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Research Article

Trust Across Borders: Buyer-Supplier Trust in Global Business-to-Business E-Commerce

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Abstract

This study focuses on trust formation and development in global buyer-supplier relationships. Trust affects all business relationships, especially global business-to-business (B2B) transactions due to the distances between buyers and suppliers. We use information signaling theory to examine how information indices and signals affect buyers' trust in suppliers in global B2B commerce. Specifically, we examine how buyers' trust is affected by (1) their perceptions of the national integrity and legal structure of suppliers' country, and (2) third-party verifications of suppliers on B2B exchanges. Because buyer-supplier relationships usually evolve over time, we study how the effects of indices and signals change as the number of transactions between the partners increases. A survey of global organizational buyers finds that perceptions of national integrity, legal structure, and supplier verifications are all positively related to buyers' trust. However, the number of prior transactions between buyers and suppliers moderates the impact of perceived legal structure on buyers' trust.

Keywords: *Trust, Online Exchange, E-Commerce, Buyer-Supplier Relationship, Globalization, Supplier Verification, Legal Structure, National Integrity, Information Signaling.*

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1. Introduction

This paper examines trust formation and development in e-commerce transactions between buyers and suppliers from different countries. In existing research on trust in transactional exchanges, trading partners are generally based in the same country. Yet globalization is changing who and where the trading partners are. The world is "flattening" (Friedman, 2005) as technology drives and facilitates the globalizing of culture and markets. Globalization involves more than reducing technical barriers and transaction costs; it also requires human interaction across cultures and national practices. Even with enabling technology and lower transaction costs, global trade still requires two or more people or firms to interact to develop a cooperative venture across borders. We look at a prototypic example of globalization facilitated by information technology – business-to-business (B2B) e-commerce – where buyers and suppliers across the globe exchange goods and services using information systems, such as online exchanges. These exchanges aggregate, make, and facilitate markets (Bakos, 1998; Dai & Kauffman, 2002), and help firms bypass traditional distribution channels and extend their reach globally (Senn, 2000). We study how the perceived country and firm characteristics of trading partners influence trust formation and development on online exchanges.

Buyers' trust in suppliers is critical in all commerce, but particularly e-commerce, due to more pronounced information asymmetry, where buyers have incomplete information about suppliers. Under these conditions, buyers risk selecting incompetent or opportunistic suppliers. This risk impedes transactions between buyers and suppliers. (The risk is not one-sided because suppliers also face problems such as non-payments by buyers.) In such situations, trust is "an important lubricant" for economic exchanges to take place (Arrow, 1974, p. 23). The separation in time and space between buyers and suppliers in cross-border e-commerce raises the risks associated with information asymmetry and, consequently, increases the value of trust.

One way to increase buyers' trust when there is information asymmetry is to close the information gap. In markets suffering from information asymmetries, buyers can gather information about suppliers (Eisenhardt, 1989), and suppliers could reassure potential buyers of their abilities and intentions by providing credible information to reduce the asymmetries (Nayyar, 1990). There are two types of information suppliers can provide: indices and signals (Spence, 1973). Indices are supplier attributes that are inherently fixed or difficult to alter (e.g., the suppliers' country of origin). In contrast, signals are characteristics that suppliers can more easily invest in or acquire (e.g., web-seals that the suppliers can buy). The aphorism "talk is cheap" captures the idea that signals must go beyond the supplier saying "You can trust me" to be credible; effective signals must create a separating equilibrium (Boulding & Kirmani, 1993) where it is costly for untrustworthy suppliers to acquire the signals. Collectively, indices and signals influence buyers' trust in suppliers only if they are costly to change (indices) or acquire (signals).

Using Spence's (1973) distinction, we examine how information indices and signals influence e-commerce buyers' trust in suppliers. First, how do suppliers' country characteristics influence buyers' trust? Individual suppliers cannot easily change their country's reputation, which is based on public opinion and the behavior of many other suppliers. While a supplier could disguise its country of origin or relocate to another country, such moves are costly, challenging, and potentially disruptive to its business operations or existing industry ties, especially for small and medium-sized enterprises. Hence, we consider suppliers' country of origin as an information index. In particular, we focus on the extent to which buyers' trust is affected by their perceptions of the national integrity and legal structure of the suppliers' country.

Second, how do signals acquired by suppliers affect buyers' trust, particularly in B2B exchanges? Many exchanges provide tools such as feedback mechanisms to help trading partners evaluate each other's trustworthiness (Ba & Pavlou, 2002; Bolton, Katok, & Ockenfels, 2004; Pavlou, 2002; Pavlou & Gefen, 2004). Some B2B exchanges also offer verification or web-seal services that suppliers can use to verify information that they provide. These services help to assure buyers that the information about verified suppliers' is authentic. Do such services increase buyers' trust? Previous studies that

examine how web-seals affect buyers' trust h inconclusive results. In this study, we propose conditions for web-seals to be effective trust-building mechanisms.

Third, when do country attributes and web seals have more or less influence on buyer trust? Specifically, could the effectiveness of perceived country attributes and supplier verification be moderated by past transactions between buyers and suppliers? Examining this question complements previous research that looks at initial trust formation in e-commerce (e.g., Lim, Sia, Lee, & Benbasat, 2006; McKnight, Choudhury, & Kacmar, 2002b; Stewart, 2003). Surprisingly, we show that buyers' own experiences with suppliers do not necessarily diminish the value of trust-enhancing indices and signals.

This study makes three contributions to trust research. First, by examining how both information indices and signals serve as antecedents of trust, this study provides a more complete and comprehensive understanding of the role that signaling theory plays in trust development than past research does. Spence's (1973) theory is about information indices as much as it is about information signals. However, existing trust research that applyies signaling theory focuses only on information signals, such as sellers' reputation (e.g., Pavlou & Dimoka, 2006) or competitors' prices (e.g., Trifts & Häubl, 2003). In contrast, information indices as antecedents of trust have received little attention.

Second, we investigate antecedents of trust that are salient in cross-border, global B2B e-commerce contexts. This focus contrasts with most existing research that focuses on localized e-commerce where buyers and sellers are in the same country (e.g., Balasubramanian, Konana, & Menon, 2003; Gefen, Karahanna, & Straub, 2003; Lim et al., 2006; McKnight et al., 2002b; Pavlou & Dimoka, 2006; Stewart, 2003; Sun, 2010). Localized and globalized transactions have different implications for the formation and impact of trust. In localized e-commerce, trading partners in the same country share common knowledge about cultural and legal structures, ways to enforce contracts, and access to legal recourse if transactions fail. Moreover, trading partners can more easily gather information about each other's competencies and reputation. Such conditions, which facilitate trust formation, are more rare in globalized e-commerce, which makes it more difficult to establish trust in this context. Furthermore, buyers' trust in suppliers during cross-border transactions may be influenced by factors that are otherwise not salient in localized e-commerce contexts. Our focus on such transactions fills an important gap in our knowledge of online trust.

Finally, we examine the moderating role of past transactions on buyer-supplier trust. When assessing suppliers' trustworthiness in the early stages, buyers draw inferences from various sources, including the characteristics of the suppliers' country. Repeated transactions help buyers to accumulate knowledge about their suppliers, and may reduce the influence of country characteristics on buyers' trust. We find that past transactions do mitigate some, but not all, impacts of country characteristics on buyers' trust. This suggests that although suppliers can build up trust through repeated transactions, factors that are outside their direct control also affect buyers' trust in them. This finding has important implications for firms and policy makers.

2. Trust

We define buyers' trust in a supplier as the buyers' willingness "to accept vulnerability based upon positive expectations of the intention or behavior of" the supplier (Rousseau, Sitkin, Burt, & Camerer, 1998, p. 295). Mayer, Davis, and Schoorman (1995) identify three components of trustworthiness: ability, benevolence, and integrity. Ability is the supplier's skills and competencies in meeting the buyer's needs. Ability is thus context-dependent. In the case of B2B transactions, the buyer would focus on the supplier's ability to satisfy their purchase requirements such as quality, timeliness, and cost. Benevolence is the overall goodwill of the supplier towards the buyer. A benevolent supplier would not behave opportunistically (in Williamson's (1975) sense of opportunism) towards the buyer for their own benefit. Rather, the supplier is concerned for the buyer's well-being. Integrity is the supplier's adherence to principles (e.g., being honest and fair) that are acceptable to the buyer. The supplier's integrity is judged by the consistency in their behaviors, the credibility of their communication, and their commitment to justice and fairness (Mayer et al., 1995).

