Competing pressures of risk and absorptive capacity potential on commitment and information sharing in global supply chains

Vicky Arnold[1,2],
Tanya Benford[1],
Clark Hampton[3] and
Steve G. Sutton[1]

[1]Dixon School of Accounting, University of Central Florida, U.S.A.; [2]Department of Accounting & BIS, University of Melbourne, Australia; [3]School of Accounting and Finance, University of Waterloo, Canada

Correspondence: Vicky Arnold, University of Central Florida, P.O. Box 161400, Orlando FL 32816, U.S.A.
Tel: 407 823 3192;
Fax: 407 823 3881

Abstract
Organizations' competitiveness and success are no longer dependent solely on their own performance, but rather are dependent on the competitiveness of the supply chains in which they participate. Increasingly, these supply chains are globally distributed introducing the possibility of greater benefits, as well as greater risk. This study examines the countervailing impact of a global supply chain partner's business-to-business e-commerce business risk and absorptive capacity on an organization's willingness to commit to and share information with that supply chain partner. We survey 207 organizations on their perceptions of specific offshore outsourcing and supply chain partners across dimensions of risk, absorptive capacity, commitment, and information sharing. The results support the theorized relationships indicating that a supply chain partner's increased levels of perceived risk has a strong negative effect on an organization's commitment and information sharing; conjointly, increases in a supply chain partner's absorptive capacity has a strong positive effect on commitment and information sharing. For both risk and absorptive capacity, commitment partially mediates the relationship with information sharing. Testing for systemic effects from geographical/cultural location on the relationship factors provides no evidence of a regional effect on measured items.
European Journal of Information Systems (2010) **19**, 134–152.
doi:10.1057/ejis.2009.49; published online 19 January 2010

Introduction
In a business landscape where market competition between global supply chains is increasing, organizations face the necessity of building strong relationships and interconnections with their global supply chain partners (Daniel & White, 2005). In this environment, the need to view global supply chains as integrative systems that mirror a traditional focus on improving intraorganizational connections through tightly coupled information systems is critical to agility and performance (Park *et al.*, 2005). There is persistent evidence that the benefits from linkages with supply chain partners are predominantly produced through enhanced collaboration facilitated by B2B e-commerce technologies (Lee *et al.*, 2003; Prater & Ghosh, 2006). However, these tight collaborations are only possible when both supply chain partners have the capacity for strong internal integration of B2B (Iacovou *et al.*, 1995; Prater & Ghosh, 2006) and only strategically successful when there is a willingness to share information necessary for both partners to enhance knowledge and

support collaborative reaction to changes in the business environment (Buhman *et al.*, 2005; Chae *et al.*, 2005; Park *et al.*, 2005; Cousins *et al.*, 2006).

Researchers are increasingly emphasizing the need for commitment to supply chain partners in order to make information sharing technologically and relationally feasible (e.g. Söllner, 1999; Chae *et al.*, 2005; Daniel & White, 2005). However, some tightly bound relationships are successful, but many others fail (Handley & Benton, 2009). Failure can be very costly in terms of transaction-specific capital (i.e. investments in relationship with little residual value in lieu of other potential relationships), information asymmetries (i.e. difficulty of monitoring a supply chain partner's actions), and loss of resource control (i.e. resources that are transferred in a relationship and are not necessarily recoverable if a relationship ceases) (Kumar & Dissel, 1996; Sutton *et al.*, 2008).

As a result, organizations must carefully assess their supply chain partners when considering an escalation of commitment (Park *et al.*, 2005). Prior research has identified various factors that should be considered in decisions to strengthen commitments. Those factors predominantly center around four areas: resource advantage capability (Hunt, 1997; Hunt & Davis, 2008), knowledge sharing capability (Bensaou & Anderson, 1999; Buhman *et al.*, 2005; Malhotra *et al.*, 2005; McEvily & Marcus, 2005; Park *et al.*, 2005), information sharing (Buhman *et al.*, 2005; Park *et al.*, 2005; Klein *et al.*, 2007), and risk management (Kumar & van Dissel, 1996; Bensaou & Anderson, 1999; Khazanchi & Sutton, 2001; Aron *et al.*, 2005; Buhman *et al.*, 2005; Malhotra *et al.*, 2005; Klein *et al.*, 2007; Sutton *et al.*, 2008). Resource advantage capability can provide an organization competitive advantage and motivate commitment. However, knowledge sharing is generally viewed as arising in part from information sharing. The bigger question from a commitment and information-sharing perspective is whether the supply chain partner is prepared to absorb and use the information that would be available via information sharing and whether this absorption will lead to knowledge creation (i.e. the supply chain partner's absorptive capacity).

Malhotra *et al.* (2005) define absorptive capacity as 'the set of organisational routines and processes by which organisations acquire, assimilate, transform, and exploit knowledge to produce dynamic organisational capabilities'. They note that there is increased focus on the integration of strategic information and related knowledge creation from collaboration with supply chain partners in order to garner longer-term advantage (Majchrzak *et al.*, 2000; Malhotra *et al.*, 2001; Malhotra *et al.*, 2005). This view is based on Zahra & George's (2002) conceptualization of absorptive capacity as a dynamic capability focused on knowledge creation and utilization coupled with Malhotra *et al.*'s (2005) view that information sharing in interorganizational relationships can facilitate this absorptive capacity capability of the supply chain partner. But, embedded in this perspective is a basic reliance on the supply chain partner having the

absorptive capacity to actually use shared information to create knowledge. Absent absorptive capacity, there is much less reason to share high-level information in such a supply chain relationship.

Sutton *et al.* (2008) also note the need to consider risks that arise from B2B e-commerce linkages with a supply chain partner. In light of this concern, management arguably should assess carefully a supply chain partner's performance before tightening the linkages across the interorganizational relationship (Park *et al.*, 2005). Benefits from strong information sharing with the supply chain partner can be negated (or worse) if an organization is unable to properly control the associated risks (Bensaou & Anderson, 1999; Buhman *et al.*, 2005). Khazanchi & Sutton (2001) present a model for understanding risks in these e-commerce supported relationships. The model focuses on technical level, operational level, and business level risks with management's broader understanding of the ability to leverage such linkages (i.e. business level risk) being the key strategic level concern (Sutton *et al.*, 2008). Risks at the business level provide explicit recognition of the limitations of strategic use of shared information if the supply chain partner is incapable of using the information to the benefit of the supply chain. These risks should be key factors in the decision to increase commitment in a supply chain relationship and to elevate information sharing.

Most organizations now operate in global networks of organizations that form globally based supply chains; and, this fact should be considered when evaluating supply chain models. Organizations are increasingly reliant on their network of global supply chain partners to enhance product/service value, which serves to further add complexity to interorganizational relationships (Buhman *et al.*, 2005). Some researchers have argued that this cross-border networking of organizations, however, can influence the way relationships are formed and limit the level of interconnection and information sharing based on geography and culture differences (Bensaou & Anderson, 1999; Aron *et al.*, 2005). Other research suggests that these geographical and cultural barriers to commitment are disappearing in countries such as China (Cai *et al.*, 2006) and India (Balakrishnan *et al.*, 2007), where there has been substantial growth in outsourcing and supplier relationships.

The purpose of this study is to explore the impacts of supply chain partners' absorptive capacity, B2B e-commerce business risk, and global dispersion on an organization's willingness to increase commitment to partner relationships and to increase high-level information sharing within these relationships. Data are collected from 207 participants employed by North American companies on their perceptions of offshore supply chain partners' absorptive capacity and B2B e-commerce business risk along with their level of commitment to the partner and the level of information shared with the partner. Participants were selected based on their strong knowledge of a particular supply chain partner and their

organization's relationship with that partner in order to gain a better understanding of the conflicting effects of risk and absorptive capacity.

The results of the study provide evidence of strong effects for both B2B e-commerce business risk and partner's absorptive capacity on an organization's level of commitment to a supply chain partner and on the level of information sharing that takes place. The results also show that commitment partially mediates the effects of both B2B e-commerce business risk and partner's absorptive capacity on the level of information sharing. However, tests for any differences in perceptions of B2B e-commerce business risk, absorptive capacity, commitment and information sharing, based on the global region in which the partner is located, yield no differences.

This study contributes on several levels to the research on global supply chain relationships and supply chain practice. First, the results indicate that interorganizational relationships are impacted by an organization's ability to demonstrate lower levels of B2B e-commerce business risks for its e-commerce-based relationships. For less dominant supply chain participants, this result suggests that taking measures to decrease their perceived riskiness can lead to stronger commitment and greater leveraging of shared information with desirable trading partners. Second, the findings provide strong evidence that the development of a learning organization with higher levels of absorptive capacity can strengthen relationships with supply chain partners and increase the partner's commitment and sharing of high-level knowledge. For supply chain participants, this suggests that organizational structure and focus on knowledge creation can strengthen and further secure supply chain relationships. Third, the results provide some evidence that the world is getting flatter and relationships appear to be influenced more by an organization's internal capabilities and culture than the geographic location or external cultural setting that it finds itself. This finding suggests subsequent research should explore in detail the effects of country culture and geography on relationships.

