-enabled interfirm communication.

4. Research method

4.1. Study setting

China was the third largest international trading country in the world by 2008, in that year exporting US $1.43 trillion of goods (the second largest in the world) and importing US $1.13 trillion (the third largest) (World Trade Organization, 2009). China's international trade is conducted by international trading companies – companies with legal import and export trading rights that are licensed by the Chinese government. Our sampling frame consists of Chinese international trading companies in the Beijing area. We generated a list from a database published by the Beijing Municipal Bureau of Commerce. At the time of our data gathering, there were a total of 2075 companies registered in the database, of which 810 were foreign companies, 337 were branch offices of foreign companies, and 928 were domestic companies.

4.2. Data collection

We started the data collection process by telephoning all the 2075 registered trading companies in November 2003. We made follow-up phone calls to companies who were unreachable during the first attempt. As a result, a total of 812 companies agreed to participate in the survey.

Rather than using a mail survey, we conducted personal survey interviews with the respondents. Doing so should accomplish two purposes. First, personally administering the survey should help respondents better understand the survey questionnaire. Second, personal administration will likely improve the survey response rate and data quality.

To administer the survey, we hired 50 students who had completed e-business or e-commerce courses to work as interviewers. They were trained in two 1-h sessions, one that concentrated on interview skills and the other on the questionnaire

items. Because of budget limits, 500 companies were randomly selected from the initial pool of 812 companies. We conducted third-round telephone calls and 446 companies agreed to interviewer site visits. The formal interviews were conducted between December 2003 and January 2004 and took an average of 30 min to complete. From the 446 companies, we conducted a total of 307 interviews, and 139 were cancelled by the companies for various reasons. Therefore, the response rate was 38% of the initial sample of 812 companies, and 69% of the companies originally agreeing to on-site visits.

We used the extrapolation procedure suggested by Armstrong and Overton (1977) to assess non-response bias. We compared the early quartile with late quartile of the respondents on demographic variables. The comparison revealed no significant difference between the early and the late quartile of respondents, which suggests that non-response bias is unlikely to be present in our data.

4.3. Measures

We present the English version of our survey questions in Appendix A. All of the research constructs were measured by the survey. In addition, we collected company profile information such as age, size, industry, the range of products traded by the company, and ownership type.

We measure the dependent variable using three questions related to how firms valued using the Internet to facilitate information and knowledge sharing with their customers. We use 5-point Likert scale for this measure. In addition, we adopt our measure for community of practice from scales used in previous studies, such as the scales of market information dissemination and information distribution activities (e.g., Hult et al., 2004). The scale in our study assesses the degree to which information was shared across the organization, such as between the employees of the international business department and among employees from different related departments. We measure responses on a 5-point Likert scale.

Several published studies have used the commitment to learning scale as the measure of learning orientation (Hult, 1998; Hult et al., 2002), and we follow this approach. The commitment to learning scale is associated with a long-term strategic orientation (Calantone et al., 2002, p. 516), and thus appears to capture the strategy component of this study. The scale assesses an organization's learning orientation. We measure customer orientation and competitor orientation using derivatives of the well-accepted scales of market orientation developed by Narver and Slater (1990). Again, we assess these three orientations on 5-point Likert scales.

We include several control variables that have been widely cited in previous literature. We measure firm age as the number of years the firm had been in business and firm size as the number of employees in the firm. Both of these continuous variables have been used extensively in the literature. We control for them because as the firm ages and grows larger, it becomes more likely that it will develop an extensive network of ties with other organizations, independent of the effects we are specifically hypothesizing. Therefore, to prevent potential confounds, we control for firm size and age. We measure foreign and domestic ties on 5-point Likert scales. These ties capture possible normative or mimetic isomorphism when supplier or customer firms adopt Internet technologies (Scott, 2001; von Hippel, 1988), increasing the likelihood that the focal firms themselves will adopt Internet-based interfirm communication.