We focus on interorganizational trust in this study. This trust can emerge from prior history and expectations of continued relations between the buyers and suppliers (Poppo, Zhou, & Ryu, 2008). Past interactions provide opportunities for partners to build knowledge about each other (Koehn, 2003; Ratnasingam, 2005) and affect their satisfaction and trust in each other (Kwon & Suh, 2004; Selnes, 1998). Expecting continuity in a relationship improves buyer-supplier trust by extending the time horizon for mutual benefits and discouraging opportunistic short-term gains (Aulakh, Kotabe, & Sahay, 1996; Poppo et al., 2008).

Interorganizational trust affects the organization and coordination of economic activities (McEvily, Perrone, & Zaheer, 2003). It affects transaction costs (Chiles & McMackin, 1996), governance choice, exchange performance (Gulati & Nickerson, 2008), information sharing (Dyer & Chu, 2003), and negotiation and conflict (Zaheer, McEvily, & Perrone, 1998) between the buyer and supplier. Interorganizational trust also has positive transactional effects. Buyers' trust in suppliers is positively related to the buyers' anticipated future interaction with the suppliers (Doney & Cannon, 1997; Pavlou, 2002) and increases their commitment to and cooperation with their suppliers (Morgan & Hunt, 1994). Buyers also allocate a higher share of their business to suppliers whom they trust (Doney, Barry, & Abratt, 2007).

3. Antecedents of Buyers' Trust

In most interorganizational transactions, buyers are concerned with micro, supplier-level characteristics, such as the level of specific investments made by suppliers (Heide & John, 1990) or the suppliers' customer orientation (Doney et al., 2007). However, in international sourcing, buyers are also concerned with macro, country-level characteristics, such as the political environment, business practices, and regulations in the supplier's country (Birou & Fawcett, 1993; Min, 1994; Min & Galle, 1993). Therefore, it is important to examine both micro (supplier-level) and macro (country-level) factors in global B2B commerce.

Signaling theory (Spence, 1973) provides a framework to holistically examine how both micro and macro factors affect buyers' trust in suppliers. Information signals encompass micro, supplier-level factors (since suppliers can manipulate their individual characteristics), whereas information indices encompass macro, country-level factors (since individual suppliers cannot change these factors at their own discretion).

3.1. Information Indices: Perceived National Integrity and Legal Structure

Information indices are observable, fixed, relatively unalterable attributes of an individual, such as race or nationality (Spence, 1973). Earlier research has shown how foreign partners' nationality – and the corresponding value systems, cultural traits, and institutions – affects others' prior expectations about their behaviors (Ariño, de la Torre, & Ring, 2001). Country of origin influences evaluations of products, people, and firms (Bilkey & Nes, 1982; Madon et al., 2001; Zaheer & Zaheer, 2006), and firms from countries that are viewed as untrustworthy may be perceived as untrustworthy (Zaheer & Zaheer, 2006).

Given the forces of globalization and proliferation of online B2B exchanges, buyers are increasingly exposed to prospective suppliers from different countries with different business practices and orientations (e.g., Ariño et al., 2001; Hofstede, 1980; Xiao & Tsui, 2007). In the context of global B2B e-commerce, two indices that are associated with suppliers' country of origin may be especially important: national integrity and legal structure. National integrity is the extent to which typical actors in a particular country are presumed to adhere to some set(s) of moral or ethical principles in their actions (e.g., fairness and honesty towards others). Legal structure broadly refers to the rules and regulations in a country that govern relationships between entities (e.g., individuals, firms, organizations). These indices respectively relate to the social and formal conditions in partners' countries, which are important considerations in cross-border relationships such as international joint ventures (e.g., Holton, 1989; Luo, 2007) and trade (Birou & Fawcett, 1993). Because individual suppliers cannot easily alter societal norms or modify business regulations on their own, national integrity and legal structure are informative and should affect buyers' beliefs about suppliers (Spence,

1973). Specifically, perceptions of social and formal norms in a supplier's country help to reduce the information asymmetry about the supplier's behaviors and shape a buyer's expectations about the supplier's trustworthiness (e.g., Bachmann, 2001; Bradach & Eccles, 1989; Zaheer & Zaheer, 2006)[1].

Our concepts of national integrity and legal structure have parallels with the notions of situational normality and structural assurance, respectively. These latter notions have often been used to explain online trust (e.g., Chau, Hu, Lee, & Au, 2007; Gefen et al., 2003; McKnight, Choudhury, & Kacmar, 2002a, 2002b, 2004; Ou & Sia, 2010). Situational normality is the belief that the Internet environment is in proper order and success in online transaction is likely because the situation is normal or favorable. For example, buyers have higher trust in a retailing website when the nature of interaction with the website is typical of other similar websites (Gefen et al., 2003; Ou & Sia, 2010). Structural assurance refers to the belief that "structures like guarantees, regulations, promises, legal recourse, or other procedures are in place to promote success" in e-commerce transactions (McKnight et al., 2002a, p. 339). An online store with sufficient encryption and security capabilities, for instance, is perceived to provide a secured transaction environment, which improves consumers' trust and purchase intention (Chau et al., 2007; Ou & Sia, 2010). However, there is a key distinction between situational normality and structural assurance on one hand and national integrity and legal structure on the other. Situational normality and structural assurance pertain more to the channels in which the online transaction occurs, whereas national integrity and legal structure concern the environment the trading partners are in. Consider a buyer who finds suppliers from different countries on an online exchange. The buyer's situational normality and structural assurance beliefs about the exchange do not vary by suppliers – their perception about whether the exchange is a favorable and safe channel is the same for all suppliers. However, the buyer's perceptions of national integrity and legal structure in different countries are likely to vary and affect the buyer's relationships with suppliers at the dyadic level on the exchange. This is the aspect of situational perceptions that we look at in this study. Because the context of most research in online trust is localized e-commerce (where buyers and sellers are from the same country), the relationship between buyers' trust and their perceptions of foreign suppliers' country has received little attention. Yet given how e-commerce facilitates international trade in today's economy, understanding this relationship is important.

3.1.1. Perceived National Integrity

Most studies of integrity concentrate on how individual actors' integrity affects the trust others place in them. Trust in trading partners can also be related to the perceived level of integrity in the society (i.e., national integrity) to which they belong (Fukuyama, 1995; Mackie, 2001). As noted above, perception of national integrity relates to perceived social norms in suppliers' country. When buyers perceive that norms in a supplier's country encourage positive behaviors such as cooperation or honesty, they expect the supplier to adhere to these norms. Furthermore, societal norms can act as a powerful form of social capital that inhibits deviant actions (Coleman, 1988; Doney, Cannon, & Mullen, 1998). The higher the national integrity of a country, the less likely any particular supplier will be to commit deviant actions that would sully its reputation. Conversely, in a country with lower level of national integrity, deviant behaviors may be more accepted or tolerated.

Thus, perceived national integrity in a supplier's country provides information about expected supplier behavior, and shapes a buyer's beliefs about the moral character of typical suppliers in that country. These expectations and beliefs, in turn, affect the buyer's cognition-based trust in a supplier's reliability and dependability (McAllister, 1995). Suppliers in countries with higher perceived national integrity may be seen to be more likely to adhere to moral or ethical norms and show individual integrity. The country's norms also deter deviant supplier behavior. Therefore, buyers are likely to trust suppliers in countries with higher national integrity.

[1] There are other considerations influencing cross-border relationships, such as exchange rate fluctuations, and logistics support for longer supply lines (Birou & Fawcett, 1993). While these factors affect buyers' choice of suppliers, they are not relevant to buyer-supplier trust. Buyer can hedge exchange rate risk in futures markets, and use insurance markets and global logistic companies to help handle international logistics. Presently, we do not have sufficient theoretical rationale to explore whether and how these factors affect suppliers' competency, benevolence, and/or integrity, or buyer-supplier trust at dyadic levels. Hence, we focus on buyers' perceptions of national integrity and legal structure in suppliers' country in this study.

H1: *The perceived level of national integrity in the supplier's country is positively related to the buyer's trust in the supplier.*

3.1.2. Perceived Legal Structure

Trust in transactional relationships also depends on stable legal, political, and social institutions (Lane & Bachmann, 1996). As an economy moves from local to national markets, transactions span longer social and geographical distances, which requires institutional, formal trust (Zucker, 1986). Extending this line of argument, we expect institution-based trust to play a significant role when transactions take place in international markets.

The legal structure of a supplier's country provides information about the formal norms in the suppliers' country, and shapes buyers' expectations of suppliers' behaviors in two ways. First, institutional rules and regulations in a country affect various facets of business operations and the types of firms that can operate. For example, when a country has formalized licensing policies that govern businesses formation and operation, opportunities for those that do not meet the requirements to operate are reduced. A buyer may thus expect suppliers from countries with effective business laws and regulations to be more competent. This is consistent with Zucker's finding that the "emergence of licensing standards … increased the certainty of performance characteristics" (1986, p. 94). Licensing provides the buyer some assurance of a licensee's ability to fulfill their purchase requirements.

