



Information orientation and its impacts on information asymmetry and e-business adoption

Information
orientation and
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Evidence from China's international trading industry

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Abstract

Purpose – To define the term “information orientation” and to propose a model to investigate how information orientation influences information asymmetry and e-business adoption.

Design/methodology/approach – The model was tested using survey data from 307 international trading companies in Mainland China. Partial least squares was chosen to conduct data analysis in this study.

Findings – Results suggested that information orientation could significantly reduce information asymmetry. This influence may be mediated by information sharing and information collection. It has been found that information orientation could also significantly influence e-business adoption.

Research limitations/implications – Further studies are needed regarding how information orientation and such other strategic orientations as marketing and learning orientations may interact to influence business performance and organizational innovation.

Practical implications – Companies with stronger information orientation may have less information asymmetry problems and would be more capable to make appropriate decisions based on information. The information orientation also motivates the e-business adoption, which in turns would help the company to share information among supply chain members and among internal employees.

Originality/value – This study provides valuable insights for managers that building a stronger information orientation may help companies motivate e-business adoption and alleviate information asymmetry, thus improve decision-making processes.

Keywords Information strategy, Information modelling, Electronic commerce, China

Paper type Research paper



Introduction

Strategic orientation refers to the firm's philosophy of how to conduct business through a deeply rooted set of values and beliefs (Gatignon and Xuereb, 1997). For decades, two strategic orientations, namely customer and competitor orientations, have been well defined and examined in the marketing and strategic management

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literatures. Customer orientation emphasizes on driving business decisions to meet customer needs (Gulati and Oldroyd, 2005), while competitor orientation emphasizes on observing and responding to the competitive moves of competitors (Porter, 1980, 1985). Evidences are abundant that these strategic orientations help companies to adapt to customer needs and respond to rival firms' moves, and thus result in superior performance (Narver and Slater, 1990; Porter, 1980, 1985; Lee and Tsai, 2005).

Importance of information orientation, another form of strategic orientation, however, has only been barely addressed. Even though customer orientation and competitor orientation may lead to superior performance (Narver and Slater, 1990), the superior performance may, at least partially, come from strategic use of information and effective information-based decision making (Lee and Tsai, 2005). A firm with strong orientation regarding information processing, including such as integration, capture, access and use, could achieve better performance and reducing information asymmetry.

As more and more businesses are exploring the competitive opportunities that internet might offer, how information orientation may influence information asymmetry and e-business adoption would be another important area to investigate into. Since, information asymmetry plays an essential role in decision making, companies with more information about such things as price, quality, and, etc. tend to enjoy better competitive advantages (Barney and Ouchi, 1986). Lesson learned from supply chain management further suggests that information asymmetry is a key source of bullwhip effects (Filia, 2005). Therefore, reducing information asymmetry is imperative for companies.

For years, many previous studies have shown that organizational factors are important determinants of e-business adoption (Tornatzky and Fleischer, 1990). But the majority of organizational factors addressed involve such organizational characteristics as size, industry type and business scope (Zhu *et al.*, 2004, 2006). Studies addressed the relationship between information orientation and information asymmetry are very limited.

In this report, theory and hypotheses pertaining to the relationship between information orientation and information asymmetry will be presented. Methodologies developed to conduct empirical testing of the presented hypotheses will then be described. Data collected from companies in international trade industry in China will then be used to empirically testing the validity of these hypotheses. Results derived from empirically analyses will then be used to propose some practical managerial strategies. A brief discussion on major findings of this study and the limitations conclude this report.

Theoretical background

An important measurement of a firm's capability is its strategic orientation, which reflects the firm's philosophy of how to conduct business through a deeply rooted set of values and beliefs (Gatignon and Xuereb, 1997). These values and beliefs define the resources to be used, transcend individual capabilities, and unify the resources and capabilities into a cohesive whole (Day, 1994).