The remainder of this paper is presented in four major sections. The next section presents the theoretical model and articulates the hypothesized relationships. The third section presents the research methodology and the fourth section provides the empirical results. The fifth and final section provides concluding thoughts on the implications of the research, associated limitations, and avenues for future research.

Theory and hypotheses

The theoretical basis underlying the current study draws from multiple theories on supply chain integration. One dimension of the conceptual model is drawn from theories examining the effect of trading partner strategic capabilities on willingness to form commitment. Resource advantage theory suggests that an organization's ability to provide unique capabilities will foster comparative advantage and motivate commitment between trading partners (Hunt, 1997; Hunt & Davis, 2008). Absorptive capacity theory provides insights on the positive relationship between knowledge creation abilities and information sharing in supply chain relationships (Malhotra *et al.*, 2005). The second dimension draws from alternative theory on risks in interorganizational relationships, and the negative relationship with commitment and information sharing in supply chain relationships (Khazanchi & Sutton, 2001; Sutton *et al.*, 2008). Linking the varied theoretical perspectives is the underlying relationship between commitment and information sharing. The conceptual model is shown in Figure 1. The focus in the remaining discussion will be on the relationships between the bolded items in Figure 1.
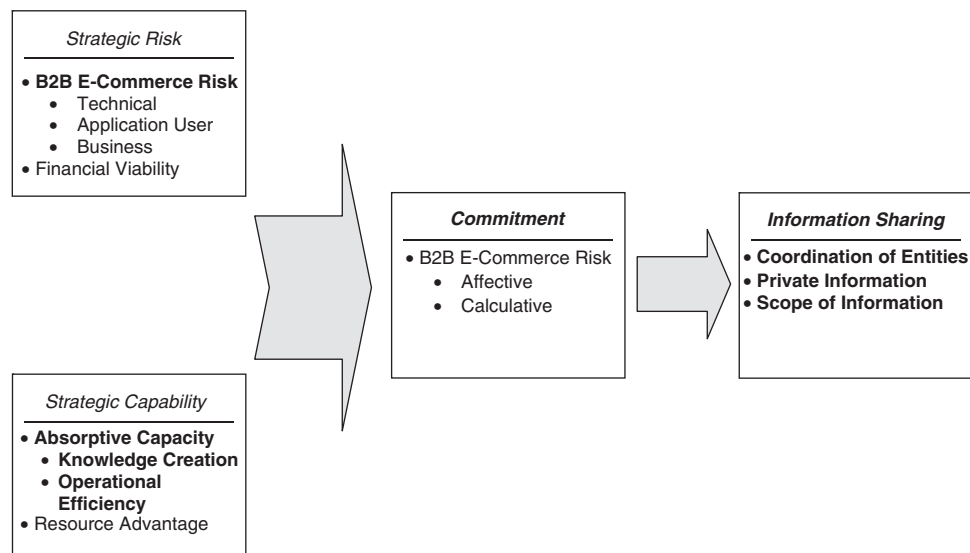

Figure 1 Factors influencing supply chain integrativeness.

Strategically successful integrated supply chain relationships are often viewed as evolving from a willingness to share information necessary for both partners to enhance knowledge and support collaborative strategic initiatives (Buhman *et al.*, 2005; Chae *et al.*, 2005; Park *et al.*, 2005; Cousins *et al.*, 2006). Thus, the relationships of most interest to the current research are those having a primary influence on the decision to share information.

Absorptive capacity and information sharing

Malhotra *et al.* (2005) theorize that information sharing has multiple levels depending on the depth of the supply chain relationship and the level of absorptive capacity pursued within the relationship. At its lowest level, the supply chain relationship produces a minimal level of information on an as needed basis in order to allow an exchange of products/services. As the level of collaboration between an organization and its supply chain partner grows, the organization and its partner begin to develop a more committed relationship that justifies investment in the resources necessary to enhance the collaborative relationship (Daniel & White, 2005). Söllner (1999) posits that commitment to a supply chain partner is a necessary precursor to the development of strong interorganizational relationships and the desired outcomes from those relationships. Chae *et al.* (2005) provide empirical support for the importance of commitment indicating that the technological linkage and development of collaborative relationships form when there is a long-term orientation of an organization toward a supply chain partner, which is representative of strong commitment. This leads to the first hypothesis:

H1   *As commitment to a supply chain partner increases, the level of information sharing will increase.*

The underlying drivers of information sharing other than commitment are less understood. McEvily & Marcus (2005) posit that commitment-driven information sharing is important only in that it facilitates joint problem solving and leverages the collaborative nature of the relationship. This is consistent in many ways with the dynamic capabilities thrust in the information technology for competitive advantage literature (Overby *et al.*, 2006). This dynamic capabilities view posits that competitive advantage arises when an organization is able to absorb information quickly and has the agility to respond to changes in its business environment. This ability explains why global supply chain organizations strengthen their interorganizational relationships and foster higher-level information sharing; in essence it is to build the capability for the global network of organizations to jointly respond to changes in their business environment (Malhotra *et al.*, 2005). This joint capability is founded on an absorptive capacity paradigm that assumes that the supply chain can respond based on its ability to

acquire, assimilate, and exploit knowledge in order to produce dynamic capabilities (Zahra & George, 2002; Overby *et al.*, 2006).

Simply facilitating information sharing does not generate dynamic capability across a supply chain (Malhotra *et al.*, 2005). Rather, the absorptive capacity of the supply chain is based on the assumption that the individual supply chain members have their own absorptive capacity that allows them to acquire and assimilate information in a manner that allows it to participate in the joint exploitation of that knowledge along with other supply chain partners. If an individual supply chain partner is unable to provide absorptive capacity in a manner that adds value to other members of the supply chain, that member is less likely to be tightly integrated into the supply chain relationships. Given that the weaker member (in terms of absorptive capacity) has less value to the supply chain, it would follow that an organization in that supply chain will be less likely to take a long-term orientation (i.e. commitment) toward that weaker supply chain partner because there is limited long-term benefit to be derived from the relationship. Benefit is derived when the supply chain partner's absorptive capacity can contribute to the dynamic capabilities of the overall supply chain. This leads to the second hypothesis:

H2   *As the supply chain partner's absorptive capacity increases, the commitment by an organization to the supply chain partner will increase.*

As a supply chain partner's absorptive capacity increases, they are better able to assimilate and exploit information that they acquire. The potential to increase knowledge creation capability in the collaborative relationship provides an incentive for an organization to share high-level information with supply chain partners. Increased information sharing facilitates greater information acquisition by the supply chain partner allowing for greater assimilation and exploitation capabilities within the context of the collaborative relationship. Given the expected positive effects of a supply chain partner's absorptive capacity on the organization's commitment to that partner, there should be both a direct effect of the supply chain partner's absorptive capacity on information sharing and an indirect effect that flows through commitment to increased information sharing. This leads to the third and fourth hypotheses:

H3   *As the supply chain partner's absorptive capacity increases, the level of information sharing by an organization with the supply chain partner will increase.*

H4   *The relationship between supply chain partner's absorptive capacity and the level of information sharing is mediated by the organization's commitment to the supply chain partner.*

Note that absorptive capacity within a supply chain context has two primary outcomes: operational efficiency and market knowledge creation (Malhotra *et al.*, 2005). Operational efficiency is an important factor driving commitment, but knowledge creation benefits from information sharing. Thus, the relationships hypothesized in H3 and H4 are driven theoretically by the knowledge creation aspect of absorptive capacity.

Business risk and information sharing
While information sharing has great potential to improve the absorptive capacity of a supply chain, the desire for coordination and information sharing should also be balanced by the associated risks (Klein *et al.*, 2007). Risks associated with outsourcing and other collaborative supply chain relationships have been identified as the primary limiting factors on the growth of such relationships (Aron *et al.*, 2005; Goh *et al.*, 2007). Aron *et al.* posit that controlling or mitigating such risks is critical to advancing collaborative relationships that have significant upside potential for productivity and knowledge gains. Traditionally, many organizations have relied on trust to mitigate risk, but increasingly research has shifted to a focus on risk and direct risk mitigation as the central concern (e.g. Miller *et al.*, 2008). This view is consistent with that put forth by Power (2007) that risk management is the overriding dominant corporate strategy in today's environment; in a risk management focused world, stakeholders will first demand evidence that supports a desired level of trust before trust will be offered (Power, 2007, p. 39).