Second, a country's legal structure affects the extent to which contracts are enforceable, which provides effective legal recourse when disputes arise. Contract laws are broad societal guarantees needed by buyers and suppliers. The availability and effectiveness of these formal mechanisms are important to foreign buyers since trade disputes are more likely to occur given the greater separation in time and space of cross-boundary transactions. Furthermore, more market-oriented societies with more non-familial/tribal transactions have developed institutions to punish those who are not fair and trustworthy (Henrich et al., 2010). Suppliers may be deterred from behaving opportunistically or dishonestly when such legal mechanisms are in place and enforced. A supplier that operates in such an environment could be expected to be more benevolent and ethical.

Therefore, perceptions about legal structure affect expectations about the types of market participants that one is likely to encounter. A buyer may expect a supplier from a country with strong legal structure to be more trustworthy. With stronger legal structures, "undesirable entities" (i.e., those with low ability, integrity, and/or benevolence) are also expected to self-select out from participating in the market given their inability to meet legal requirements or concern for legal penalties for misbehavior.

H2: *The perceived level of legal structure in the supplier's country is positively related to the buyer's trust in the supplier.*

3.2. Information Signals: Supplier Verifications and Web Seals

Signals are information that a supplier can send to better communicate their ability, benevolence, or integrity to the buyer. For such signals to be credible, the cost of signaling must be negatively correlated with the capability being signaled (Spence, 1973). Consider, for example, the provision of product warranties by suppliers. For warranties to effectively signal supplier quality, the costs of providing warranties must be high for low-quality suppliers, and low for high-quality suppliers.

Effective signals create what is known as a separating equilibrium, where high-quality and low-quality suppliers have incentives to choose different signals (Boulding & Kirmani, 1993). Buyers can use effective signals to distinguish between high-quality and low-quality suppliers. Ineffective signals create a pooling equilibrium, in which high-quality and low-quality suppliers share incentives to invest in the same signals. Buyers are then unable to differentiate the suppliers using those signals.

In global B2B e-commerce, many exchanges offer services, such as third-party verifications of suppliers and web seals, as trust-building signals. These signals can play important roles in buyer-supplier trust. B2B exchanges typically maintain low entry costs for suppliers to increase their pool of

suppliers and raise the liquidity and activity levels among the exchanges' users. The costs for suppliers to join an exchange can range from nothing (free membership) to between US$300 and US$7,500 per annum (paid memberships). Table 1 shows the annual paid membership fees (in addition to free membership options) in three B2B exchanges (as of November 2008). These membership fees are relatively low compared to suppliers' annual sales volumes or the values of typical B2B orders. The ease and affordability of exchange memberships make it easier and attractive for a supplier to (1) engage in identity theft/misrepresentation, where it intentionally and wrongfully submits information of a legally existing supplier, or (2) act as a phantom supplier by creating an account for a nonexistent company. Buyers purchasing from such suppliers face the risks of non-performance and usually have limited legal recourse. It is difficult to locate or take legal actionsagainst a nonexistent company in a foreign country. Moreover, due to the distance between trading partners in global B2B exchanges, buyers have difficulties verifying suppliers' identities, which affects their trust in these suppliers.

Table 1. Annual Paid Memberships in Three B2B Exchanges

B2B Exchange	Annual Membership Fee (US$)
Alibaba.com (www.alibaba.com)	$600 for TrustPass; $7,300 for Gold Supplier
EC Plaza (www.ecplaza.com)	$420
Gsm Exchange (www.gsmexchange.com)	$380

Therefore, buyers must rely on B2B exchanges to verify the suppliers' identities. For a fee, a supplier can initiate a third-party verification check through a B2B exchange. This verification check is often out-sourced to independent companies, which verify that particular supplier on the exchange is a registered company. In addition, these services also verify information posted by the supplier in the exchange by inspecting the supplier's production capabilities, premises, and factories. Such verifications signal the legality of the supplier and the authenticity of the information about them in the exchange. A supplier who passes the verification check usually receives a web seal on their company's profile page in the B2B exchange, which indicates that the information has been verified. Typically, the web seal is valid for one year, after which the supplier needs to be re-verified.

The mere presence of web seals, though, may not lead to higher trust. Some studies show that Better Business Bureau Online seals reduce the risk perceived by consumers (Grazioli & Javenpaa, 2000), while other studies find that seals of approval, privacy seals, and industry seals do not significantly affect customer trust (Fisher & Chu, 2009; Houston & Taylor, 1999; McKnight et al., 2004; Ou & Sia, 2010; Pennington, Wilcox, & Grover, 2003). The mixed results from these studies raise an important question about when web seals serve as effective trust-enhancing signals. We believe there are two essential conditions for web seals to improve buyer-supplier trust.

3.2.1. Condition 1

Does a particular web seal create the necessary separating equilibrium for it to be a credible signal? When the costs to obtain verification web seals are substantial, they provide credible signals. Even though the fees to initiate verification checks may be relatively low, the costs associated with having the documentation and capabilities to meet the verification requirements are often high. For instance, to pass the verification checks, suppliers must register their business and subject it to regulations, demonstrate that they have the production capacity, and/or show the certifications they claim (e.g., ISO 9001). Those who cannot incur these costs would either fail the verification checks or avoid undertaking them. Moreover, third-party companies that provide verification services have a continuing reputational stake in the verifications being accurate and untainted. This stake in their reputation is of greater value than acting opportunistically to help any particular supplier. As such, independent verifications are conducted with care. Thus, third-party verifications serve as implicit guarantees (Parkhe, 1998) and contribute to the formation of firm-specific trust (Zucker, 1986), just as outside auditors do in the context of managing the principal-agent problem in management settings (Antle, 1982, 1984; DeFond, Raghunandan, & Subramanyam, 2002).

3.2.2. Condition 2

The presence of a separating equilibrium, however, may be a necessary but insufficient condition for a web seal to be an effective signal. For the web seal to engender trust, buyers must care about the characteristics that are being qualified and signaled. McKnight et al. (2004) suggests that a possible reason why TRUSTe, a privacy web seal, did not improve consumer trust in their study was that the respondents did not consider privacy to be an important web problem. As we point out earlier, the authenticity of counterparties' identities and claims are essential in B2B relationships. Heide and John (1990) found that increased verification efforts by OEM buyers increased their joint action with the supplier (e.g., in the areas of component testing, planning, and forecasting). Similarly, Gefen (2004) found that quality certifications increased client trust in ERP software vendors. Because third-party supplier verification creates a separating equilibrium (see Condition 1 above) and is important to potential buyers in B2B commerce, we posit that:

H3: *Supplier verification is positively related to the buyer's trust in the supplier.*

3.3. Effects of Indices and Signals on Trust over Repeated Interactions

Previous research has examined how initial trust formation is affected by institutional mechanisms (e.g., McKnight, Cummings, & Chervany, 1998; Stewart, 2003; Zucker, 1986) or the specific use of web-seals (e.g., McKnight et al., 2004; Pennington et al., 2003). However, do factors that influence trust early in a buyer-supplier relationship have the same effect later in the relationship? Do the effects of trust indices and signals change as buyer-supplier relationships develop? These are important questions because buyer-supplier relationships can and do evolve over time.

When there are no transactions between the buyer and supplier, categorization processes such as stereotyping should affect the levels of trust between them (McKnight et al., 1998). At this initial stage of their relationship, buyers may expect a supplier to perform or behave like typical suppliers in that country. These expectations are shaped by their perceptions of national integrity and legal structure. Thus, when a buyer is unfamiliar with a supplier, information indices influence the buyer's trust in the supplier.

However, while information indices provide some indications of the typical suppliers' quality, the buyer gains knowledge about the specific supplier through first-hand, repeated interactions (Koehn, 2003; Ratnasingam, 2005). Cooperative history between partners in international alliances affects their trust in each other (Parkhe, 1998). With repeated transactions, buyers should rely less on their perceptions of the supplier's country (i.e. information indices) in evaluating the supplier's trustworthiness. Instead, they should base their evaluation on past performance of the supplier (Ariño et al., 2001; Lane, 1998; Zucker, 1986). Thus, we hypothesize that the influence of information indices on buyer's trust decays with more transactions between the buyer and supplier.