4.4. Sample characteristics and respondents demographics

As shown in Table 1, 58% of the companies are pure trading companies while others are manufacturing (22%), service (10%), and comprehensive firms (which comprise a wide range of business activities) (10%) which had trading rights that enabled them to manage their own import and export activities. Eighty-two percent of the firms have at least 5 years' trading experience in China. The average firm age is 18 years. Just over half of the companies are medium sized, employing between 50 and 1000 people. The companies trade a broad scope of products, ranging from machinery and electronics to services, finance, and infrastructure. In terms of the employment classification of the individual respondents, 55% are in the trading department, 17% are top managers (CEO, CFO, etc.), and 92% are functional managers as opposed to technical managers (see Table 2).

5. Analyses and results

We use Partial Least Squares (PLSs) for our data analysis. We pay careful attention to the various measurement problems (i.e., inconsistent and inappropriate tests of measurement reliability and validity), and adopt the suggested standards for using PLS (Chin, 1998; Fornell and Larcker, 1981). We adopt a bootstrapping estimation procedure to assess the significance of the factor loadings in the measurement model and the path coefficients in the structural model.

5.1. The measurement model

We display descriptive statistics for the measurement items in Table 3. As shown in Table 3, except for the single-item scales, all of the *t*-statistics of the factor loadings are significant at the $p = 0.001$ level.

Based on the results of the measurement model, we analyze the convergent validity, discriminant validity, and reliability of all of the multiple-item scales, following the guidelines in the prior literature (Fornell and Larcker, 1981). We assess

Table 1
Characteristics of participating firms.

Characteristic	*N*	Percent (%)
Company type		
Pure trading	177	58
Manufacturing	68	22
Service	32	10
Comprehensive	30	10
Ownership type		
State-owned	132	43
Non-state-owned (Chinese private and foreign invested)	140	46
Undecided (collective owned)	35	11
Age		
Less than 5 years	56	18
Between 5 and 15 years	139	45
More than 15 years	112	37
Number of employees		
$\leqslant$49	88	29
Between 50 and 199	77	25
Between 200 and 999	84	27
$\geqslant$1000	58	19
Trading products		
Machinery and electronic	86	28
Chemical, oil, petrochemical, pharmacy, coal, mine, and steel	61	20
Light industrial product, craftwork, and construction material	51	17
Software and information technology	40	13
Textile and garment	31	10
Food, grain, and stock	19	6
Service, finance, and infrastructure	11	4
Other	8	3

Table 2
Respondent demographics.

Department[a]	*N*	Percent
Trading	170	55
Manufacturing	9	3
Information technology	21	7
R&D	11	4
Marketing	45	15
Top decision maker (general manager, CEO, CFO, CIO, etc.)	51	17
Role		
Business functional	283	92
Technical	24	8

[a] All respondents are senior managers who were familiar with the companies' strategies and operations.

reliability in terms of composite reliability. Composite reliability is similar to and superior to Cronbach's Alpha because it considers the actual factor loadings instead of assuming an equal weight for each item (Fornell and Larcker, 1981). The composite reliabilities in our measurement model range from 0.75 to 0.88, which are all above the recommended value of 0.70 (Nunnally, 1978).

We assess convergent validity in terms of average variance extracted (AVE). Convergent validity requires an average variance extracted of no less than 0.50 (Fornell and Larcker, 1981). As shown in Table 3, AVE explains the variance that is measured by the construct in relation to the measurement error. All of the AVE values demonstrate adequate convergent validity (ranging from 0.51 to 0.66), and are above the recommended value of 0.50.

Discriminant validity is assessed by comparing the AVE of each individual construct with the shared variances between this individual construct and all of the other constructs. A higher AVE than shared variance for an individual construct suggests discriminant validity (Fornell and Larcker, 1981). Table 4 shows the inter-construct correlations off the diagonal of the matrix. A comparison of all of the correlations and square roots of the AVEs on the diagonal indicates adequate discriminant validity.

Table 3
The measurement model.