Klein *et al.* (2007) examine a large number of dyadic supply chain relationships and find that managers tend to polarize around assessing relationships as cooperative or entirely competitive. Cooperative relationships require information sharing to function, while competitive relationships present high risks to information sharing. At the same time, cooperative relationships bring risk and leave an organization vulnerable if not controlled for during the formulation and/or commitment stages of the relationship (Kumar & van Dissel, 1996).

Sutton *et al.* (2008) explore these critical risks across multiple dimensions of interorganizational relationships. They conducted focus groups with e-commerce consultants, IS security managers, e-commerce developers, electronic exchange managers, and internal and external IT auditors. They identify 49 specific risks across three organizational levels. The first two levels of risk include technical and line/IT manager levels both of which influence the third level of business level risk. Business level risks are related to the supply chain partner's ability to appropriately re-engineer traditional business processes to incorporate e-commerce-driven business processes. They are also related to the supply chain partner's ability to identify and appropriate benefits from e-commerce, adhere to legal requirements, assure auditability of transactions, and improve the efficiency of related work flows (Khazanchi & Sutton, 2001; Sutton

et al., 2008). The supply chain partner's business level risks are of most concern as organizations look to develop more collaborative relationships with the partner. The preparedness of the supply chain partner for B2B e-commerce strategies is critical to accruing benefits from the relationship (Lin *et al.*, 2007). This leads to the fifth hypothesis:

H5   *As the supply chain partner's B2B e-commerce business risk increases, an organization's commitment to the partner will decrease.*

The supply chain partner's B2B e-commerce business risk is also important from an information-sharing perspective. If the supply chain partner is incapable of leveraging B2B processes, there is less value to the organization to increase the B2B connectivity and the related information flows (Khazanchi & Sutton, 2001). In addition, high risks also suggest that any information that is shared could be misappropriated or improperly safeguarded. Additionally, information exchanged is also at higher risk of being incorrectly processed. Nicolaou & McKnight (2006) provide some evidence of this effect in a data exchange environment where concerns over lower perceived information quality led participants to lower their intention to use the data exchange. Similar effects would be expected in collaborative relationships where the higher perceived risk of a supply chain partner would lower the amount of information an organization would want to share with that partner. This negative relationship between risk and information sharing should have direct effects as well as indirect effects that flow through lowered levels of commitment. This leads to the sixth and seventh hypotheses:

H6   *As the supply chain partner's B2B e-commerce business risk increases, the level of information sharing will decrease.*

H7   *The relationship between supply chain partner's B2B e-commerce business risk and the level of information sharing is mediated by the organization's commitment to the supply chain partner.*

Taken in aggregate, Figure 2 provides the research model based on the seven hypotheses. The model is consistent with the conceptual model shown in Figure 1, but the research model in Figure 2 addresses more specifically the components of the conceptual model of primary interest in examining the antecedents to information sharing in supply chain relationships.

Impact of geographic location
An issue in studying global supply chain relationships is the potential uncertainty caused by dealing with supply chain partners in different geographic regions and with potential cultural differences in attitudes. Some researchers have indicated that risks may escalate in cross-border
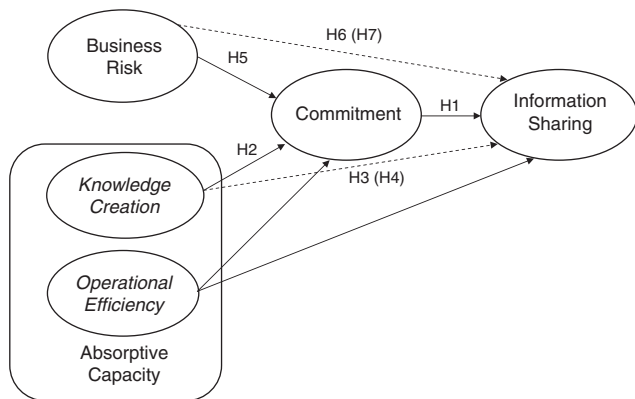
Figure 2 Research model.

outsourcing and collaborative supply chain relationships (Aron *et al.*, 2005). Others have reported differences in the nature of relationships within countries (Bensaou & Anderson, 1999). On the other hand, Balakrishnan *et al.* (2007) report that increasing quality reports have negated many concerns with supply chain partners in India. Similarly, Cai *et al.* (2006) find that the variation in risk assessments of Chinese companies are identified as being associated with organizational factors rather than country factors. Still, amidst several recent crises in the global food supply chain these concerns continue to be voiced. This leads to the following research question:

RQ: Does the supply chain partner's geographical/cultural location systematically impact the levels of perceived absorptive capacity, B2B e-commerce business level risk, commitment or information sharing?

A diverse population of supply chain partners is required to facilitate the above research question.

Research method
This study examines the impacts of supply chain partners' absorptive capacity, B2B e-commerce business risk, and global dispersion on an organization's willingness to increase commitment to partner relationships and to increase high-level information sharing within these relationships. Structural equation modeling (Amos 17.0) was used to test the measurement and structural models employed in this study. The following subsections discuss participants' demographics, survey development and validation, data analysis, and the study results.

Participants
To test the relationships posited in Figure 2, online surveys were distributed to managers in firms engaged in offshore interorganizational relationships. Because the complex knowledge required to complete the survey crosses technical dimensions of e-commerce, business level activities with a supply chain partner, and response requirements about the supply chain partner makes identification of specific respondents on a broad scale basis difficult, a survey company was used to reach the

targeted sample. Using job titles, the survey company identified 18,500 potential participants for this study and sent them email solicitations. Each potential respondent who indicated a willingness to participate in the study (6,668 or 36.04% of the initial contacts) was presented with the following pre-screening questions to determine their appropriateness for the research project:

1. In which country is your company based?
2. What are your job responsibilities?
3. Does your company use any non-North American supplier or outsourcing companies?
4. How familiar are you with these non-North American supplier or outsourcing relationships.

A five-point Likert scale (1 = not at all familiar and 5 = very familiar) was used for item #4. Of the respondents who satisfied the first three requirements, 268 respondents selected 4 or 5 on the Likert scale; these respondents were deemed appropriate for this study and the survey company sent them a link to the online survey. The 268 responses received were analyzed for missing data and excessive selection of the survey option 'No basis for answering'. This resulted in the elimination of 61 responses resulting in a total usable sample consisting of 207 responses.

As shown in Table 1, 125 (60.38%) of the 207 study participants were male, 77 (37.20%) were female, and 5 (2.42%) participants did not respond to this item. The majority (60.87%) of participants were between the age of 25 and 40 years and 35.75% were over 40 years. These data also revealed that 87% of the participants had 3 or more years with their current employer and the primary industries represented were manufacturing (32.37%), wholesale/retail (14.98%), construction (6.28%), consulting (5.79%), and health (5.79%). Participants were asked to think of an offshore or overseas supply chain partner with whom they were very familiar when responding to the survey questions. The primary supply chain partner locations included China (16.43%), Canada (13.52%), the United Kingdom (13.52%), and India (10.14%). The complete breakdown of participant demographic information and supply chain partner locations is presented in Table 1.

Survey development
The survey used in the current study was designed to collect measures of the theoretical constructs as well as participant demographic data. Each item was measured using a five point Likert scale where 1 represents the strongest positive response and 5 represents the strongest negative response; 6 was used to allow participants to respond 'no basis for answering'. The following discussion describes the item measures used to reflect the study constructs.

Absorptive capacity   Absorptive capacity is a measure of a firm's ability to 'recognize the value of new external information, assimilate it, and apply it to commercial

Table 1 Participant demographics

Category	Frequency (n = 207)	Percentage
Gender		
Male	125	60.38
Female	77	37.20
Not answered	5	2.42
Age		
Under 25	4	1.93
25–40 years	126	60.87
40+ years	74	35.75
Not answered	3	1.45
Experience with current employer		
1–2 years	17	8.21
3–10 years	122	58.94
10+ years	59	28.50
Not answered	9	4.35
Organizational structure		
Publicly traded	113	54.59
Not publicly traded	93	44.93
Not answered	1	0.48
Industry		
Manufacturing	67	32.37
Wholesale/retail	31	14.98
Construction	13	6.28
Consulting	12	5.79
Health	12	5.79
Technology	11	5.31
Financial	8	3.86
Telecommunications	7	3.38
Energy	6	2.90
Insurance	6	2.90
Aerospace	5	2.42
Education	5	2.42
Transportation	5	2.42
All other	15	7.25
Not answered	4	1.93
Supply chain partner location		
China	34	16.43
Canada	28	13.52
United Kingdom	28	13.52
India	21	10.14
Mexico	12	5.80
United States	9	4.35
Argentina	7	3.38
Germany	6	2.90
Japan	6	2.90
Other European countries	20	9.66
Other Asia-Pacific countries	15	7.25
Other Central/South American countries	12	5.80
Africa and Middle East	6	2.90
Not answered	3	1.45

ends' (Cohen & Levinthal, 1990, p. 128). This study adopts the absorptive capacity measures developed and previously validated by Malhotra *et al*. (2005). Malhotra *et al*. propose a multi-level absorptive capacity construct wherein an organization's absorptive capacity is influenced by the operational efficiency of their supply chain trading partner and the ability of the supply chain trading relationship to enable knowledge creation within the organization. Operational efficiency measures are associated with the physical movement and transfer of goods or services between supply chain trading partners. The operational dimension of absorptive capacity is necessary to ensure a stable and well functioning supply chain trading relationship. In addition, organizations leverage the information shared with supply chain trading partners to create knowledge about customers, competitors, and emerging markets. In testing the research model, this latter knowledge creation is perceived to drive the hypothesized effects of absorptive capacity on commitment and information sharing. This focus on knowledge creation is consistent with the focus advocated in recent management literature calling for greater focus on the foundations of learning and knowledge creation (Lane & Koka, 2006; Easterby-Smith *et al*., 2008). Nonetheless, both knowledge creation and operational efficiency are captured and operational efficiency is included in the measurement model to assist in identifying the specific effects arising from the trading partner's knowledge creation capabilities.