H4a: *The effects of the perceived level of national integrity in the supplier's country on the buyer's trust should decline as the number of transactions increases.*

H4b: *The effects of the perceived level of legal structure in the supplier's country on the buyer's trust should decline as the number of transactions increases.*

Do information signals in the form of supplier verifications and web-seals also become less influential with more transactions? Given the different levels of firm-specific information that indices and signals provide, we believe that there are structural differences in how these informational sources affect the development of interorganizational trust. Indices are generic and provide little firm-specific information. When only information about a supplier's location is available, a buyer would treat the supplier as typical of firms with similar attributes in that location (Spence, 1973). Direct experiences with the supplier, however, allow the buyer to move from an average impression of the supplier's quality to a more precise assessment. Relative to indices, signals provide more firm-specific information. Furthermore, because signals are in the firm's control, the absence of a signal in itself is also a signal, albeit a potentially counter-productive one. For instance, companies tend to purchase only from suppliers who are verified or qualified in order to maintain corporate governance and

manage liability risks. In our case, the legality of the supplier and authenticity of their claims (ascertained through third-party verifications) are important criteria for the buyer regardless of the length and strength of the buyer-supplier relationship. The buyer may interpret that something is amiss when a long-term supplier is no longer verified – for example, they may wonder whether the supplier's license has been revoked or whether the supplier's production capacity has changed. Trading with this supplier would increase the buyer's exposure to risk[2]. This response is similar to market reactions when experienced professionals (e.g., lawyers or doctors) and established institutions (e.g., schools) lose their licenses or accreditations.

Therefore, unlike country-level indices, we do not expect repeat transactions between buyers and suppliers to moderate the influence of supplier-specific signals on buyers' trust. These signals provide critical information about individual suppliers, and should remain relevant and important even when the buyer has first-hand, direct experiences with the suppliers.

4. Method

4.1. Overview

We conducted an online survey of buyers on a global B2B exchange in September 2008. This exchange, started in the late 1990s, is operated by a publicly listed firm in Asia. By 2010, it had more than three million international users in its member base. The exchange handles products in multiple industries, including agriculture, electronics, and textiles. Buyers and suppliers can search for and post products, request quotes for price and terms, and contact one another through the exchange. The exchange offers various services for suppliers, such as premium membership (US$4,500 per annum) and third-party verification services (US$1,400 per annum)[3]. It also provides services such as banner advertising and reports on individual verified suppliers.

To develop the survey instrument, we first pre-tested using four organizational buyers from three countries. We obtained feedback about the structure, questions, and cognitive load of the survey from these buyers and refined the instrument. Next, we conducted four rounds of pretests that involved 600 randomly selected active buyers in the B2B exchange. Active buyers are those who had posted at least one buying request in the exchange and had logged in at least once within the three months before the survey. Since communication on the exchange (and in international trade) is primarily in English, we did not translate the instrument into various languages.

Two weeks after the final round of pretesting, the B2B exchange randomly selected and invited 5,250 active buyers (excluding those in the pretests) to take part in the actual survey. We gave respondents two weeks to complete the survey. The B2B exchange sent a first reminder email one week after the initial invitation, and a second reminder email two days before the survey ended. To assure the buyers of their confidentiality and anonymity, we informed them that their responses would be sent directly to the research team, and that the exchange would only receive aggregated results and not individual responses. In addition, we collected no identifying information during the survey. To further encourage participation, respondents who completed the survey received a US$20 credit to purchase reports from the exchange.

Our survey used a within-subject design. We asked the buyers to list company names or initials of two suppliers whom they would consider for an imminent corporate purchase[4]. At least one of the

[2] On February 21, 2011, Alibaba.com announced that about 1% of its verified suppliers engaged in fraud against its buyers. These fraudulent suppliers evaded the third-party verification process with the help of some Alibaba.com employees. Following the announcement, Alibaba.com's market capitalization dropped by almost US$1b, and its CEO and COO were replaced (although Alibaba.com's internal investigation confirmed that these executives were not involved in the incident). This incident shows that the market places a high value on verified suppliers.

[3] These rates are correct as of November 2008.

[4] Traditionally, respondents are asked to identify purchase decisions that they have been involved in (e.g., Doney & Canon, 1997). In such cases, it is possible that the measured post-transaction trust could differ from the unobserved pre-transaction trust. For instance, a buyer may have a high level of trust in a particular supplier before a transaction. However, due to a below expectation performance by the supplier, the buyer's trust in this supplier may be lowered after the transaction. To overcome such issues, we

suppliers needed to be a participant in the exchange so that we could examine the influence of third-party verifications. Buyers not making such a purchase could exit the survey and still receive a US$20 credit from the exchange. Buyers whose purchase decisions met these criteria provided information on each supplier's verification status (conditional on the supplier being listed in the exchange)[5], evaluated each supplier's performance in past transactions (if any), and rated their trust in each supplier. Finally, we asked the buyers for their perceptions of the national integrity and legal structure in each supplier's country.

Two hundred and eighty-seven buyers completed the survey, which provided information about 574 suppliers (two suppliers per respondent). The effective response rate is difficult to determine as not all the 5,250 buyers sampled were making an imminent purchase on the exchange during the survey period. The exchange found 19.95 percent of active buyers sent at least one enquiry to suppliers in a two-week period. Using this type of query as a proxy for whether a buyer was making an imminent purchase, the relevant sample size for this study is 1,048 buyers (5,250 x .1995) and the effective response rate is 27.39 percent.

Appendix A shows the characteristics of our buyers, which includes their location and product category of their imminent purchases. The average buyer in our dataset had three to five years of B2B e-commerce experience. On average, the buyer's company had between 10 and 19 employees and sales between US$500,000 and US$999,000 in the previous financial year. The buyer had on average purchased from between one and four other suppliers that are from the referent supplier's country. The median estimated transaction value of the imminent purchase was US$30,000. The B2B exchange reported that these respondents' characteristics and transaction values are representative of those in the exchange. Forty-six percent of buyer-supplier pairs in our sample had prior experiences with each other (see Table 2).

Table 2. Prior Transactions Between Buyers and Supplies

Number of past transactions	Percentage
No prior transaction	54%
Between 1 and 3 transactions	26%
Between 4 and 6 transactions	10%
Between 7 and 9 transactions	4%
Between 10 and 19 transactions	2%
20 transactions or more	4%

Note: Base on 574 pairs of buyer-supplier relationships in our sample.

Because the B2B exchange did not provide information about non-respondents, we could not compare respondents' attributes with those of non-respondents. Instead, to check for non-response bias, we compared buyers who responded before the final reminder with those who responded after. There were no significant differences between early and late respondents in company's sales, number of employees, purchase value, respondents' education, working experience, and B2B e-commerce experience. This suggests non-response bias is not a problem in our sample (Armstrong & Overton, 1977).

4.2. Measures

Appendix B presents the items that this study used. When appropriate, we specified the suppliers' company name or initials in the questions' stem by using information provided by the buyers. This clarified the questions to the buyers, especially since they had to evaluate two suppliers in the survey.

asked buyers to consider an imminent purchase that they were making. This approach allows us to better relate (pre-transaction) trust to purchase intention. Although there is a possibility that the buyers' trust in suppliers was biased (where more trustworthy suppliers were being considered for the transaction), we employed a within-subject research design to control for this potential bias (see Appendix G).

[5] As multiple suppliers could use the same company name, it was not feasible for the B2B exchange to provide information of the supplier's verification status. Therefore, we relied on buyers' input for this information.

4.2.1. Purchase Intention

Although this study focuses on antecedents of trust, we also measured outcomes of trust so that we could relate our findings to past research and estimate the expected value of information indices and signals. Because buyers evaluated their supplier before actual purchases, a relevant outcome of trust is the likelihood of purchasing from that supplier.

Because the B2B exchange did not track actual transactions, and because some buyers also evaluated suppliers that were not participating on the exchange, we could not use archived purchase data in our analysis. Additionally, because buyers spend different amounts of time making their purchase decisions, it would have been challenging to follow-up with them to get information about their actual purchases. Therefore, we asked buyers to estimate on a 5-point Likert scale the likelihood of making the imminent purchase with the particular supplier. Verbal statements of purchase intentions are excellent predictors of actual purchase behavior (Armitage & Conner, 2001; Sheppard, Hartwick, & Warshaw, 1988; Webb & Sheeran, 2006).

4.2.2. Buyer's Trust

We used nine items from Mayer and Davis (1999) to measure the buyer's trust in the supplier. Sample survey items include "Supplier X is well qualified" and "Supplier X would not knowingly do anything to hurt me". We changed one of the items to focus on the supplier's capabilities (instead of skills as per Mayer and Davis' (1999) measures) to make the question contextually relevant. We also asked about the extent to which the supplier can be trusted.