Construct	Item	Loading	Standard error	Composite reliability	AVE
Internet-enabled interfirm communication	IIC1	0.69	0.05	0.82	0.60
	IIC2	0.84	0.02		
	IIC3	0.79	0.04		
Community of practice	CP1	0.72	0.04	0.84	0.57
	CP2	0.83	0.03		
	CP3	0.82	0.02		
	CP4	0.86	0.01		
Learning orientation	LO1	0.72	0.04	0.88	0.66
	LO2	0.83	0.02		
	LO3	0.82	0.03		
	LO4	0.86	0.02		
Customer orientation	CuO1	0.82	0.03	0.82	0.61
	CuO2	0.70	0.05		
	CuO3	0.81	0.03		
Competitor orientation	CoO1	0.60	0.06	0.75	0.51
	CoO2	0.67	0.06		
	CoO3	0.84	0.03		
Log (age)	AGE	1	0	NA	NA
Log (size)	SIZE	1	0	NA	NA
Foreign tie	FT1	1	0	NA	NA
Domestic tie	DT1	1	0	NA	NA

All loadings are significant at the 0.001 level. AVE = average variance extracted. NA: not applicable to single-item measures.

We conduct a series of statistical analyses to assess the potential severity of common method bias. First, we conduct a Harmon one-factor test (Podsakoff et al., 2003) on the five main constructs in our theoretical model. Results from this test show that the most covariance explained by one factor is 30.89%, indicating there is no evidence of a common method bias. Second, following Liang et al.'s (2007) analytical procedure, we include in the PLS model a common method factor whose indicators are all the principal constructs' indicators. This analysis shows that each indicator's principal loading is substantively larger than its method loading. In addition, all principal loadings are significant at the $p = 0.001$ level, whereas all method loadings (except three) are not significant. Given the small magnitude and insignificance of method loadings, we believe that the results of this study are not unduly impacted by common method bias. Third, if significant common bias exists, there would be extremely high correlations between the latent variables ($r > 0.9$) (Pavlou et al., 2007). The latent variable correlation matrix of our study (Table 4) reveals the highest correlation is 0.61, further alleviating concerns about a common method bias.

5.2. Hypotheses testing

We present the PLS results of our hypotheses testing in Fig. 2 and Table 5. As shown in the structural model (Fig. 2), our model explains 40% of the variance in community of practice and 28% of that in Internet-enabled interfirm communication. Community of practice has a significant effect on Internet-enabled interfirm communication ($\beta = 0.22$, $p < 0.01$), which provides support for H1. H2, which hypothesizes a positive effect of learning orientation on community of practice, is supported ($\beta = 0.37$, $p < 0.001$). A firm's customer orientation does not directly influence community of practice ($\beta = 0.03$, n.s.). Thus, H3 is not supported. H4, which predicts a significant positive relationship between competitor orientation and community of practice, is also supported ($\beta = 0.33$, $p < 0.001$). The relationship between customer orientation and Internet-enabled

Table 4
Inter-construct correlations.

	1	2	3	4	5	6	7	8	9
Internet-enabled interfirm communication	0.77								
Community of practice	0.34	0.75							
Learning orientation	0.34	0.56	0.81						
Customer orientation	0.35	0.40	0.44	0.78					
Competitor orientation	0.33	0.55	0.53	0.61	0.71				
Age	−0.03	0.04	0.04	−0.08	0.02	NA			
Size	0.13	−0.10	0.03	−0.05	−0.04	0.44	NA		
Foreign tie	0.16	0.21	0.30	0.15	0.22	0.14	0.04	NA	
Domestic tie	0.23	0.26	0.28	0.11	0.15	0.03	0.05	0.49	NA

Square root of average variance extracted (AVE) is shown on the diagonal of the matrix. Inter-construct correlation is shown off the diagonal. NA: not applicable to single-item measures.