Several types of strategic orientations, such as customer, competitor, and technological have been proposed in marketing and strategy literatures (Gatignon and Xuereb, 1997). Customer orientation refers to company's business decisions, which

are based on “to meet the needs of customers drive”. In contrast, competitor orientation refers to company’s business decisions, which are based on “to response to the competitive moves of rivals in the market” (Gulati and Oldroyd, 2005). As suggested in some previous studies, marketing orientation consists of primarily customer and competitor orientations, and has been a significant indicator of business financial performances and new product innovation (Cooper, 1994; Narver and Slater, 1990; Slater and Narver, 1994; Zhou *et al.*, 2005). It is because when companies are aware of their customers’ needs, they will be in adapting to those needs. Similarly, as firms become better aware of the competitive moves of competitors, they will be able to develop effective counter- or anticipatory-moves to enhance firm’s performance.

Unlike customer- and competitor-pull philosophy of market orientation, technology orientation reflects the philosophy of “technological push” which posits that consumers prefer technologically superior products and services (Gatignon and Xuereb, 1997; Wind and Mahajan, 1997). Accordingly, a technology-oriented firm would advocate a commitment to R&D, the acquisition of new technologies, and the application of the latest technology (Gatignon and Xuereb, 1997).

Both market orientation and technology orientation are “outside in” (Baker and Sinkula, 1999; Celuch *et al.*, 2002). This means that they tend to focus the firm’s attention on factors external to the firm. However, the “outside in” strategic orientations may overlook important internal factors (Barney and Zajac, 1994; Henderson and Mitchell, 1997). Therefore, an “inside out” orientation, namely “learning orientation” (Bunderson and Sutcliffe, 2003; Garvin, 1993) has been suggested (Baker and Sinkula, 1999; Celuch *et al.*, 2002) in an effort to reflecting an internal management focus on establishing organizational learning a priority for organizational participants (Baker and Sinkula, 1999; Bunderson and Sutcliffe, 2003; Celuch *et al.*, 2002; Garvin, 1993).

There are two important reasons to necessitate the establishment of “information orientation”. First reason is that the important role of organizational information process (e.g. information acquisition and dissemination) in shaping how firms respond to their market environment has long emphasized in market orientation and organizational learning processes (Jayachandran *et al.*, 2005). However, there is no dedicated measure to examine this strategic role. The other reason is that it is probably because of the strategic use of information and effective information-based decision making that the marketing and technological orientations of the firm lead to superior performance. Clearly, there is an “information orientation” which is a glue to integrate external factors focused by marketing and technological orientations and internal factors focused by learning orientation.

Drucker (1988) introduced an “information-based organization” as an advanced development stage of companies that employ information effectively. Davenport (1997) proposed “information ecology” as an effective “business model for information management”. Choo (1998, p. 3) defined the concept of the “knowing organization” as an “organization that is able to integrate sense making, knowledge creation, and decision making effectively”. In fact, in the era of information economy, an increasing number of organizations centre their businesses on information (Desai *et al.*, 2004). Therefore, these organizations demonstrate a strategic orientation towards information, which is referred to as “information orientation” in this study.

To be consistent with concepts of marketing orientation, learning orientation, and knowledge management, in this study information orientation is defined as the company's deeply rooted set of values and beliefs regarding information. The definition was further expanded to operational aspects of a company as strategic perceptions of values and beliefs towards information acquisition and dissemination in the company. This definition reflects the degree to which an organization acquires and disseminates the information within the organization.

Based on the knowledge management literature and information processes theory, special emphasis will be put on information acquisition and dissemination. In the knowledge management literature, there are five phases to the knowledge management process – acquiring, coding, developing, applying and disseminating information (Van Zolingen *et al.*, 2001). Information acquisition refers to the process of collecting and filtering new information and storing it in memory (Sternberg, 1983). Information dissemination is defined as managing the way information is shared within an organization (Yang *et al.*, 2006). Among these phases, information acquisition and dissemination are the two endpoints in the information value chain, which represent the most important knowledge management processes (Yang, 2004). In the relationship marketing literature, it has been long emphasized that information processes play a key role in building and maintaining customer relationship (Selnes and Sallis, 2003; Jayachandran *et al.*, 2005).

The information processes systematize the capture and use of information, and alleviate information loss and overload (Sinkula, 1994; Jayachandran *et al.*, 2005). Further, the information processes has been conceptualised as information reciprocity, information capture, information integration, information access, and information use (Jayachandran *et al.*, 2005). These information processes may be largely grouped into information acquisition and information dissemination. Figure 1 below shows a model whereby the varying firm information orientation influences information asymmetry and e-business adoption.