4.2.3. National Integrity

We used two 5-point Likert scale items to measure the buyer's perceptions of the national integrity in a particular supplier's country: the likelihood that suppliers in that country would behave with integrity and do the right things in business deals. These items are similar to those that Morgan and Hunt (1994) use in their study of dyadic retailer-supplier relationships; however, our items focused on the buyer's perception of all suppliers in the country instead on the individual focal suppliers. Appendix C shows the average perceived national integrity ratings for the 50 supplier countries in our sample.

4.2.4. Legal Structure

The measure of the buyer's perceptions of the legal structure in a supplier's country came from two sources. The first comprised three 5-point Likert scale items to measure the buyer's confidence in the legal systems in that country, and the perceived effectiveness of the laws and regulations in that country to govern the suppliers' operations and resolve business disputes, respectively.

The second source was the 2007 corruption perception index (CPI), administered by Transparency International. The CPI is a composite index that provides information about perceptions of corruption within countries. The index score ranges from 0 (high corruption) to 10 (low corruption). The 2007 CPI is based on 14 sources that originate from 12 institutions, such as the Asian Development Bank, the Economist Intelligence Unit, and the World Economic Forum. The average correlations between the sources are .77, which suggests high overall reliability of the CPI (Lambsdorff, 2007). Moreover, Herzfeld and Weiss (2003) found that a positive relationship between countries' CPI scores and the degree to which their citizens are willing to accept the established institutions to make and implement laws and adjudicate disputes. Hence, CPI is a relevant external measure of legal structure perception for this study.

Appendix C shows the average perceived legal structure ratings and CPI scores for the 50 supplier countries in our sample. These two measures correlate at .44 ($p < .01$), which supports the validity of our survey measure of legal structure perceptions.

4.2.5. Supplier Verification

We asked the buyer to indicate the supplier's verification status, provided that the supplier is listed in the exchange. The buyer indicated "not sure" if they could not recall this information about the supplier. The verification status indicator takes the value of 1 if the supplier was verified and 0 otherwise.

4.2.6. Past Transactions

We accounted for the buyer's experience with the supplier using the number of transactions between them over the last 12 months, as reported by the buyer.

4.2.7. Supplier's Performance

To control for supplier's performance, we asked the buyer to compare the referent supplier to other suppliers in terms of three performance criteria: price, product availability, and delivery (Doney & Cannon, 1997). We measured the responses for each on a 5-point Likert scale, ranging from performing much worse than other suppliers to performing much better than other suppliers. The neutral point on the scale was that the supplier's performance was equal to other suppliers'. The buyer indicated "not sure" if they were unable to ascertain the supplier's relative performance.

4.2.8. Supplier Membership

We dummy coded supplier memberships to control for different membership types. We categorized suppliers who were not on the B2B exchange as non-members. Among suppliers who were listed on the exchange, we categorized those with paid memberships as paid members. The buyer indicated "not sure" if they could not recall the supplier's membership type in the B2B exchange. We used suppliers on the exchange with free membership or whose membership types buyers could not recall as the reference group in our analyses.

4.2.9. Same Country

Because cultural or ethnic similarity may influence trust, we controlled for whether the buyer and supplier were from the same country using a dummy variable. Since the buyer indicated their and the supplier's countries during the survey, we matched their responses to code this dummy variable. The variable takes the value of 1 if the buyer and supplier were from the same country and 0 otherwise.

4.2.10. China Supplier

Seventy percent of the suppliers in our sample were based in China, which reflectis the current state of international trade where buyers actively source from China. We added a country dummy that takes the value of 1 if the supplier was from China and 0 otherwise.

5. Analyses and Results

Since our respondents were from different countries, we assessed whether we should pool their responses in our analyses. We conducted a Kruskal-Wallis test to assess differences among respondents between countries (Appendix D). The results show that it is reasonable to pool respondents across countries in our analyses. We also assessed the presence of common method variance in two ways (Appendix D). First, we conducted Harman's one-factor test. Second, in a stronger, more refined test that fits our research setting, we compared (1) the covariance of buyer's trust in and likelihood of purchasing from one supplier (i.e., within-supplier covariance), and (2) the covariance of buyer's trust in one supplier and likelihood of purchasing from the other supplier (i.e. between-supplier covariance). The results from both tests indicate that common method variance is not a problem in our data.

5.1. Structural Equation Modeling

We analyzed our data using structural equation modeling. Structural equation modeling (SEM) provides the flexibility to properly account for measurement error by having multiple indicators per latent variable. It also allows us to test the overall model and model the error terms. In addition, we can include a consequence of trust (i.e., purchase intention) in the structural model and estimate the expected values of trust indices and signal. We did this using the Mplus (version 5.21) software, which lets us model interaction using the latent moderated structural equations approach (Klein & Moosbrugger, 2000). This approach results in relatively smaller bias of structural parameter estimates and higher power to detect interaction effects than partial least square (Schermelleh-Engel, Werner, Klein, & Moosbrugger, 2010).

Appendix E shows the descriptive statistics and intercorrelations of the items. We mean-centered the items for national integrity, legal structure, and past transactions before creating the interaction terms. Using maximum likelihood, we simultaneously estimated the measurement and structural models. To reduce the number of parameters to estimate, we assigned the ten survey items that measure buyer's trust into three parcels (Trust-A (4 items), Trust-B (3 items), and Trust-C (3 items)), and used them as indicators of the latent variable buyer's trust. Each parcel's score is the average score of the assigned items. The latent variable legal structure comprises four indicators – the three survey items and the supplier's country CPI score. We fixed the error variance of single-indicator variables (i.e., purchase intention and past transactions) with the assumption that the reliability for each of these indicators is .85. Using the Spearman Brown prophecy formula and Cronbach's α for the measure of buyer's anticipated future purchase in Doner and Canon's (1997) study, we estimated a reliability of .90 had we used a single-item scale to measure purchase intention. Our assumed reliability of .85 is therefore conservative.

Also, because each respondent in our dataset provided two supplier-observations, individual respondents' observations may have correlated errors. To obtain robust variance estimate, we clustered the observations by respondent to appropriately adjust the standard errors (Wooldridge, 2002). Lastly, when estimating the structural model, we treated "not sure" responses for supplier's price, product, and delivery performances as missing data. We assumed these responses to be missing at random, which makes the use of maximum likelihood estimation with estimation of missing data values appropriate and strongly preferable to listwise case deletion (Schafer & Graham, 2002).

5.2. Measurement Model

We conducted a confirmatory factor analysis and computed the Cronbach's α of the multi-items constructs in our model (Appendix F). The model fit is not significant (χ^2 = 55.20, d.f. = 48, p > .10), and the other fit indices also indicate good model fit (CFI = .99; RMSEA = .02; SRMR = .03). All items loaded on their respective constructs. The Cronbach's α estimates suggest the items have good internal consistency. Good convergent validity is shown by higher correlations between items reflecting the same construct than correlations between items reflecting different constructs (see Appendix E). We tested discriminant validity of our constructs using a chi-square difference test (Bagozzi, Yi, & Phillips, 1991). For each pair of constructs, we ran a chi-square difference test that compared an unrestricted model (where correlation of the constructs was freely estimated) and a restricted model (where correlation was fixed to unity). In all pair-wise comparisons, the two models differ significantly on the chi-squared difference test (p < .001), with the unrestricted models having better fit, which supports the discriminant validity of the constructs.

5.3. Structural Model

We estimated a baseline model with only the main effects. The test of fit for this model is significant (χ^2 = 352.04, d.f. = 113, p < .01), but the other fit indices indicate adequate model fit (CFI = .92, RMSEA = .06, SRMR = .05). Based on the modification indices, we added covariance between trust and purchase intention, and between the CPI and whether the supplier is from China. A buyer's trust and purchase intention may share common causes that we did not measure (e.g., buyer's commitment to supplier). Also, given that the proportion of China suppliers in our dataset is high and that the CPI is a country-level score, it is reasonable to allow their error terms to correlate. We re-estimated the model with these modifications (Model 1 in Table 3). Although the test of fit is still significant (χ^2 = 209.36, d.f. = 111, p < .01), the other goodness of fit indices improved (CFI = .97, RMSEA = .04, SRMR = .04).

We next added two interaction terms, "national integrity x past transactions" and "legal structure x past transactions", to the structural model (Model 2 in Table 3). Including these interaction terms makes the second model a non-nested model relative to the first model, and these two models have overlapping but non-identical variance-covariance matrices (Vandenberg & Grelle, 2009). We compared the models' Akaike information criteria (AIC) and Bayesian information criteria (BIC) to assess whether including the interaction terms is appropriate. These information criteria reward a goodness of model fit and penalize a lack of model parsimony, and the model with the smaller AIC and BIC is the better one (Vandenberg & Grelle, 2009). The AIC declined from 20686.42 in Model 1

to 19482.23 in Model 2, and the BIC (adjusted for sample-size) declined from 20785.38 to 19559.98. The relatively large reductions in information criteria values support the inclusion of these two interaction effects in our structural model.