Supply chain partner B2B e-commerce business risk The B2B e-commerce business risk measures employed in the current study were developed by the authors to capture the participants' overall assessment of the business risk associated with their B2B e-commerce supply chain partner relationship. These measures were developed based on the findings of Sutton *et al*. (2008) and designed to capture the overall risk effects from the technical, application-user, and business-level components of B2B e-commerce risk. Participants were asked to compare the B2B e-commerce business risk associated with this supply chain partner relationship to that of their other domestic and international supply chain partners as well as provide overall risk assessments.

Relationship commitment Generally, individuals are less committed to short-term relationships than ones that are expected to be long term. The items used to measure commitment focus on the expected long-term nature of the supply chain partner relationship. Consistent with Hart & Saunders (1998), the measures of commitment capture the participant's assessment of the likelihood of a long-term relationship between their own organization and the supply chain partner's organization. This commitment can arise for different reasons. Geyskens *et al*. (1996) note that commitment can arise from either affective (commitment from liking to maintain a relationship) or calculative (commitment from the need to

maintain a relationship) commitment. Our interest in this study is less on the type of commitment and more on long-term commitment that exists to some degree and how long-term commitment is affected by risk versus capability, and its influence on willingness to share information. Similar to Hart & Saunders' (1998) earlier work on B2B inter organizational relationships, we focus on overall long-term commitment.

Information sharing The four characteristics of information sharing include the breadth, quality, privileged nature, and coordination of the information exchanged (Malhotra *et al*., 2005). The breadth of the exchange reflects the diversity of the business relationship information exchanged between supply chain partners. The quality of the information reflects overall value of the information exchanged to the supply chain partner relationship. The privileged nature of the information exchanged measures how willing supply chain partners are to exchange confidential information that would enhance the relationship. The information coordination measures reflect the ability of the supply chain partners to synchronize their joint processes.

The measures of these characteristics were adapted from those previously validated by Malhotra *et al*. (2005). These measures were selected based on Malhotra *et al*.'s (2005) validation in a supply chain environment as the key information exchange aspects that support absorptive capacity capability along the overall supply chain. The four aspects represent the critical information necessary to facilitate identification of new knowledge across the supply chain to support transformative learning and help create new knowledge and commercial outputs – core aspects of absorptive capacity (Lane & Koka, 2006).

Scale validation

With the exception of the B2B e-commerce business risk scale, all survey questions are from measurement scales used in prior studies. The supply chain partner absorptive capacity scale is adapted from Malhotra *et al*. (2005). Malhotra *et al*. propose absorptive capacity as a second-order construct comprised of two first-order constructs, operational efficiency, and enable market knowledge creation. As previously discussed, the research model presented in this study decomposes absorptive capacity into two separate component constructs, operational efficiency and knowledge creation, to investigate the impact of each on information sharing and commitment. Therefore, confirmatory factor analysis is applied to both the absorptive capacity-operational efficiency sub-scale and the absorptive capacity-knowledge creation sub-scale as each scale now represents a uniquely identifiable construct. Confirmatory factor analysis indicates all scale items for absorptive capacity-knowledge creation load at a minimum of 0.74 or higher. The minimum item loading for the absorptive capacity-operational efficiency scale is 0.75.

The commitment scale is adapted from four items developed by Hart & Saunders (1998) to study of antecedents of electronic data interchange (EDI) use by suppliers. The scale focuses on the expectation of a long-term relationship between supply chain partners. Confirmatory factor analysis indicates all scale items for supply chain partner commitment load at a minimum of 0.72.

Scale items used to measure the B2B e-commerce business risk construct are developed for this study based on prior research by Sutton *et al.* (2008). Initial validation of the measures is conducted using principle axis factoring. Results of the initial validation indicate all scale items load on a single factor with individual item loads ranging from 0.73 to 0.80. Scale reliability of 0.88 was obtained using Cronbach's α. Based on these initial results, confirmatory factor analysis was conducted. All scale items for B2B e-commerce business risk load at a minimum of 0.75.

The information sharing scale is adapted from Malhotra *et al.* (2005). As developed by Malhotra *et al.*, information sharing is a second-order construct consisting of four first-order constructs: breadth, quality, privileged nature, and coordination of information exchange. Confirmatory factor analysis is conducted using a two-stage approach. First, items loadings on the first-order constructs breadth, quality, privileged nature, and coordination of information exchange are assessed using confirmatory factor analysis. The results indicate all items load at an acceptable level on their respective constructs. Item loadings range from 0.72 to 0.85. Next, the item loadings of the first-order constructs on the second-order construct, information sharing, are assessed using confirmatory factor analysis. The results indicate that the breadth, quality, privileged nature, and coordination of information exchange first-order constructs load on the information sharing second-order construct at a minimum of 0.76. Scale items with their corresponding means, medians, and standard deviations are presented in Table 2.

Results

Measurement model validation
Validation of the measurement model and structural model is conducted using covariance-based SEM (Amos 17.0). Because information sharing is a multi-level construct, a two-stage approach is used to assess convergent validity. First, scale item loadings for the first-order constructs breadth, quality, privileged nature, and coordination of information exchange are evaluated. The results indicate all scale items load at a minimum of 0.70 on their respective constructs. The second stage evaluates the breadth, quality, privileged nature, and coordination of information exchange construct loadings on the second-order construct information sharing. The loadings of scale item for the remaining constructs are simultaneously evaluated during this second stage. Table 3 reports the loadings, composite reliability scores,

and average variance extracted (AVE), for all scale items. Initial analysis indicates that all scale items load significantly on their respective constructs at a minimum level of 0.70 (Hair *et al.*, 2006). Composite reliability scores for all scales are greater than 0.70 and AVE for all scales exceeds 0.50 (Nunnaly & Bernstein, 1994). These results support convergent validity of the item measures on their respective constructs.

Discriminant validity is assessed by inspection of construct correlations. Again, the presence of a multi-level construct requires a two-stage approach. First, construct correlations between the first-order constructs breadth, quality, privileged nature, and coordination of information exchange are evaluated. All construct correlations are below the commonly accepted cut-off of 0.80. However, several of the correlations exceed 0.70 warranting additional analysis. Fornell & Larker (1981) recommend a more conservative test of discriminant validity wherein the square root of a constructs AVE should exceed the correlations between all constructs. The results of this analysis indicate that the correlations between quality and coordination of information exchange exceed the square root of the AVE for breadth of information exchange. An examination of the quality and coordination of information exchange scale item correlations indicates quality of information exchange scale item IS-OE2 is highly correlated with coordination of information exchange scale item measures. When the IS-QE2 scale item is eliminated, all first-order construct correlations are less than the lowest stage one construct square root of AVE.

In the second stage, correlations between all remaining constructs, including the second-order information sharing construct, are evaluated. Initial results indicate that while all construct correlations are below 0.80, several exceed 0.70 necessitating additional analysis. Comparing construct correlations to the square root of construct AVE indicates the correlation between information sharing and business risk exceeds the square root of AVE for business risk. Examination of the scale item correlations for business risk and information sharing indicates business risk items GBR1 and GBR2 are highly correlated with information sharing scale item measures. When these scale items are eliminated from the business risk scale, correlations between all remaining constructs evaluated in stage two, including the second-order information sharing construct, are less than the lowest stage two construct square root of AVE (As a sensitivity analysis, construct correlations between all constructs are evaluated simultaneously, regardless of level. When using the adjusted scales, all construct correlations are less than the lowest construct square root of AVE.). All analysis and statistics are generated using the revised scales (Table 4).