Shown in Figure 1 are seven important strategic relationships associated with information asymmetry reduction. These are labelled as *H1* through *H7*, which denote the hypotheses that must be empirically tested. Detailed discussion on these hypotheses is presented in the following section, followed by the sections reporting the procedures of conducting the empirical test and the results.

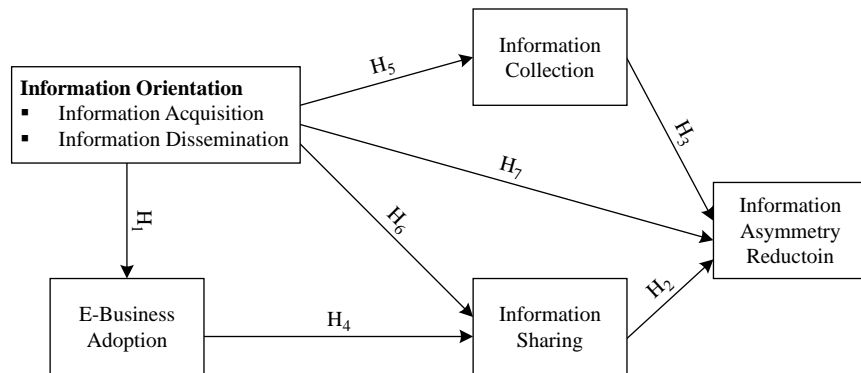


Figure 1.
Conceptual model

Hypotheses

Apparently, a firm's information orientation critically influences the firm's behaviors, particularly the decision making, because the firm's information orientation is the deeply rooted set of values and beliefs regarding information acquisition and dissimilation. These rooted values and beliefs may serve as powerful signals to the managerial community to guide managers about the information acquisition and dissimilation. Further, these values and beliefs can legitimise the willingness of managers to commit resources and managerial efforts for the information acquisition and dissimilation (Chatterjee *et al.*, 2002).

Meanwhile, acquiring and disseminating information tends to promote the development of new knowledge (Ghoshal and Moran, 1996; Tsai, 2002) and to increase the diversity of knowledge (Slater and Narver, 1995). This new knowledge and diversity of knowledge improve an organization's ability to innovate (Cohen and Levinthal, 1990; Damanpour, 1991, Zhang *et al.*, 2004). This will help the firm to recognize early on new opportunities, and this in turn will spur the firm on to develop new strategic initiatives for innovations, such as e-business adoption. Together, this suggests that:

H1. Information orientation positively relates to e-business adoption.

Information asymmetry refers to that each player has private information about his or her strategies (Milgrom and Roberts, 1987). In particular, firms have an informational advantage over their customers (Barney and Ouchi, 1986), because firms know more about product attributes, such as prices and quality, than customers (Akerlof, 1970). Although customers may search for information on prices and quality to some extent before they purchase a product, the "true" prices and quality are revealed only after the customers use the product. The customers' searching for information may be costly (Stigler, 1961).

However, recent advances in information technology (IT) have significantly reduced the costs of information dissemination, acquisition and processing for both firms and customers. Alba *et al.* (1997) and Stewart (1995) suggested that IT has significant influences on the way information is disseminated and acquired, as well as how products are sold. Kulkarni (2000) further examined how IT influences the costs of information dissemination and acquisition, and ultimately the information asymmetry between a firm and its customers.

The management and organizational theories, such as TQM, business process re-engineering (BPR), virtual teams, network organization, and knowledge management, have all emphasized on the importance of sharing information within teams and across functional boundaries in the company (Marchand *et al.*, 2001). For example, TQM suggests information sharing among teams and departments as central to performance. To improve product or process quality, team members must identify and share information about the sources of defects, failures, and mistakes (Bell *et al.*, 1994). Similarly, information sharing is also the target for the organizational design. Continuous improvement and BPR emphasize the information sharing and improved human communications across functional departments to simplify and streamline processes across the value chains of companies (Marchand *et al.*, 2001).