5.4. Results

Figure 1 presents the hypotheses testing results using Model 2 in Table 3. After controlling for the supplier's performance, the supplier's membership category, whether the buyer and supplier are from the same country, and whether the supplier is China based, we found that the favorable perception of national integrity had a positive effect on buyers' trust in the supplier (β_2 = .18, p < .05). However, this perception did not become less influential with increasing transactions (β_3 = .10, p > .10). Therefore, H1 is supported but H4a is not. Although the perception of national integrity perception appears to have modest statistical impacts, its economic impacts are substantial and meaningful. We discuss the practical impacts of our findings in Section 6.2.

Table 3. Structural Model Results

	Model 1	Model 2	Model
	Coeff.	Coeff.	Coeff.
β_1: Buyer's trust → likelihood of purchase	0.94** (0.11)	0.93** (0.11)	0.92** (0.11)
β_2: National integrity → buyer's trust	0.17* (0.08)	0.18* (0.08)	0.18* (0.08)
β_3: National integrity x past transaction → buyer's trust	-	0.10 (0.07)	0.10 (0.07)
β_4: Legal structure → buyer's trust	0.06 (0.06)	0.05 (0.06)	0.05 (0.06)
β_5: Legal structure x past transaction → buyer's trust	-	-0.09* (0.05)	-0.11* (0.05)
β_6: Supplier verification → buyer's trust	0.20+ (0.11)	0.24* (0.11)	0.12 (0.14)
β_7: Supplier verification x past transaction → buyer's trust	-	-	0.07 (0.06)
β_8: Past transaction → buyer's trust	0.06* (0.03)	0.06* (0.03)	0.05 (0.03)
Controls			
β_9: Supplier's performance → buyer's trust	0.59** (0.12)	0.58** (0.12)	0.59** (0.11)
β_{10}: Non member → buyer's trust	0.03 (0.07)	0.05 (0.06)	0.06 (0.06)
β_{11}: Paid member → buyer's trust	-0.15+ (0.09)	-0.16+ (0.09)	-0.15+ (0.09)
β_{12}: Same country → buyer's trust	0.06 (0.11)	0.02 (0.13)	0.02 (0.12)
β_{13}: China supplier → buyer's trust	0.04 (0.07)	0.02 (0.07)	0.02 (0.07)
χ^2 (d.f.)	209.36 (111), p < .01	-	-
CFI	0.97	-	-
RMSEA	0.04	-	-
SRMR	0.04	-	-
AIC	20686.42	19482.23	19482.90
BIC	20785.37	19559.98	19561.83

Note: + p < .10 * p < .05 ** p < .01
Note: Standard errors in parentheses. The software package (Mplus) does not provide goodness of fit indices for Models 2 and 3, where we include the interaction terms.

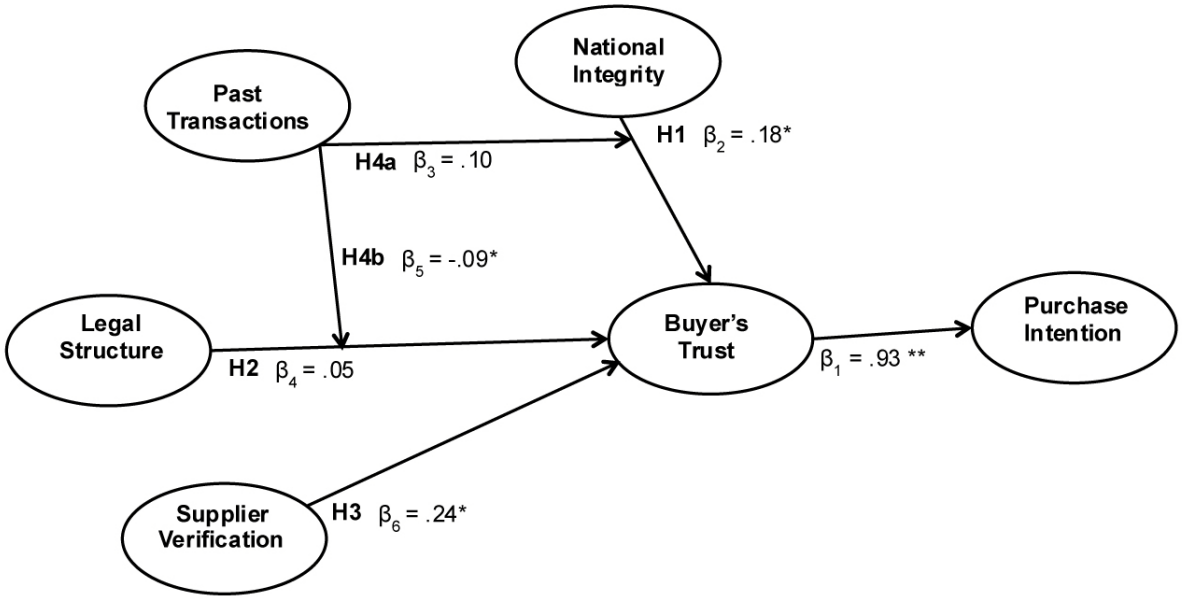

Figure 1. Summary of Results

We also found that (i) the perceived legal structure positively impacted buyers' trust when the buyer had relatively few prior interactions with the supplier, but that (ii) the effects of perceived legal structure on buyers' trust weakened as the number of interactions increased. The number of prior buyer-supplier transactions negatively moderated the relationship between perceived legal structure and buyer's trust (β_5 = -.09, p < .05), although the positive main effect of perceived legal structure on trust was not statistically significant (β_4 = .05, p > .10). These results collectively support H2 and H4b. In addition, buyers' trust was higher in suppliers who had been verified by a third party compared with those who were not verified (β_6 = .24, p < .05), which supports H3. Lastly, a buyer's trust in a supplier was positively related to the likelihood that the buyer would purchase from that supplier (β_1= .93, p < .01). This result is consistent with other studies on outcomes of trust (e.g., Doney & Cannon, 1997; Pavlou, 2002).

We then added the interaction supplier verification x past transactions in Model 3. Since AIC and BIC were higher in Model 3 than in Model 2 (see Table 3), there is no evidence to suggest that Model 3 is a better model (Vandenberg & Grelle, 2009). This interaction term was also not significant (β_7 = .07, p > .10), which implies that the impact of a supplier's verification status on buyer's trust does not diminish with more transactions between them.

5.5. Robustness Analyses

We conducted several analyses to check the robustness of our results (see Appendix G for details). First, unobserved effects such as priming, social desirability, and buyer heterogeneity may bias our results. For example, respondents might give positive evaluations of suppliers because they were strongly considering these suppliers in their purchases. The respondents' trust in individual suppliers might also be affected by their disposition to trust (Balasubramanian et al., 2003; McKnight & Chervany, 2001; McKnight et al., 1998) or by their trust in the exchange (Pavlou, 2002; Pavlou & Gefen, 2004). Our within-subject design, where each respondent evaluated two suppliers, allows us to account for these unobserved effects using a random effects model. The results using random effect models show qualitatively similar conclusions as the results using SEM.

Second, we replaced survey data about supplier's membership types with available data from the exchange. We also checked the sensitivity of our SEM results to different model specifications and assumed reliability of single-indicator variables. Finally, we ran a multi-level mixed effects model because the survey responses were nested within buyers. The results in these analyses are consistent with the main results discussed above.

6. Discussion

Information systems researchers have examined the roles and impacts of interorganization systems such as electronic data interchange (e.g., Mukhopadhyay, Kekre, & Kalathur, 1995) and electronic infomediaries (e.g., Ghose, Mukhopadhyay, & Rajan, 2007). Online B2B exchanges are also interorganization systems that help buyers and suppliers search for and connect with each other (Pavlou, 2002). Yet firms do not establish relationship with each other simply because the systems to do so are in place. In this study, we examined factors that affect the formation and development of interorganizational relationships on online exchanges, particularly in a global setting.