Structural model results
The model, as presented in Figure 3, consists of two countervailing influences, supply chain partner absorptive capacity-knowledge creation and B2B e-commerce

Table 2 Descriptive statistics

Variable measures		Mean	Median	SD
Absorptive capacity outcomes (Malhotra *et al.*, 2005)				
Knowledge creation				
Working with Company ABC has helped you:				
AC-KC1	Better understand the market segments you serve	1.965	2	0.953
AC-KC2	Better understand the needs of customers	2.005	2	0.949
AC-KC3	Better understand new or emerging markets	1.965	2	0.951
AC-KC4	Better understand intentions and capabilities of your competitors	1.965	2	0.943
AC-KC5	Find better ways of distributing/selling the products	1.921	2	0.925
Operational efficiency				
How would you rate your transactions with Company ABC in terms of:				
AC-OE1	Meeting agreed upon costs per unit	1.890	2	0.828
AC-OE2	Meeting productivity standards Meeting on-time delivery requirements	1.954	2	0.932
AC-OE3	Ability to meet inventory requirements (finished goods)	1.912	2	0.930
Information sharing (Malhotra *et al.*, 2005)				
Breadth of exchange:				
Regarding the sharing of information between your company and Company ABC				
IS-BE1	To what extent do you exchange details of upcoming product or service related changes with Company ABC?	2.019	2	0.947
IS-BE2	To what extent do you exchange future plans such as promotion and marketing plans, long-term production plans, capital investments and capacity utilization with Company ABC?	2.169	2	1.045
IS-BE3	To what extent do you exchange information related to market demand trends and forecasts with Company ABC?	2.195	2	0.976
IS-BE4	To what extent do you exchange information on demand shifts and changes in customer preferences with Company ABC?	2.136	2	0.968
IS-BE5	To what extent do you exchange information related to changes in supply chain structure – such as addition or dropping of partner companies, merger and alliances, with Company ABC?	2.213	2	1.092
IS-BE6	To what extent do you exchange process information needed to support changes in product features or volumes, with Company ABC?	2.029	2	0.980
Quality of exchange:				
How would you rate the information exchanged with Company ABC in terms of its:				
IS-QE1	Relevancy to your business needs, compared to information exchanged with other similar partners?	1.892	2	0.817
IS-QE2	Value-added to your business needs, compared to information exchanged with other similar partners?	1.898	2	0.789
IS-QE3	Timeliness, compared to information exchanged with other similar partners?	1.951	2	0.901
IS-QE4	Its completeness, compared to information exchanged with other similar partners?	2.010	2	0.860
Privileged information exchange:				
In our relationship with Company ABC				
IS-PE1	We provide each other proprietary information if we feel it can help our business partner.	1.951	2	1.018
IS-PE2	We share confidential information if we feel it can help our business partner.	2.069	2	1.067
IS-PE3	We share information with each other that is not available from other sources.	1.995	2	0.944
IS-PE4	The information exchange helps us provide each other a unique perspective that neither of us could have developed on our own.	1.971	2	0.980

Table 2 Continued

Variable measures	Mean	Median	SD
Coordination information exchange			
When performing processes that are inter-linked			
IS-CE1 To what extent does your company and Company ABC exchange coordination information exchange to synchronize your activities?	1.990	2	0.888
IS-CE2 To what extent does your company and Company ABC exchange information to track each other's internal processes?	2.177	2	0.979
IS-CE3 To what extent does your company and Company ABC exchange operational information (such as inventory levels, product availability, production volumes etc.)?	2.078	2	0.959
Commitment (Hart & Saunders, 1998)			
COM1 We expect this relationship to last a lifetime.	2.025	2	1.035
COM2 It is assumed that renewal of agreements in this relationship generally will occur.	1.902	2	0.848
COM3 The relationship with Company ABC is essentially 'evergreen', and will continue to be a good relationship.	2.034	2	0.938
Global business risk assessment			
GBR1 Understanding of the strategic nature of the B2B e-commerce relationship? (R)	4.139	4	0.817
GBR2 Understanding of the benefits of the B2B e-commerce relationship? (R)	4.238	4	0.781
GBR3 Reengineering of business processes to facilitate B2B e-commerce transaction requirements? (R)	4.035	4	0.912
GBR4 Management of data, transmission security, and auditability? (R)	4.162	4	0.821
GBR5 Ability to fulfill legal obligations initiated via B2B e-commerce transactions? (R)	4.184	4	0.831

(R) – Reverse coded.

business risk. These influences have strong and opposite effects on organizational commitment and information sharing. However, the influence of knowledge creation and B2B e-commerce business risk on information sharing are, to varying degrees, reduced by organizational commitment to a supply chain partner. The overall model provides strong support for all hypothesized relationships with all paths significant in the predicted direction at the $P < 0.05$ or less. In addition, the inclusion of operational efficiency in the model shows a significant relationship with commitment, but no significant relationship with information sharing (the relationships expected and controlled for per the earlier theory discussion and operationalization). The model results, unless otherwise noted, are based on the mediated structural model presented in Figure 3.

H1 predicts a positive association between an organization's commitment to supply chain partners and information sharing. The results indicate a positive (0.387) and significant ($P = 0.003$) association between increases in organizational commitment to supply chain partners and increases in information sharing.

H2 posits that increases in supply chain partner absorptive capacity will increase organizational commitment to the supply chain partner. The results indicate that both operational efficiency and knowledge creation positively influence organizational commitment to a supply chain trading partner. However, the component of absorptive capacity of most interest in the theoretical model and study, knowledge creation, has a much stronger influence (0.625, $P < 0.001$) than the other component, operational efficiency (0.143, $P < 0.05$).

The relationship between supply chain partner absorptive capacity and organizational information sharing is addressed by H3. The results show a positive (0.256) and significant ($P = 0.015$) relationship between increases in knowledge creation and organizational willingness to share information, supporting H3. Not unexpected from a theoretical basis, operational efficiency does not directly influence information sharing between supply chain trading partners (0.074 $P = 0.278$). These results suggest that while the ability of a supply chain partner to provide quality goods and services in a timely and cost effective manner is a necessary condition for the maintenance of the supply chain, the absorptive capacity capabilities related to knowledge creation are the driving force behind increases in information sharing, consistent with the underlying theory.

The effect of B2B e-commerce business risk on organizational commitment to a supply chain partner is addressed by H5. As predicted, a negative (−0.388) and significant ($P < 0.001$) association exists between increases in B2B e-commerce business risk and organizational commitment to a supply chain partner.

H6 posits that increases in B2B e-commerce business risk will be negatively related to organization's willingness to share information with supply chain partners. The results support the hypothesized relationship and

Table 3 Factor loadings, composite reliability, and average variance extracted

Scale/sub-scale/survey questions		Factor loading	Construct composite reliability	Average variance extracted
Absorptive capacity outcomes (Malhotra *et al.*, 2005)				
Knowledge creation			0.891	0.620
Working with Company ABC has helped you				
AC-KC1	Better understand the market segments you serve	0.817		
AC-KC2	Better understand the needs of customers	0.815		
AC-KC3	Better understand new or emerging markets	0.784		
AC-KC4	Better understand intentions and capabilities of your competitors	0.742		
AC-KC5	Find better ways of distributing/selling the products	0.778		
Operational efficiency			0.826	0.612
How would you rate your transactions with Company ABC in terms of:				
AC-OE1	Meeting agreed upon costs per unit	0.751		
AC-OE2	Meeting productivity standards Meeting on-time delivery requirements	0.786		
AC-OE3	Ability to meet inventory requirements (finished goods)	0.809		
Commitment (Hart & Saunders, 1998)			0.819	0.602
COM1	We expect this relationship to last a lifetime.	0.721		
COM2	It is assumed that renewal of agreements in this relationship generally will occur.	0.816		
COM3	The relationship with Company ABC is essentially 'evergreen', and will continue to be a good relationship.	0.787		
Global business risk assessment			0.873	0.697
GBR1 (D)	Understanding of the strategic nature of the B2B e-commerce relationship? (R)	N/A		
GBR2 (D)	Understanding of the benefits of the B2B e-commerce relationship? (R)	N/A		
GBR3	Reengineering of business processes to facilitate B2B e-commerce transaction requirements? (R)	0.756		
GBR4	Management of data, transmission security, and auditability? (R)	0.881		
GBR5	Ability to fulfill legal obligations initiated via B2B e-commerce transactions? (R)	0.863		
Information sharing (Malhotra *et al.*, 2005)			0.896	0.684
Breadth of exchange		0.836		
Quality of exchange		0.872		
Privileged information exchange		0.759		
Coordination information exchange		0.837		
Breadth of exchange			0.888	0.570
Regarding the sharing of information between your company and Company ABC				
IS-BE1	To what extent do you exchange details of upcoming product or service related changes with Company ABC?	0.754		
IS-BE2	To what extent do you exchange future plans such as promotion and marketing plans, long-term production plans, capital investments, and capacity utilization with Company ABC?	0.741		