In supply chain management literature, information asymmetry is a source of inefficiency in supply chain (Filia, 2005). Information asymmetry is one of the most

powerful sources of the bullwhip effect, which refers to that the variance of orders may be larger than that of sales, and distortion tends to increase as information moves upstream along with the supply chain (Lee *et al.*, 2004). Information sharing in the supply chain is often considered as a generic cure for the bullwhip effect and it is generally accepted that information sharing can optimize the supply chain-wide performance (Lee *et al.*, 1997, 2004; Simchi-Levi *et al.*, 2000; Chen *et al.*, 2000). In our study, distinction between information sharing and information collection will be formally made. Information sharing refers to share information among internal functional departments and employees and among supply chain members, while information collection means to collection information, such as government regulations and social background from organizations outside the supply chain. Therefore, the following two hypotheses are offered:

H2. Information sharing positively relates to information asymmetry reduction.

H3. Information collection positively relates to information asymmetry reduction.

Lipnack and Stamp (1997) suggested with help of IT, information sharing can be encouraged across virtual teams and across processes in supply chains with suppliers, customers, and partners operating in a virtual network. The e-business adoption can facilitate communications among supply chain members and enhance internal communications, which further foster information sharing. It is because the internet technologies, such as TCP/IP and XML, are universally compatible (Lau *et al.*, 2004). The hypothesis below will be used to test the said relationship:

H4. E-business adoption positively relates to information sharing.

Sharing of information has been perceived as both an important value and a set of behaviors associated with what organizational members are expected to do with information inside the company, and outside with customers, suppliers, and partners. However, sharing of information must be part of the company's culture (Marchand *et al.*, 2001). Firms that have higher levels of information orientation tend to have stronger information technologies, which facilitate information sharing among employees and supply chain members (Rowley, 2004). Two hypotheses listed below will be used to test such relationships.

H5. Information orientation positively relates to information sharing.

H6. Information orientation positively relates to information collection.

Furthermore, to have a broader and more integrative view, it is expected that information orientation directly influence the information asymmetry. As mentioned previously, information orientation was anticipated to influence information sharing and information collection, which in turn, were hypothesized to having impacts on information asymmetry reduction. Therefore, the following hypothesis needs to be tested too:

H7. Information orientation positively relates to information asymmetry reduction.

These seven hypotheses will be empirically tested using sample collected from China's international trade industry. Detailed discussion on the characteristics of sources of data and the derivation of sample are provided in the following sector.

Research design and methodology

Data collection

To empirically test these hypotheses, a sample is selected from Chinese international trading companies that were listed in a database published by the Beijing Municipal Bureau of Commerce. At the time of data gathering, there were a total of 2,075 companies registered in the database. Among them, 810 were foreign companies, 337 were branch offices of foreign companies, and 928 were domestic companies.

The data were collected through personally administered surveys. The data collection process began with telephoning all the 2,075 registered trading companies. Follow-up phone calls were made to companies, which were unreachable during the first attempt. As a result, a total of 812 companies agreed to participate in the survey. Owing to the budget constraint, 500 companies were randomly selected from the 812 companies as the sample. Subsequently, follow-up phone calls were made to schedule interview appointments with IT managers or operations managers of these 500 selected companies. Appointments with 54 of the 500 selected companies could not be arranged, so formal interviews were conducted with senior IT managers or operations managers from the remaining 446 companies. A total of 307 interviews were successfully completed, while 139 interviews failed because not all required feedbacks were provided from these companies. The response rate was 68.8 per cent.

The respondent profile is shown in Table I. As shown in Table I, 58 per cent of the responding companies were pure trading companies, which provide trading services only. In terms of ownership, 43 per cent of the companies were state-owned, while 24 per cent of the companies were foreign invested. Most of the companies were over five years old (72 per cent) and had less than 200 employees (54 per cent).

The extrapolation procedure suggested by Armstrong and Overton (1977) was used to assess non-response bias. Early quartile was then compared 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.

Measures

Measurement items were developed based on the literature review and expert opinions. Except information asymmetry reduction, all other constructs are implemented in the form of multiple items. While detailed definitions of all measurement items were presented in Appendix, the brief discussion of the operationalizations is discussed below.