Using information signaling theory (Spence, 1973), we treated perceived level of national integrity and legal structure in the supplier's country as indices that are difficult for suppliers to alter, and third-party verifications and web seals on B2B exchanges as costly signals that suppliers can manipulate at their discretion. Our results show that supplier indices and signals have positive effects on buyers' trust. Hypotheses 4a and 4b suggested that, with increased experience (more past transactions), the effect of indices such as legal structure and national integrity would decline. This would be evidenced by negative coefficients for interactions of the respective indices and past transactions. We did find such an effect for legal structure by past transactions (β_5= -.09, $p < .05$). However, the estimated coefficient for national integrity by past transactions was not significant (β_3= .10, $p > .10$), which suggests that national integrity is still a consideration even with much past experience. A possible explanation for this non-significant effect is that national integrity and individual suppliers' integrity are more closely associated than we expected – buyers may expect social norms to strongly influence individual suppliers' behaviors, even for those suppliers whom they have transacted with. Since integrity is a key component of trust, and repair of trust due to integrity-related violations (e.g., dishonest behavior) is difficult (Kim, Dirks, & Cooper, 2004; Kim, Ferrin, & Cooper, 2009), buyers' perceptions of national integrity may still matter even when they have completed many transactions with the suppliers in the past. Finally, we also found that buyers' trust positively affects their supplier-selection decisions. Buyers were more likely to purchase from suppliers whom they trust more (β_1 = .93, $p < .01$).

Apart from third-party verifications, another potential signal for suppliers in B2B exchanges is paid membership. Surprisingly, we found a weak negative relationship between buyer's trust and paid membership (β_{11} = -.16, $p < .10$), which indicates that buyers may distrust suppliers that are on paid memberships. We also observed this phenomenon among B2B exchange users. For instance, a participant in an online community shared their experiences with suppliers on paid membership (Gold membership) in a B2B exchange (Alibaba.com):

> *Bear in mind that I have successfully dealt with an Alibaba Gold member, and still do this day, so I was taken in by the belief that Gold membership meant that the company I was dealing with would be more genuine, than say a free member seller.* ***I now know that this is not the case*** (emphasis added) (Robbobb, 2007).

Our results and the anecdotal evidence suggest that genuine suppliers may not effectively distinguish themselves from non-genuine ones by subscribing to paid memberships – in fact, such services seem to have adverse effects on genuine suppliers. Unlike verification services, paid memberships usually just require suppliers to pay a fee, which may not be effective barriers to untrustworthy suppliers. Membership fees could be too low to separate types of suppliers, which leads to a pooling equilibrium.

Our results add to our understanding of cross-border transactions on online B2B exchanges. Regardless of whether B2B transactions occur within or across borders, or through online exchanges

or physical channels, buyers look for certain qualities in suppliers – competency, integrity, and benevolence. However, it is more challenging to identify these qualities in cross-border e-commerce due to information asymmetry in online markets. Moreover, research in localized B2B e-commerce typically focuses on technological structure, particularly the situational normality and structural assurance of the Internet or platforms (e.g., Pavlou, 2002; Pavlou & Ratnasingam, 2003; Ratnasingam, 2005). However, these factors, cannot explain why a buyer's trust in suppliers from different countries may differ on a B2B exchange. A favorable and secured online platform may not be a sufficient condition for global e-commerce transactions to occur because a buyer's trust in foreign suppliers and the buyer's purchase intention also depend on factors that are external to the platform. Our results show that it is necessary to examine social-economic characteristics in partners' countries in globalized B2B e-commerce.

Furthermore, supplier verifications may be more salient when cross-border transactions take place on online exchanges instead of through traditional channels. Earlier studies, particularly those that predate the Internet era, have considered the importance of foreign supplier certifications in international sourcing through physical channels (e.g., Birou & Fawcett, 1993; Scully & Fawcett, 1994). In these cases, an implicit assumption is that the suppliers' certifications are authentic. However, the importance of authenticating trading partners' information, is a relatively new phenomenon with the proliferation of online platforms (e.g., Basu & Muylle, 2003; Lee, 2002). As we note earlier, the relatively low costs of exchange memberships lead to problems such as misrepresentation and phantom suppliers. Thus, in the context of exchange platforms, the authenticity of a firm's information could be as important as the information itself.

6.1. Theoretical Implications

With the Internet and e-commerce technology, organizations can now easily look beyond their local markets for new buyers and suppliers. While participating in the global marketplace is attractive, the risks and uncertainties that come with it are qualitatively different from those that arise in domestic exchange. By focusing on globalized B2B e-commerce, we see important factors of trust that are not salient in localized commerce of any kind. Our findings show that perceptions of country and supplier attributes influence buyers' trust. It is important to account for such indices and signals when studying information asymmetry and signaling. Indices are often treated as given. This study suggests that they have informational impact precisely because they are relatively unalterable by suppliers.

We expected that perceptions of supplier-country attributes would have less effect as the buyer gained experience with the supplier. The actual picture is more complicated. Whereas the effects of legal structure on a buyer's trust diminished with repeated transactions, national integrity remained influential. These differences may be due to the different basis for each perception. Perceived national integrity is a cognition-based trust mechanism. It influences judgment of trustworthiness via a categorization process, where an entity in an untrustworthy culture is expected to be untrustworthy (Zaheer & Zaheer, 2006). In cross-border e-commerce, even though a supplier is highly rated in terms of their ability, benevolence, and/or integrity based on their performance in prior transactions, the larger context may make trusting the supplier unwise or indicate the need for lower trust. For example, when opportunism is common or highly tolerated in a particular culture, high integrity and benevolence of an individual may be insufficient assurance that the individual will not be opportunistic (Wicks, Berman, & Jones, 1999). Therefore, the stereotyping of counterparts' national characteristics not only affects initial trust formation (Ariño et al., 2001), but it also influences subsequent trust development as relationships between the partners grow.

Perceived legal structure, in contrast, is an institution-based trust mechanism. Institution-based trust is important when there are limited prior exchanges between buyers and suppliers (Zucker, 1986). However, third-party, institutional mechanisms provide fewer cues about individual suppliers' competency. While the legal structure and licensing requirements in a country provide general indications of the quality of typical suppliers, a buyer learns about the ability of a particular supplier as the exchanges between them increase. Furthermore, although the enforceability of contracts and legal recourses are important in cross-border transactions, these considerations are more important

when the partners are unfamiliar with each other. In inter-organizational relationships, buyers and suppliers may avoid invoking legal sanctions when trade disputes occur, as doing so is costly and interferes with their desire to continue doing business with one another (Macaulay, 1963). Instead, they try to resolve disputes through direct negotiations. Thus, when buyers and suppliers can assess each other's trustworthiness through direct means and exchanges, institution-based trust mechanisms become less influential. As a result, buyers' reliance on the legal system in suppliers' countries decreases with repeat transactions. Work in this area should account for the length and strength of buyer-suppliers relationships when examining institution-based trust.

In addition, this study extends research on how online exchanges mechanisms, such as feedback systems, affect a buyer's trust in the community of suppliers on the exchanges (Pavlou, 2002; Pavlou & Gefen, 2004). Just because a buyer trusts the community of suppliers does not mean that they have the same level of trust in every individual supplier in that community. Ultimately, trust at the dyadic buyer-supplier level plays an important role in shaping individual buyers' relationships with their suppliers. We see here that suppliers can differentiate themselves on an exchange by sending credible and important signals of their trustworthiness through third-party verifications.

6.2. Managerial Implications

Do the estimated effects in this study have meaningful consequences for buyers and suppliers on B2B exchanges and for policy makers? To address this, we estimated the economic impacts of supplier verification and changes in perceived national integrity using the SEM results in Table 3 (Model 2). The expected value of supplier verification on the B2B exchange was 22.32 percent (.93 (β_1) x .24 (β_6)) of the transaction value. Using the median transaction value of US$30,000 and assuming a supplier is considered for 12 purchases per year on the exchange, the expected value for the supplier of being verified was US$80,352 annually[6]. Since the primary context of this study was in cross-border transactions, and perceived country characteristics affect all suppliers within a country, we estimated the impact of perceived national integrity on the external trade of an economy. The expected value of a .01-point improvement in perceived national integrity (measured on a 5-point scale) was .17 percent (.93 (β_1) x .18 (β_2) x .01) of the total export value of a country. Using the 2008 trade statistics for China, for instance, a .01-point increase in its perceived national integrity has an expected value of US$2.43 billion[7]. While this figure is only suggestive, it indicates the potential impact of even small changes in perceived country characteristics.

Therefore, suppliers should be aware of how buyers' perceptions of the legal structure and national integrity in their countries affect buyers' trust. A buyer's trust due to country attributes is essentially beyond an individual supplier's control. Moreover, perceptions of country attributes of a particular country may differ among buyers, which makes it more challenging for individual suppliers to come up with an optimal strategy to engender and sustain trust. As such, what might be needed is a concerted effort to improve the perceived legal structure and national integrity of suppliers at the industry or country level. This can sometimes be done through voluntary business associations developing accreditation standards and self-regulation. Such improvements can benefit both individual suppliers and the respective countries as a whole. For example, Knack and Keefer (1997) found that a 10 percent increase in the level of trust in a society was associated with a .8 percent rise in annual growth in per capita income. The analysis in our study also shows that a small change in perceived national integrity can have a relatively significant impact on a country's external trade.