Table 3 Continued

Scale/sub-scale/survey questions		Factor loading	Construct composite reliability	Average variance extracted
IS-BE3	To what extent do you exchange information related to market demand trends and forecasts with Company ABC?	0.720		
IS-BE4	To what extent do you exchange information on demand shifts and changes in customer preferences with Company ABC?	0.756		
IS-BE5	To what extent do you exchange information related to changes in supply chain structure – such as addition or dropping of partner companies, merger and alliances, with Company ABC?	0.759		
IS-BE6	To what extent do you exchange process information needed to support changes in product features or volumes, with Company ABC?	0.798		
Quality of exchange			0.850	0.592
How would you rate the information exchanged with Company ABC in terms of its:				
IS-QE1	Relevancy to your business needs, compared to information exchanged with other similar partners?	0.757		
IS-QE2 (D)	Value-added to your business needs, compared to information exchanged with other similar partners?	N/A		
IS-QE3	Timeliness, compared to information exchanged with other similar partners?	0.847		
IS-QE4	Its completeness, compared to information exchanged with other similar partners?	0.821		
Privileged information exchange			0.882	0.652
In our relationship with Company ABC				
IS-PE1	We provide each other proprietary information if we feel it can help our business partner.	0.824		
IS-PE2	We share confidential information if we feel it can help our business partner.	0.855		
IS-PE3	We share information with each other that is not available from other sources.	0.739		
IS-PE4	The information exchange helps us provide each other a unique perspective that neither of us could have developed on our own.	0.807		
Coordination information exchange			0.809	0.585
When performing processes that are inter-linked				
IS-CE1	To what extent does your company and Company ABC exchange coordination information exchange to synchronize your activities?	0.797		
IS-CE2	To what extent does your company and Company ABC exchange information to track each other's internal processes?	0.747		
IS-CE3	To what extent does your company and Company ABC exchange operational information (such as inventory levels, product availability, production volumes etc.)?	0.750		

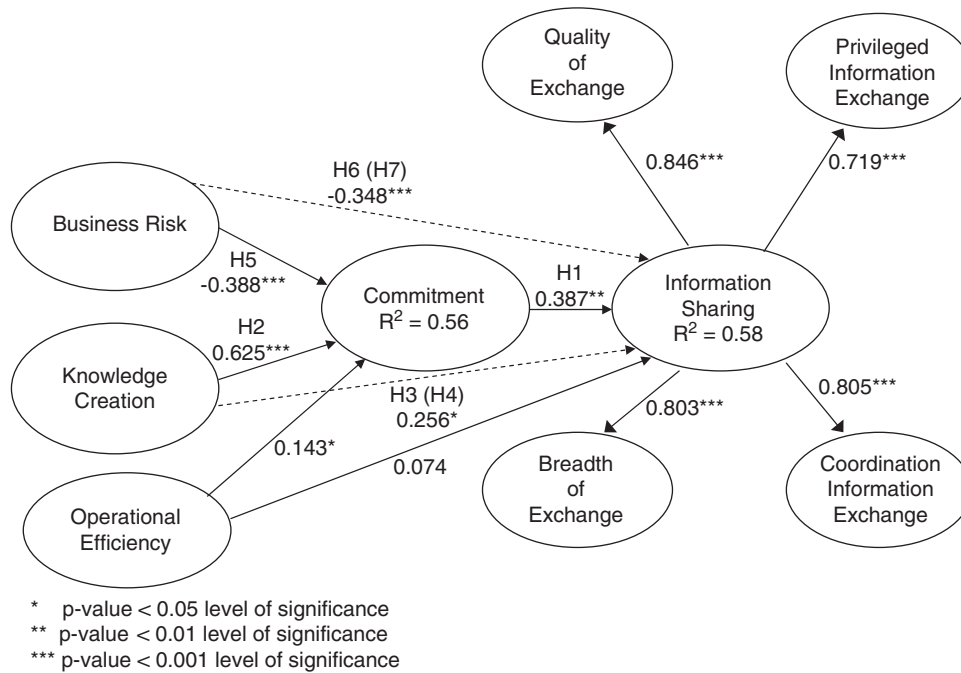(R) – Reverse coded; (D) – Dropped; (N/A) – Not applicable.

Figure 3 Model results.

Table 4 Construct correlations and square root of average variance extracted[a]

	IS-BE	IS-QE	IS-PE	IS-CE
Panel A – Information sharing first order constructs				
IS-BE	**0.76**			
IS-QE	0.70	**0.77**		
IS-PE	0.74	0.54	**0.81**	
IS-CE	0.73	0.75	0.66	**0.77**

	AC-KC	AC-OE	COM	GBR	IS
Panel B – Primary research constructs					
AC-KC	**0.79**				
AC-OE	0.61	**0.78**			
COM	0.75	0.58	**0.78**		
GBR	−0.43	−0.50	−0.61	**0.84**	
IS	0.67	0.54	0.76	−0.66	**0.83**

[a]Square root of average variance extracted appears bolded and on the diagonal.

indicate that increases in B2B e-commerce business risk are negatively (−0.348) and significantly ($P<0.001$) associated with decreases in organizational information sharing with supply chain partners.

The ability of an organization's commitment to a supply chain partner to simultaneously reduce both the positive and negative influences of supply chain partner absorptive capacity and B2B e-commerce business risk on organizational information sharing is addressed by H4 and H7. As commitment is posited to mediate the effects of both supply chain partner absorptive capacity (knowledge creation) and B2B e-commerce risk through a single

path extending from commitment to a supply chain partner to information sharing, testing of both H4 and H7 is performed simultaneously using the three-step approach recommended by Baron & Kinney (1986).

In step 1, a significant relationship is established between the constructs, knowledge creation and B2B e-commerce business risk, and the construct information sharing. This condition is met in the tests of H3 and H6. Step 2 requires that a significant effect exist between the constructs knowledge creation and B2B e-commerce business risk and the mediating construct organizational commitment to a supply chain partner. This condition is

met in the tests of H2 and H5. The final step requires the insertion of the mediating path to determine if a reduction in the path loadings from B2B e-commerce business risk and knowledge creation to organizational information sharing occurs.

To test this final step, the model is estimated without the commitment to organizational information sharing path. The model is then re-estimated with the path reinserted. When supply chain partner commitment is added into the model, the path coefficient between knowledge creation and organizational information sharing decreases by 0.270. The strength of this mediation effect is evaluated using the Aroian method of the Sobel test. The result indicates the mediating effect of supply chain partner commitment on the relationship between knowledge creation and organizational information sharing is significant ($t = 2.72$, $P = 0.007$).

Likewise, when commitment is added into the model, the path coefficient between B2B e-commerce business risk and organizational information sharing decreases by 0.157. The strength of this mediation effect is evaluated using the Aroian method of the Sobel test. The result indicates the mediating effect of commitment on the relationship between B2B e-commerce business risk and organizational information sharing is significant ($t = 2.56$, $P = 0.011$).

While the mediating effects hypothesized in H4 and H7 are supported, all paths remain significant at the $P < 0.05$ level indicating that commitment partially mediates both the knowledge creation and organizational information sharing relationship and the B2B e-commerce business risk and organizational information sharing relationship.

Overall, the proposed model demonstrates strong path coefficients as well as R^2 of 0.58 and 0.56 for organizational information sharing and commitment, respectively. Model fit is evaluated using the Tucker Lewis index (TLI), comparative fit index (CFI), and root mean square error of approximation (RMSEA). Both TLI and CFI values, 0.834 and 0.859 respectively, are below the preferred 0.90 level (Bentler & Bonett, 1980). The RMSEA is 0.081, which is also slightly above the preferred level of 0.08 (Browne & Cudeck, 1992). These results are not surprising and may be attributable to the discriminant validity issues. While all constructs exhibit acceptable discriminant validity, the correlations between constructs are high indicating multicollinearity may be affecting model fit.

Additional analysis
The supply chain relationships evaluated in this study are cross-cultural. As such, a supply chain partner's geographical location and cultural orientation may systematically impact the levels of perceived supply chain partner knowledge creation, B2B e-commerce business risk, organizational supply chain partner commitment, and organizational information sharing. To evaluate the effects of culture, supply chain partners are classified into four groups, Anglo, European, Latin America, and

Asia-Pacific, based on cultural orientation (Ronen & Shenkar, 1985). These groupings serve as the independent variables in this analysis. The dependent variables are obtained by averaging individual participant ratings for each scale question on the knowledge creation, B2B e-commerce business risk, organizational supply chain partner commitment and organizational information sharing, to obtain an average score for each participant on each scale. The results of a one-way ANOVA with Bonferroni adjustment are presented in Table 5. Based on these results, culture does not appear to have an impact on knowledge creation, B2B e-commerce business risk, organizational supply chain partner commitment, and organizational information sharing. However, it should be recognized that because of the broad diversity of countries represented in the sample, the groupings have necessarily been at a fairly high level based primarily on geographic region.