Information orientation was modelled as a second-order construct formed by two first-order factors: information dissemination and information acquisition. The measures for information dissemination were adapted from the scales in previous studies, such as the scales of market information dissemination (Sinkula *et al.*, 1997; Srinivasan and Moorman, 2005; Jayachandran *et al.*, 2005) and information distribution activities (Hult *et al.*, 2004). The information acquisition measures were developed by combining expert opinions and adaptation from previous studies

IMDS 106,6	Characteristic	N	Per cent
832	<i>Company type</i>		
	Pure trading	177	58
	Manufacturing	68	22
	Service	32	10
	Comprehensive	30	10
	<i>Ownership type</i>		
	State-owned	132	43
	Foreign invested	73	24
	Chinese private or collective owned	97	31
	Other	6	2
	<i>Age</i>		
	Less than 5 years	56	18
	Between 5 and 15 years	139	45
	Over 15 years	112	37
	<i>Number of employees</i>		
	Less than 49	88	29
	Between 50 and 199	77	25
	Between 200 and 999	84	27
	Over 1,000	58	19
	<i>Trading products</i>		
	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 IT	40	13
	Textile and garment	31	10
	Food, grain, and stock	19	6
	Service, finance, and infrastructure	11	4
Others	8	3	

Table I.
Characteristics of
participating firms

(Jayachandran *et al.*, 2005; Marchand *et al.*, 2001). All responses were measured on a five-point Likert scale, as commonly adopted in these types of researches.

E-business adoption was measured as the extent to which the internet technologies have been diffused into the routine activities and processes of a business (Chatterjee *et al.*, 2002; Cooper and Zmud, 1990), for enabling customer-facing activities, including product or service sales, distribution, and after-sales support, and product testing, and market research (Chatterjee *et al.*, 2002).

Information sharing was operationalized with two items as degrees to which the firm has enabled intra-organizational inter-organizational information sharing. This operationalization has support from Marchand *et al.* (2001), which suggests that managers do not view inter-organizational information sharing in the same light as sharing information within companies and suggested that internal and external information sharing are two different dimensions.

Information collection measurement was developed from expert opinions. The operationalization was whether or not international business information in 14 aspects, like exchange rate, market, and raw material supply, was collected.

Information asymmetry was measured using a single item as degree to which the company was able to access needed information and reduced information asymmetry and uncertainty problems. These items were developed by converting the definitions of constructs into a questionnaire format (Bock *et al.*, 2005).

Data analyses and results

Partial least squares (PLS) was chosen to conduct data analysis in this study. PLS has been widely selected as a tool in IS/IT field (Wasko and Faraj, 2005). Unlike structural equation modelling (SEM), which is based on the covariance structure of the latent variables, PLS is a component-based approach. Thus, PLS is suitable for predictive applications and theory building because it aims to examine the significance of the relationships between research constructs and the predictive power of the dependent variable (Chin, 1998). Further, SEM, such as LISREL and AMOS, cannot model formative indicators effectively, but PLS can handle both reflective and formative scales (Chin, 1998; Fornell and Larcker, 1981) and also has the advantage of modeling single-item scales and summated scales (Chin *et al.*, 2003). In addition, PLS does not place a very high requirement for normal distribution on the source data, and thus works better than LISREL and AMOS under conditions of non-normality (Chin, 1998; Gefen and Straub, 2005). PLS also has the ability to handle relatively small sample size (Chin, 1998; Barclay *et al.*, 1995). Therefore, PLS is an appropriate choice for testing research model (Ko *et al.*, 2005).

PLS was chosen for two reasons. First, our model has formative constructs, which can be handled by PLS, rather than LISREL or AMOS (Chin, 1998). Second, PLS is more appropriate when the research model is in an early stage of development and has not been tested extensively (Teo *et al.*, 2003). A review of the literature suggests that empirical tests of information orientation, e-business adoption, and information asymmetry are still sparse. Hence, PLS is the appropriate technique for our research purpose. Specifically, PLS-Graph 3.00 was used in this study.

Measurement model

After considering the relationships of the measurement items with their respective constructs, all first-order constructs were specified as formative constructs (Chin, 1998). As shown in Appendix, all measurement items have significant ($p < 0.001$) weights with acceptable magnitude (Chin, 1998). Thus, constructs measured by these items can be used for hypothesis testing. The correlation matrix is shown in Table II. Results of hypothesis testing are presented below.

	(1)	(2)	(3)	(4)	(5)	(6)
(1) Information acquisition	1.000					
(2) Information dissemination	0.396	1.000				
(3) E-business adoption	0.354	0.318	1.000			
(4) Information sharing	0.310	0.356	0.252	1.000		
(5) Information collection	0.330	0.214	0.361	0.293	1.000	
(6) Information asymmetry reduction	0.359	0.241	0.369	0.367	0.432	1.000

Table II.
Construct correlation
matrix

Structural model

To test the proposed hypotheses, the structural model was fitted using the full sample. The results are shown in Figure 2.