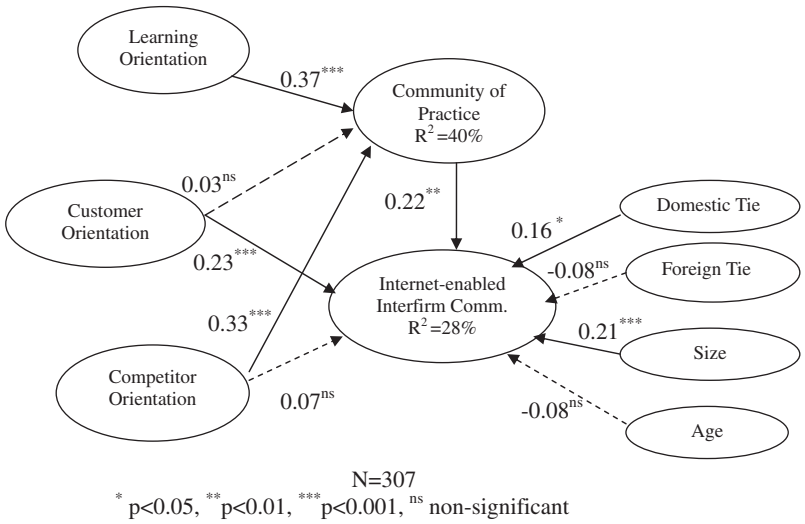

Fig. 2. Results of hypothesis testing.

Table 5
Summary of hypothesis testing.

Hypothesis	Path	β	Supported?
1	Community of practice → Internet-enabled interfirm communication	0.22**	Yes
2	Learning orientation → community of practice	0.37***	Yes
3	Customer orientation → community of practice	0.03ns	No
4	Competitor orientation → community of practice	0.33***	Yes
5	Customer orientation → Internet-enabled interfirm communication	0.23***	Yes
6	Competitor orientation → Internet-enabled interfirm communication	0.07ns	No

* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$, ns non-significant.

interfirm communication is significant ($\beta = 0.23$, $p < 0.001$), generating support for H5. H6, which suggests that the higher a firm's competitor orientation, the higher the level of Internet-enabled interfirm communication, is not supported ($\beta = 0.07$, n.s.). Finally, two control variables, i.e., firm size ($\beta = 0.21$, $p < 0.001$) and domestic tie ($\beta = 0.16$, $p < 0.05$) significantly explain Internet-enabled interfirm communication.

Although the direct impact of competitor orientation on Internet-enabled interfirm communication is not significant and no direct impact of learning orientation on Internet-enabled interfirm communication has been hypothesized, we conduct (Sobel, 1988) tests to examine their indirect effects on Internet-enabled interfirm communication through community of practice. The results show community of practice carries significant indirect effects of learning orientation ($\beta = 0.08$, $p < 0.01$) and competitor orientation ($\beta = 0.07$, $p < 0.01$) on Internet-enabled interfirm communication.

6. Discussions

In our model, we examine the effects of firm orientation on communities of practice and Internet-enabled interfirm communication, as well as the effect of communities of practice on Internet-enabled interfirm communication. We found that two of the three orientations (learning and competitor, but not customer) enhance communities of practice, and one of two orientations (customer, but not competitor) directly enhance Internet-enabled interfirm communication. Additionally, we find that communities of practice drive Internet-enabled interfirm communication. We now examine each of these findings in more detail.

In terms of the effect of firm orientation on the development of intra-firm community of practice, we find that both learning and competitor orientation strongly enhance the emergence of community of practice, while customer orientation does not. This suggests that firms that value learning will make efforts to develop informal knowledge-transfer mechanisms such as communities of practice, to enhance the learning of all members of the firm. Firms that value learning recognize that it occurs more readily when mechanisms exist to share knowledge broadly through the organization. Additionally, firms with a competitor orientation tend to develop communities of practice. Given that firms enhance their competitiveness by gathering and sharing information from many sources (Cornish, 1997), it makes sense that competitor-oriented firms will seek to share their knowledge informally through communities to become more competitive.