Conclusions and summary thoughts
This study investigated a broad range of participants' perceptions on relationships with supply chain partners on a global basis. The purpose of the study was to examine the countervailing effects of a global supply chain partner's B2B e-commerce business level risk and absorptive capacity on an organization's willingness to commit to the supply chain partner and to share high-level information. The literature has well documented the purported benefits of information sharing between supply chain partners to increase the joint absorptive capacity, supply chain agility, dynamic capabilities for responding to changes in the business environment, and general knowledge creation (Malhotra *et al.*, 2005; Overby *et al.*, 2006).

The results of the current study confirm the theorized relationships between risk and absorptive capacity on organizational commitment and information sharing. Increased levels of B2B e-commerce business-level risks have a negative impact on information sharing, which is partially mediated by commitment. The supply chain partner's absorptive capacity has a positive impact on information sharing, a relationship that is also partially mediated by the organization's commitment to the supply chain partner.

Additionally, the potential impact of the supply chain partner's geographic location/cultural influence was examined to determine whether there were any systemic effects on risk assessments, perceived absorptive capacity, organization's commitment to supply chain partner or organization's information sharing with the partner. Using basic groupings of countries based on geographical location and/or cultural commonalities, the results indicate that there is no evidence of a geographical/cultural effect. In light of this finding, it appears that the research model is robust across different global locations; as the world flattens, global supply chain partners are evaluated more on their own capabilities and companies' experiences with the partner than on cultural biases.

Table 5 Effects of culture on supply chain relationships

Variables	Absorptive capacity – knowledge creation			Organizational commitment to supply chain partner			B2B E-commerce business risk			Organizational information sharing		
Culture group (number of participants)	Mean diff.	SD	Sig.	Mean diff.	SD	Sig.	Mean diff.	SD	Sig.	Mean diff.	SD	Sig.
Anglo (65) *vs* European (26)	−0.184	0.191	1.00	−0.056	0.183	1.00	0.112	0.165	1.00	0.041	0.158	1.00
Anglo (65) *vs* Asia-Pacific (76)	0.131	0.135	1.00	0.011	0.130	1.00	−0.014	0.117	1.00	0.037	0.112	1.00
Anglo (65) *vs* Latin America (31)	0.110	0.177	1.00	0.044	0.170	1.00	−0.071	0.153	1.00	0.026	0.146	1.00
European (26) *vs* Asia-Pacific (76)	0.316	0.187	1.00	0.066	0.179	1.00	−0.126	0.161	1.00	−0.004	0.154	1.00
European (26) *vs* Latin America (31)	0.294	0.219	1.00	0.101	0.209	1.00	−0.183	0.188	1.00	−0.015	0.181	1.00
Asia-Pacific (76) *vs* Latin America (31)	−0.217	0.172	1.00	0.034	0.165	1.00	−0.057	0.148	1.00	−0.012	0.142	1.00

Implications for theory

The results of the study have important implications to further theory development in the discipline and further research investigation. The study has placed significant focus on two key antecedents to commitment and information sharing: riskiness of the trading partner and the capabilities provided by the trading partner. The model demonstrates how competing positive and negative forces can simultaneously impact relationship building in global supply chains.

The results supporting the impact of the trading partner's B2B e-commerce business risk provide evidence to support contemporary views that risk is becoming a dominant strategic concern in organizational relationships. Power (2007) posits that the dominant strategic management theme in contemporary organizations has become the 'risk management of everything'. Similarly, among others, Miller *et al.*, 2008 suggest that risks and risk mitigation have become the predominant concern in interorganizational relationships, displacing trust as the key managerial control concern in establishing such relationships.

Similarly, the results for absorptive capacity provide evidence supporting the importance of supply chain partner capabilities to organizations' willingness to invest in commitment to the relationship and to share information. Hunt & Davis (2008) note that tightly coupled relationships with supply chain partners are costly to put in place and at high risk of failure. They posit that organizations should only pursue such tight relationships when the partner provides some form of resource advantage that can provide a comparative advantage to the organization. Absorptive capacity, particularly in terms of knowledge creation capability, is one form of resource advantage a trading partner can provide and, based on this study, appears to be important to establishing commitment and engaging in higher levels of information sharing.

Implications for practice

There are also significant implications from this study's research findings for organizations participating in supply chains. The same dimensions highlighted as contributing to theory also have implications for organizations participating in global supply chains. Risk mitigation and capability building should be at the forefront of organizations' initiatives to improve their competitive position within potential supply chains – particularly for organizations that may be in a weaker position compared to other supply chain participants.

For organizations pursuing more active and secure roles in global supply chains, increasing the learning capabilities of the organization as a means of increasing absorptive capacity would appear to enhance opportunities for deeper relationships with supply chain partners. Much has been written about developing learning organizations and creating a learning culture within organizations for strategic benefit. The results of this

study suggest this knowledge culture is key to enhancing supply chain partners' information sharing that allows relationships to take a more strategic focus. While operational efficiency is shown to enhance commitment by a trading partner, it is the knowledge creation aspects of absorptive capacity that appear to drive more strategic information sharing.

At the same time, organizations should be keenly aware of the impact that risk in their B2B activities can have on relationship formation. Organizations should consider how risks at the technical, application, and strategic business level of their B2B operations can be minimized in order to strengthen their attractiveness and position with current and potential trading partners. The role of signaling in these relationships should also be assessed; and, organizations should consider how they can best communicate the strengths of their B2B e-commerce capability and absorptive capacity to potential supply chain partners.

Limitations and future research

The results of the study should be evaluated within the scope of the inherent limitations and the implications these limitations may have for future research. One consideration should be that all organizations participating in this study reported on a supply chain partner with which they were already very familiar, suggesting that the relationship had already evolved based on prior experience. While the distribution of responses included a full range of ratings that would indicate the data captured a diversity of relationship levels, there could be some variance in model relationships if new potential supply chain partners were considered.

Although there is no evidence of a bias in the sample of respondents, all respondents did volunteer to participate in the study, and the solicitation of participation was restricted to individuals accessible via e-mail and able to respond via the Internet. Given that a fundamental component of the survey related to e-commerce activities, the risk that bias occurred based on participants being excluded due to a lack of e-mail or Internet access should be very low. It is notable, however, that a large part of the sample represents manufacturing, construction, and wholesale/retail while other sectors such as IT outsourcing and technology/communications have low representation. Re-examination by future studies focusing on specific industries would shed light on the robustness of the findings in this study.

The results could also be affected by all participants being based in North America; and, accordingly, the perceptions measured are based on that culture's view of supply chain partners from different cultures. The data do not cover how other global regions view their supply chain partners across the dimensions measured. Future research should consider if the findings in this study hold for responding organizations in other global regions. For instance, in Europe where there are often much stronger regulatory requirements, there may be specific concerns related to regulatory risks; and, these concerns may differ based on whether the trading partner is from another European Union country, another country or region with strong regulatory requirements, or a country or region with few regulatory limitations. Other factors such as stricter privacy requirements that could directly affect technical and application level B2B e-commerce risks may be important.

The impact of cultural and/or geographic region as reported in this study should also be considered carefully. As just noted, the results could be impacted by our North American-only participants in assessing transnational trading relationships. Additionally, the diversity of countries represented by the trading partners being evaluated made it difficult to provide strong analysis of potential culture effects. Future studies may want to look at more specific countries representing cultures or regions in order to have a clearer picture of how culture might affect these relationships. Eberlein (2008) provides some evidence within a project management context that companies can control culture differences through careful communication and monitoring of cultural differences. Similarly Cai *et al*. (2006) and Balakrishnan *et al*. (2007) provide evidence that cultural barriers to commitment are disappearing as organizations gain more experience in countries such as China and India. Others, however, continue to express concerns that culture may impact supply chain relationships (Bensaou & Anderson, 1999; Aron *et al*., 2005; Buhman *et al*., 2005). Future research should continue to focus on how culture may impact and have systemic effects on these relationships.

Consideration should also be given to refining many of the constructs considered in this study. For instance, our commitment measure was drawn from Hart & Saunders (1998) and is a desired high-level measure for overall long-term commitment. Future research should explore whether the model components have varying affects on different types of commitment such as affective and calculative (see Geyskens *et al*., 1996).

Our study has also focused the examination of risk on the trading partner's B2B e-commerce risk, and other types of risks and their impact on supply chain relationships should also be considered. For instance, the financial viability of a trading partner will likely play an important part in whether to commit to that partner. Other researchers are also beginning to explore how supply chain relationship activities and designs can be used to lower all supply chain members' risk (see Braunscheidel & Suresh, 2009). As noted earlier, risk management is becoming a key strategic management focus, yet little is known on how organizations assess risk in supply chain relationships and the processes used to minimize risks for supply chain members. Substantial future research is needed in order to better understand the varied effects and influences of risk in these relationships.