As indicated by the path loadings, information orientation has significant direct influences on e-business adoption ($\beta = 0.348, p < 0.001$) and information asymmetry reduction ($\beta = 0.187, p < 0.001$). This result confirms our theoretical expectation and provides support for *H1* and *H7*. Information asymmetry reduction is significantly influenced by information sharing ($\beta = 0.203, p < 0.01$) and information collection ($\beta = 0.318$ and $p < 0.001$), suggesting support for *H2* and *H3*. The paths from information orientation to information sharing ($\beta = 0.312, p < 0.001$) and information collection ($\beta = 0.342, p < 0.001$) are highly significant. This is consistent with our theoretical expectation that information orientation significantly influences information sharing and information collection, supporting *H5* and *H6*. The path from information sharing to internet adoption is significant and positive ($\beta = 0.345, p < 0.001$), suggesting support for *H4*.

To derive additional relevant information, sub-dimensions of the second-order construct – information orientation were also examined. First, as evident from the path loadings of information acquisition and information dissemination, each of these two dimensions of information orientation is significant ($p < 0.001$) and of high magnitude ($\beta = 0.875$ and $\beta = 0.791$), supporting our conceptualization of the dependent construct as a second-order structure (Chin, 1998; Zhu *et al.*, 2006).

Discussions and conclusion

This study defined the “information orientation” which reflect the deeply rooted set of value and beliefs from two fundamental dimensions, information acquisition and information dissemination. The information orientation of a company may significantly help the company to guide its behaviours regarding e-business adoption, information sharing, and information collection.

It was suggested by the results of the empirical testing that the information orientation directly influences e-business adoption. The finding means that a company should foster the culture of information orientation, namely the values and beliefs on information. These value and beliefs serve as a power signal to guide managerial

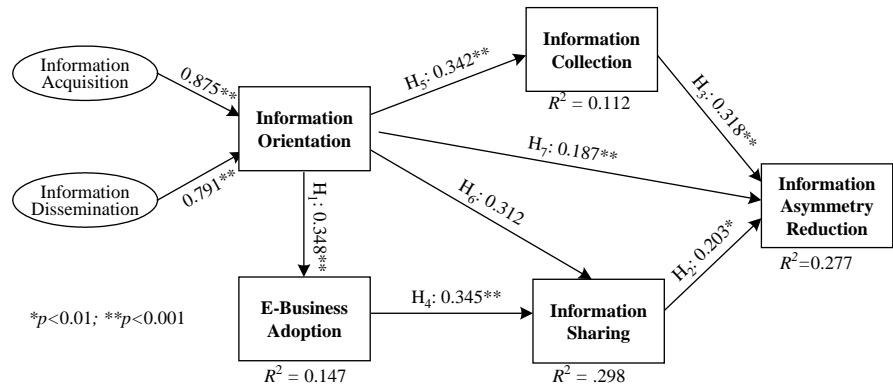


Figure 2.
Results of hypotheses testing of the structural model

community for their commitment regarding resources and participation in new information-related strategic initiatives, such as e-business adoption.

Results also confirmed that information orientation has significant influences on information asymmetry reduction. The influences can be both direct and indirect. The indirect influences are through information sharing and information collection, which significantly alleviate information asymmetry. Meanwhile, the e-business adoption facilitates the company to share information among internal employees and among supply chain members, which in turn alleviate information asymmetry. Putting together, the information orientation – the deep root values and beliefs – motivates the company to share and collect information, and thus reduce information asymmetry and improve decision making.

In summary, information orientation defines the fundamental strategic values and belief regarding information. Companies with stronger information orientation may have less information asymmetry problems, and thus would be more capable to make appropriate decisions based on information. The information sharing and information collection partially mediate the effect of information orientation on information asymmetry. The information orientation also motivates the e-business adoption, which in turn could help the company to more effectively share information among supply chain members and among internal employees.