We find a non-significant direct relationship between customer orientation and community of practice. This may reflect the possibility that employees in the firms in our sample may still be confusing "market orientation" with "marketing orientation" (Slater and Narver, 1998), or they may see "market intelligence" as primarily "marketing intelligence." Thus, they may see customer-related information as something solely within the purview of the marketing department, which would reduce the perceived necessity of sharing knowledge on a firm-wide basis. In contrast, given the belief that "winning knowledge races" and enhancing competitiveness is "everyone's business," firms with a competitor focus would have a desire to share knowledge across business units.

Turning to the effect of firm orientation on Internet-enabled interfirm communication, we first observe that customer orientation positively influences Internet-enabled interfirm communication. Firms that attend to the needs of their customers and assess their customers' satisfaction regularly appear to value Internet-enabled interfirm communication with their customers, and act to implement such web-enabled communication. Moreover, the ubiquity of the Internet provides the firm with the opportunity to attract and maintain customers from anywhere who could not previously be reached, so firms with a customer orientation would be predisposed to respond to this emerging way of interacting with customers. Alternatively, Internet-enabled interfirm communication may represent a mimetic response by the firms (Scott, 2001). Their customers may be either adopting e-business strategies themselves, or may see the focal firm's rivals doing so, and inquire whether the focal firm plans to stay "on top of things," necessitating a firm reaction to customer demands.

Competitor orientation does not directly predict Internet-enabled interfirm communication. This may be because, as Porter (2001) suggested, firms may not see the Internet as a means of enhancing their competitiveness. They may see it instead as something they have to use to be considered a "legitimate" player in the industry (Powell and DiMaggio, 1991; Scott, 2001). Moreover, they may see it as primarily a customer-focused tool rather than a competitive tool, which would explain both the positive relationship with customer-orientation and the non-relationship with competitor orientation.

We observe a significant relationship between internal firm community of practice and Internet-enabled interfirm communication. This indicates that informal knowledge-sharing communities help promote Internet-enabled interfirm communication. Organizations in our study seamlessly integrate internal and external practices of knowledge management. Cousins et al. (2011) found that organizations that actively scan the environment for breakthrough innovations in new product development can improve the development of a firm's internal technical proficiency as well as that of the knowledge sharing with external business partners. Technical proficiency and external knowledge sharing then impact product development performance and financial performance. Saraf et al. (2007) also found that a business unit's knowledge sharing with the unit's business partners, not with the unit's customers, enhanced the performance achieved by the business unit.

Even though we find the direct effect of competitor orientation on Internet-enabled interfirm communication is not significant, the indirect effect through community of practice on the impact of competitor orientation on Internet-enabled interfirm communication is significant, suggesting that community of practice carries all the influence of competitor orientation on Internet-enabled interfirm communication. Similarly, while we propose no relationship between learning orientation and Internet-enabled interfirm communication, an indirect path via community of practice is significant. Therefore, we suggest that firms still need to pay attention to these two dimensions.

7. Conclusions

7.1. Limitations

There are several limitations to this study. First, we collected the data from a very special economy – the transitional economy in China – which differs from the market economy and developed countries (Peng and Heath, 1996). Previous studies have indicated that there are very special institutional and environmental features which might affect a firm's business strategies and strategic choices in such economies (Peng, 2003). However, we did not capture such institutional and environmental factors.

Second, the industry we investigated in this study was also special. Because international trading companies are the intermediaries of a country's import and export business activities, their business strategies are also likely to be influenced by both domestic and foreign forces. The industry also faces various institutional, organizational, and environmental factors in the transitional process in China. Thus, we are cautious in generalizing the findings of this study to other industries and other countries.

Third, we relied on a single data source in our data collection and did not use multiple survey respondents, primarily because of the high cost of using multiple information sources. Thus, the respondents might not have provided accurate responses to some of the survey questions.

Finally, our method does not allow us to impute causality in our observed relationships. To overcome this limitation, we attempted to provide alternative explanations based on a possibility of causality other than that which we modeled.

7.2. Implications for research

The present study examines the influences of firm orientations on Internet-enabled interfirm communication in knowledge sharing with the firm's supply chain partners, customers in particular. The study contributes to the literature from several aspects.