About the authors

Vicky Arnold is Ernst & Young Professor at the University of Central Florida and Professorial Fellow at the University of Melbourne. She serves as the editor of *Advances in Accounting Behavioral Research* and is president-elect of AIS SIG-ASYS. Her research focuses on the impact of IT on decision-making processes.

Tanya Benford is Assistant Professor of Accounting at the University of Central Florida. Her research has appeared in journals such as *Auditing: A Journal of Practice & Theory*, *International Journal of Accounting Information Systems*, and *Journal of Emerging Technologies in Accounting*. Her research interests include business process control and corporate governance.

Clark Hampton is Assistant Professor at the University of Waterloo. His research focuses on enterprise risk management and the impact of technology on judgment and decision making. His research has appeared in *International Journal of Accounting Information Systems* and *Journal of the Association for Information Systems*.

Steve G. Sutton is KPMG Professor at the University of Central Florida. He is editor of *International Journal of Accounting Information Systems* and the founding president of AIS SIG-ASYS. His research interests include the impact of IT on individuals, organizations, and society, with a current focus on interorganizational risk.

References

ARON R, CLEMONS K and REDDI S (2005) Just right outsourcing: understanding and managing risk. *Journal of Management Information Systems* **22(2),** 37–55.

BALAKRISHNAN K, SESHADRI S, SHEOPURI A and IYER A (2007) Indian auto-component supply chain at the crossroads. *Interfaces* **37(4),** 310–323.

BARON RM and KINNEY DA (1986) The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology* **51,** 1173–1182.

BENSAOU M and ANDERSON E (1999) Buyer-supplier relations in industrial markets: when do buyers risk making idiosyncratic investments? *Organizational Science* **10(4),** 460–481.

BENTLER PB and BONETT DG (1980) Significance tests and goodness-of-fit in the analysis of covariance structures. *Psychological Bulletin* **88(3),** 588–606.

BRAUNSCHEIDEL MJ and SURESH NC (2009) The organizational antecedents of a firm's supply chain agility for risk mitigation and response. *Journal of Operations Management* **27,** 119–140.

BROWNE MW and CUDECK R (1992) Alternative ways of assessing model fit. *Sociological Methods and Research* **21,** 230–258.

BUHMAN C, SUNDER K and SINGHAL J (2005) Interdisciplinary and interorganizational research: establishing the science of enterprise networks. *Production and Operations Management* **14(4),** 493–513.

CAI S, JUN M and YANG Z (2006) The impact of interorganizational internet communication on purchasing performance: a study of Chinese manufacturing firms. *The Journal of Supply Chain Management* **42(3),** 16–29.

CHAE B, YEN HR and SHEU C (2005) Information technology and supply chain collaboration: moderating effects of existing relationships between partners. *IEEE Transactions on Engineering Management* **53(4),** 440–448.

COHEN WM and LEVINTHAL DA (1990) Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly* **35(1),** 128–152.

COUSINS PD, HANDFIELD RB, LAWSON B and PETERSEN KJ (2006) Creating supply chain relational capital: the impact of formal and informal socialization processes. *Journal of Operations Management* **24,** 851–863.

DANIEL EM and WHITE A (2005) The future of inter-organisational system linkages: findings of an international Delphi study. *European Journal of Information Systems* **14,** 188–203.

EASTERBY-SMITH M, GRACA M, ANTONACOPOULOU E and FERDINAND J (2008) Absorptive capacity: a process perspective. *Management Learning* **39(5),** 483–501.

EBERLEIN M (2008) Culture as a critical success factor for successful global project management in multi-national IT service projects. *Journal of Information Technology Management* **19(3),** 27–42.

FORNELL C and LARKER D (1981) Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research* **18(1),** 39–50.

GEYSKENS I, STEENKAMP JBEM, SCHEER LK and KUMAR N (1996) The effects of trust and interdependence on relationship commitment: a trans-Atlantic study. *International Journal of Research in Marketing* **13,** 303–317.

GOH M, LIM JYS and MENG F (2007) A stochastic model for risk management in global supply chain networks. *European Journal of Operations Research* **182,** 164–173.

HAIR JF, BLACK WC, BABIN BJ, ANDERSON RE and TATHAM RL (2006) *Multivariate Data Analysis*, 6th edn, Pearson Prentic Hall, New Jersey.

HANDLEY SM and BENTON WC Jr (2009) Unlocking the business outsourcing process model. *Journal of Operations Management* **27(5),** 334–361.

HART PJ and SAUNDERS CS (1998) Emerging electronic partnerships: antecedents and dimensions of EDI use from the supplier's perspective. *Journal of Management Information Systems* **14(4),** 87–111.

HUNT SD (1997) Competing through relationships: grounding relationship marketing in resource-advantage theory. *Journal of Marketing Management* **13,** 431–445.

HUNT SD and DAVIS DF (2008) Grounding supply chain management in resource-advantage theory. *Journal of Supply Chain Management* **44(1),** 10–21.

IACOVOU CL, BENBASAT I and DEXTER AS (1995) Electronic data interchange and small organizations: adoption and impact of technology. *MIS Quarterly* **19(4),** 465–485.

KHAZANCHI D and SUTTON SG (2001) Business to business electronic commerce assurance services: a framework and implications. *Journal of the Association of Information Systems* **1(1),** Available at URL: http://jais.isworld.org/contents.asp.

KLEIN R, RAI A and STRAUB DW (2007) Competitive and cooperative positioning in supply chain logistics relationships. *Decision Sciences* **38(4),** 611–646.

KUMAR K and VAN DISSEL HG (1996) Sustainable collaboration: managing conflict and cooperation in interorganizational systems. *MIS Quarterly* **20(3),** 279–300.

LANE PJ and KOKA BR (2006) The reification of absorptive capacity: a critical review and rejuvenation of the construct. *Academy of Management Journal* **31(4),** 833–863.

LEE SC, PAK BY and LEE HG (2003) Business value of B2B electronic commerce: the critical role of inter-firm collaboration. *Electronic Commerce Research and Applications* **2(4),** 350–361.

LIN C, HUANG Y and BURN J (2007) Realising B2B e-commerce benefits: the link with IT maturity, evaluation practices, and B2BEC adoption readiness. *European Journal of Information Systems* **16,** 806–819.

MAJCHRZAK A, RICE RE, MALHOTRA A, KING N and BA S. (2000) Technology adaptation: the case of computer supported inter-organizational virtual team. *MIS Quarterly* **24(4),** 569–600.

MALHOTRA A, GOSAIN S and ELSAWY OA (2005) Absorptive capacity configurations in supply chains: gearing for partner-enabled market knowledge creation. *MIS Quarterly* **29(1),** 145–187.

MALHOTRA A, MAJCHRZAK A, CARMAN R and LOTT V. (2001) Radical innovation without collocation: a case study on Boeing-Rocketdyne. *MIS Quarterly* **25(2),** 229–249.

MCEVILY B and MARCUS A (2005) Embedded ties and the acquisition of competitive capabilities. *Strategic Management Journal* **26,** 1033–1055.

MILLER P, KURUNMAKI L and O'LEARY T (2008) Accounting, hybrids and the management of risk. *Accounting Organizations and Society* **33,** 942–967.

NICOLAOU AI and MCKNIGHT DH (2006) Perceived information quality in data exchanges: effects on risk, trust, and intention to use. *Information Systems Research* **17(4),** 332–351.

NUNNALY JC and BERNSTEIN IH (1994) *Psychometric Theory*, 3rd edn, McGraw-Hill, New York.

OVERBY E, BHARADWAJ A and SAMBAMURTHY V (2006) Enterprise agility and the enabling role of information technology. *European Journal of Information Systems* **15,** 120–131.

PARK JH, LEE JK and YOO JS (2005) A framework for designing the balanced supply chain scorecard. *European Journal of Information Systems* **14,** 335–346.

POWER M. (2007) *Organized Uncertainty*. Oxford University Press, Inc., New York.

PRATER E and GHOSH S (2006) A comparative model of firm size and the global operational dynamics of U.S. firms in Europe. *Journal of Operations Management* **24,** 511–529.

RONEN S and SHENKAR O (1985) Clustering countries on attitudinal dimensions: a review and synthesis. *Academy of Management Review* **10(3),** 435–454.

SÖLLNER A (1999) Asymmetrical commitment in business relationships. *Journal of Business Research* **46,** 219–233.

SUTTON SG, KHAZANCHI D, HAMPTON C and ARNOLD V (2008) Risk analysis in extended enterprise environments: identification of critical risk factors in B2B e-commerce relationships. *Journal of the Association for Information Systems* **9(3/4),** 151–174.

ZAHRA SA and GEORGE G. (2002) Absorptive capacity: a review, reconceptualization, and extension. *Academy of Management Review* **27(2),** 185–203.