While this study has made a significant contribution regarding information orientation and information asymmetry, it also has some limitations. First, the construct implementation needs further development, especially for information orientation and information asymmetry. Second, although this study investigated the influences of information orientation and information asymmetry, it would be useful to further clarify how information orientation influences business performance. Nevertheless, this study should shed the lights for other researches in this regard. Third, further studies are needed regarding how information orientation and such other strategic orientations as marketing orientation and learning orientation may interact to influence business performance and organizational innovation.

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Appendix. Survey instrument and key statistics derived from sample analyses

Information acquisition (five-point Likert: very disagree ~ very agree)

- (1) The decisions based on acquired information are more accurate than decisions made from feeling ($W = 0.5698^{\ddagger}$; $T = 10.0484^{\ddagger}$)
- (2) Information acquisition helped to enhance the confidence of decision making for our international trading decisions ($W = 0.7039$; $T = 15.6825$)
- (3) The decision-making may lead to be wrong if no enough information is acquired ($W = 0.7043$; $T = 14.1772$)
- (4) The acquired information has been stored and coded and could be used by non-acquirers ($W = 0.6564$; $T = 16.2088$).
- (5) The information acquisition significantly reduced the uncertainty of our international trading businesses ($W = 0.6601$; $T = 14.9122$).
- (6) The information acquisition plays an important role in our decision making ($W = 0.7211$; $T = 26.2638$).

Information dissemination (five-point Likert: very disagree ~ very agree)

- (1) International business employees often discuss and share foreign markets information ($W = 0.7236$; $T = 21.4693$).
- (2) International business employees often discuss and study foreign markets information with the employees from other departments ($W = 0.7890$; $T = 27.8172$).
- (3) Our company's senior managers often discuss and study foreign markets information with international business employees ($W = 0.7203$; $T = 19.4737$).
- (4) International business department often communicates to the greatest extent with other departments about the development of the international markets ($W = 0.7750$; $T = 23.3900$).

E-business adoption

In what business activities do your firm use web technologies? Please check all of the following that apply (Yes/No).

- (1) Information sharing within the firm ($W = 0.3392$; $T = 3.0238$).
- (2) Information sharing with customers and partners ($W = 5524$; $T = 5.2888$).
- (3) Online transactions ($W = 0.7656$; $T = 7.5903$).
- (4) Online marketing and advertising ($W = 0.4372$; $T = 3.0264$).
- (5) Enterprise resources planning ($W = 0.4054$; $T = 3.2977$).

- (6) Customer relationship management ($W = 0.7202$; $T = 7.1594$).

Information sharing (five-point Likert: very disagree ~ very agree)

- (1) Your firm has enabled information sharing among different employees and units ($W = 0.8266$; $T = 19.3890$).
- (2) Your firm has enabled information sharing between your firm and existing and potential customers ($W = 0.8688$; $T = 32.4897$).

Information asymmetry (five-point Likert: very disagree ~ very agree)

- (1) Your firm was able to access needed information about international businesses, which helped alleviate information asymmetry and information uncertainty ($W = 1.000$; $T = 0.0000$)

Information collection: your firm has collected following international market information (Yes/No)

- (1) Potential dealers for your products ($W = 0.5303$; $T = 9.6932$).
- (2) Potential buyers of your products ($W = 0.5501$; $T = 10.1815$).
- (3) Potential suppliers of raw materials ($W = 0.5445$; $T = 9.1288$).
- (4) Information about competitive products ($W = 0.6936$; $T = 20.9506$).
- (5) Competitors ($W = 0.6371$; $T = 15.5941$).
- (6) Market scale ($W = 0.6989$; $T = 14.7213$).
- (7) Market growth ($W = 0.7014$; $T = 16.8388$).
- (8) Price trends ($W = 0.6246$; $T = 14.0012$).
- (9) Exchange rates ($W = 0.5547$; $T = 10.7428$).
- (10) Legal requirements of market entry ($W = 0.6665$; $T = 16.1897$).
- (11) Hidden hurdles of market entry ($W = 0.6601$; $T = 16.5054$).
- (12) Social and political background ($W = 0.5305$; $T = 9.1545$).
- (13) Economical background ($W = 0.5450$; $T = 9.0258$).
- (14) Transportation infrastructure ($W = 0.5916$; $T = 11.8746$).

Note: [†]Item weight; [‡] T -statistics, all $p < 0.01$

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