First, this study is one of the first to explore the link between a firm's strategic orientation and its strategic use of inter-organizational systems (IOSs) to foster inter-organizational relationships. We introduce the concept of firm orientation to the IOS literature and provide a new theoretical perspective to complements the existing perspectives of IOS implementation (Chwelos et al., 2001). Different aspects of firm orientation focus executive attention on different elements in the internal and external environment: Organizations have been told to be "learning oriented" (Garvin, 1993; Huber, 1991; Senge, 1990) – to provide the context and management support in which adaptive behavior is prized and expected. Firms have also been exhorted to be "customer focused" (Gulati and Oldroyd, 2005) - to get better knowledge of the needs of customers and let customers drive their business decisions. Additionally, firms are encouraged to be "competitor-focused" (Porter, 1980, 1985) – to observe and be knowledgeable of the competitors and concentrate on responding to the competitive moves of rivals in the market place. These facets of firm orientation drive important firm outcomes (for example, see Argote et al., 2003; Spender and Grant, 1996). The present study provides additional empirical evidence about the link between firm orientation and the firm's strategic use of IOS with its customers.

Second, the use of Internet-enabled interfirm communication can be considered an example of a firm's knowledge management practice (Alavi et al., 2005–2006). Higher level of communication, collaboration, and synchronization among the focal firm, the customer, and the supplier can be achieved along the extended supply chain connected through the Internet (Swaminathan and Tayur, 2003). Currently, various social computing technologies, especially those knowledge management systems and tools enabled by Web 2.0, are increasingly deployed in businesses as means to develop a community of practice. The implementation of these technologies should be closely related to and determined by firm orientation and the firm's conventional knowledge management behaviors (Alavi et al., 2005–2006; Janz and Prasarnphanich, 2003), including the presence of a community of practice in the firm. However, scant literature examines the effect of firm orientation on knowledge management practices and the relationships among different practices (Alavi et al., 2005–2006; Grover and Davenport, 2001). Our study provides one of the first systematic investigation of that missing link.

Third, our study applies Alavi et al.'s (2005–2006) framework by integrating firm orientation community of practice. While Alavi et al. (2005–2006) focused on organizational values and general knowledge management behaviors, we have exemplified such value and behavior in terms of firm orientation and communities of practice. This expansion to their framework has its own merit, because the incorporation of firm orientation helps uncover the internal mechanisms regarding how firm orientations influence knowledge management initiatives (in this case, Internet-enabled interfirm communication). Our results reveal that customer orientation directly influences Internet-enabled interfirm communication, but the influences of learning orientation and competitor orientation need to be bridged by communities of practices.

Fourth, our study not only extends Alavi et al.'s (2005–2006) framework, but also provides empirical support for Alavi et al.'s framework with a large-scale survey conducted in China. The empirical evidence also provides valuable insights to better understand firm strategies and communities of practices of businesses in China, which has the world's second-largest economy and the largest Internet population.

Fifth, our study also reveals connections between a firm's internal and external communities of practice. We have found that the two forms of communities of practice are closely related. As more and more firms are investing in building firm-hosted online communities or online communities sponsored by third-parties in order to interact and collaborate with customers and business partners, the firms are opening up their communication and innovation opportunities to attract the wisdom available through the Internet. These external communities will definitely benefit firms in terms of knowledge sharing and innovation practices. Our finding may shed lights for future research, which should investigate how a firm's internal communities can be designed and implemented, so that the firm can better engage in open communications through the lessons it learns from its internal community of practice.

As discussed in the limitations section, there are several opportunities to extend this study. First, it would be interesting to examine how firm orientation influences communities of practice and informal knowledge sharing and Internet-enabled interfirm communication in a variety of contexts, including both country and industry. In the current study, we examined firms in a transitional economy. It would be interesting to replicate our study in the context of advanced Western economies to examine whether the outcomes we observe hold across contexts. Doing so would foster the development of a more general theory of how firm orientation affects these important outcomes. Second, we only examined three types of firm orientations and internal communities of practice as examples of organizational culture (cf., Alavi et al., 2005–2006). Future studies could further extend the work of Alavi and her colleagues and examine other aspects of a firm's organizational culture on Internet-enabled interfirm communication in knowledge sharing. Third, it would be interesting to extend these insights by looking at other examples of major strategic initiatives, such as social computing implementation, and the implementation of emergency response systems. Finally, it would be also interesting to extend the research model by integrating other institutional factors, such as firm ownership structures, which can be observed in transitional economies such as China.

7.3. Implications for managers

Managers can glean several insights from our paper. First, managers need to emphasize the development of firm orientations that value informal knowledge sharing through the development of internal – and perhaps external – communities of practice, if such orientations are lacking in their firms. Prior research (e.g., Schrader, 1991; von Hippel, 1987) has shown that engineers are willing to share information outside their firms even in the face of formal prohibitions against so doing. Our study has also shown that three firm orientations (customer orientation, competitor orientation, and learning orientation)

impact, directly or indirectly on Internet-enabled interfirm communication, and so to do internal communities of practice. Given this, it is incumbent upon managers to facilitate desirable knowledge sharing through the development of internal and external communities of practice, rather than having knowledge-sharing on an ad hoc basis.

Second, managers need to note that different firm orientations seem to have different impacts on communities of practice and Internet-enabled interfirm communication. Our study has shown that although three firm orientations significantly influence Internet-enabled interfirm communication, the influences are differently implemented. The influence of customer orientation is direct, whereas the influences of learning orientation and competitor orientation are bridged by internal community of practice. These findings are consistent with Alavi et al. (2005–2006) who also found inconsistencies between different aspects of organizational values and knowledge management practices. In our study, while customer orientation drives Internet-enabled interfirm communication but only marginally drives communities of practice, competitor orientation functioned in the opposite manner. Therefore, managers will want to align their efforts of community building and knowledge sharing with their strategic orientations.

Third, managers need to promote and foster the development of internal community of practice. The firm's internal community of practice not only directly benefits the firm's interfirm communication in knowledge sharing with supply chain partners, but also helps firm orientations (i.e., learning orientation and competitor orientation) be leveraged for improving the firm's interfirm communication.

Appendix A. Survey questionnaire (all measures are 5-point Likert scales)

Internet-enabled interfirm communication

Please indicate how the following questions are related to the business strategies of your firm

1. The application of Internet technologies makes it easier and quicker for your firm to get information about trade businesses (including foreign customers), which helps to solve the problems of information asymmetry and information uncertainty
2. The application of Internet technologies in your firm enables information sharing between your firm and existing and potential customers
3. The application of Internet technologies in your firm enables interactions with your customers (i.e., Internet-enabled two-way and real-time communication with your existing and potential customers save costs)

Community of practice

1. International business employees often compare foreign markets information obtained from different channels
2. International business employees often study foreign markets information in order to find the basis for decision making
3. International business employees often discuss and share foreign markets information
4. International business employees often discuss and study foreign markets information with the employees from other departments.

Learning orientation

1. Managers basically agree that our organization's ability to learn is the key to our competitive advantage
2. The basic values of this organization include learning as key to improvement
3. The sense around here is that employee learning is an investment, not an expense
4. Learning in my organization is seen as a key commodity necessary to guarantee organizational survival

Customer orientation

1. We constantly monitor our level of commitment and orientation to serving customer needs
2. We measure customer satisfaction systematically and frequently.
3. We pay close attention to after-sales service

Competitor orientation

1. We rapidly respond to competitive actions that threaten us
2. Top management regularly discusses the strengths and strategies of competitors
3. Our salespeople regularly share information within our organization concerning competitors' strategies

Foreign tie

1. Our foreign customers, suppliers, and trading partners use Internet technologies.

Domestic tie

2. Our domestic customers, suppliers, and trading partners use Internet technologies

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