The negative relationship between buyer's trust and paid membership has important implications for B2B exchanges. Paid memberships are important revenue sources for these exchanges. While there are other reasons why suppliers subscribe to paid membership, such as to communicate more information or enjoy better customer support on the exchanges, it is nevertheless important for exchanges to explore how they can help those trustworthy suppliers who take up paid membership to

[6] Users' testimonials in various B2B exchanges indicated that suppliers received between 20 and 200 enquiries per month. Our assumption of the supplier being considered for 12 purchases per year is therefore quite conservative.

[7] The value of China's export to the rest of the world was US$1,430.7 billion in 2008. (Source: http://www.uschina.org/statistics/tradetable.html)

increase the buyers' trust and eventually sales through their online marketplaces. One suggestion is for B2B exchanges to create different classes of paid memberships, and entry into certain membership classes requires suppliers to meet additional criteria that credibly signal high trustworthiness, such as suppliers' track record on the exchanges. This could help buyers differentiate among suppliers based on paid memberships.

6.3. Limitations and Suggestions for Future Studies

In this study, we examined the relationship between buyers' trust and their perceptions of suppliers' country attributes. Reverse causality is a potential problem: a buyer's trust in a supplier could affect their perceptions of the supplier's country, particularly if that supplier is the only supplier from that country with whom the buyer has interacted. Reverse causality becomes less of a problem as the buyer interacts with more suppliers from that country. In this study, buyers reported that, on average, they purchased from between one and four other suppliers from the referent supplier's country. Therefore, we do not expect that reverse causality was a major problem in this study.

In terms of the theoretical model, a possible extension is to examine the direct and indirect influences of industry-level perceptions on buyers' trust. For example, safety issues in China's toy and dairy industries could have affected the perceived trustworthiness of suppliers in these industries (Fairclough, 2007; Chao, 2008). For example, the Dairy Association of China estimated that it would take about two years to restore consumer confidence following the food safety incident in 2008, where milk and infant formula were adulterated with melamine (Zhou, 2008). There might also be spillover effects to other industries in the country, thus indirectly affecting buyers' perceptions of the country attributes. Including perception of industry-level attributes in the model would strengthen our understanding of how such higher-level perceptions influence trust at dyadic levels.

7. Conclusion

Therefore, is the world really flat as Friedman (2005) asserts? Perhaps less so than Friedman thinks. Although physical and geographical boundaries are now less of an obstacle in economic exchanges, they still play important roles in economic agents' attitudes, behaviors, and decisions. Hence there is a need to examine how cross-boundaries exchanges and relationships in all commerce are shaped by country characteristics. Increasingly, transactions are taking place globally, in B2B commerce and elsewhere. Consumers all over the world can now purchase from online retailers based in the US (e.g., Amazon.com) or individuals (e.g., through eBay). Yet most research in e-commerce and sourcing focuses mainly on deals that occur locally (particularly in the US). Adopting a cross-boundary and global perspective in e-commerce studies would enrich research and help to further maximize the benefits that the Internet and e-commerce bring to the global marketplace.

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Appendices

Appendix A.

Table A-1. Buyers' Characteristics (Location, Product Category, Company Size, and E-Commerce Experience)

Buyer's continent	*n*	Product category[a]	*n*	No. of employees	*n*
Africa	46	Agriculture & Food	17	1 to 4	56
Americas	21	Apparel & Accessories	11	5 to 9	68
Asia	168	Arts & Crafts	4	10 to 10	61
Europe	24	Auto parts & Accessories	8	20 to 99	65
Oceania	28	Bags, Cases, & Boxes	1	100 to 499	24
		Chemicals	32	500 or more	13
		Computer Products	13		
		Construction & Decoration	17	**Sales in previous year**	***n***
		Consumer Electronics	17	Less than US$100,000	55
		Electrical & Electronics	28	US$100,000 to US$499,000	71
		Furniture & Furnishing	2	US$500,000 to US$999,000	40
		Health & Medicine	18	US$1 million to US$4.9 million	81
		Lights & Lighting	6	US$5 million to US$9.9 million	15
		Machinery	31	US$10 million to US$49.9 million	12
		Metallurgy, Mineral, & Energy	21	US$50 million to US$99.9 million	5
		Office Supplies	5	US$100 million or more	8
		Security & Protection	1		
		Sporting Goods & Recreation	4	**B2B e-commerce experience**	***n***
		Textile	13	1 year or less	54
		Tools & Hardware	3	Between 1 and 3 years	85
		Toys	4	Between 3 and 5 years	52
		Transportation	4	More than 5 years	96
		Others	27		

Note: [a] based on the imminent purchases which respondents considered during the survey.

Appendix B.

Table B-1. Survey Measures

Construct	Item[a]
Purchase intention	Is it likely that you would buy from *Supplier X* for the purchase that you are thinking about?
Buyer's trust	To what extent do you agree with the following statements: • *Supplier X* is very capable of performing its job. • I am confident about *Supplier X*'s capabilities. • *Supplier X* is well qualified. • *Supplier X* would not knowingly do anything to hurt me. • *Supplier X* really looks out for what is important to me. • *Supplier X* will go out of its way to help me. • I never have to wonder whether *Supplier X* will stick to its word. • *Supplier X* tries to be fair in dealings with others. • Sound principles seem to guide the *Supplier X*'s behavior. • *Supplier X* can be trusted.
National integrity	In your opinion, how likely would suppliers from *Supplier X*" s country do the following: • Behave with integrity • Do the right things in business deals always, even when no one is watching
Legal structure	How confident are you with the legal system in *Supplier X*'s country? In your opinion, how effective are the laws and regulations in *Supplier* X's country concerning the following activities: • Governing operations of the suppliers • Resolving business disputes
Supplier verification	What is the verification status of *Supplier X* in the exchange?
Past transactions	How many times has your company purchased from *Supplier X* in the last 12 months?
Price performance	How does *Supplier X* compare to other suppliers in terms of price?
Product performance	How does *Supplier X* compare to other suppliers in terms of product availability?
Delivery performance	How does *Supplier X* compare to other suppliers in terms of delivery?
Non-member	Is *Supplier X* listed in the B2B Exchange? b
Paid member	What is the membership type of *Supplier X* in the exchange?
Same country	Are *Supplier X* and buyer from the same country? b
China supplier	Is *Supplier X* based in China? b

[a] "*Supplier X*" in the question stems is the supplier's company name or initial as provided by the buyer.
[b] Not an actual item in the survey – the value is obtained from the buyer's responses to items concerning the buyer's and the suppliers' demographic profiles.

Appendix C.

Table C-1. Average National Integrity, Legal Structure, and Corruption Perception Index (CPI) Scores of Supplier's Country

Country	National integrity	Legal structure	CPI	n
Armenia	5.0	4.3	3.0	1
Australia	4.0	3.7	8.6	4
Austria	4.0	4.0	8.1	1
Bahrain	5.0	5.0	5.0	1
Belgium	3.5	4.6	7.1	3
Benin	3.0	3.3	2.7	1
Botswana	2.5	2.3	5.4	1
Brazil	3.2	2.1	3.5	3
Bulgaria	3.0	3.0	4.1	1
Canada	3.5	3.5	8.7	2
China	3.3	2.8	3.5	403
Congo, Dem. Rep.	3.0	2.3	1.9	1
Denmark	5.0	4.3	9.4	1
Egypt	3.0	2.0	2.9	1
Finland	5.0	4.7	9.4	1
France	4.5	4.3	7.3	1
Germany	4.1	4.2	7.8	9
Hong Kong	3.5	3.7	8.3	10
India	3.4	3.3	3.5	34
Indonesia	3.4	2.5	2.3	4
Iran	3.0	2.3	2.5	1
Italy	3.5	3.7	5.2	2
Japan	4.0	3.7	7.5	1
Kuwait	4.0	4.0	4.3	1
Malaysia	2.8	2.8	5.1	2
Mexico	3.5	3.0	3.5	1
New Zealand	5.0	4.3	9.4	1
Nigeria	3.3	3.7	2.2	9
Norway	4.5	4.3	8.7	1
Pakistan	3.5	2.9	2.4	3
Peru	4.0	3.7	3.5	1
Qatar	4.5	4.7	6.0	1
Romania	4.0	4.3	3.7	1
Russia	4.5	3.9	2.3	5
Saudi Arabia	3.0	3.0	3.4	1
Singapore	3.0	3.7	9.3	2
Slovenia	4.0	2.3	6.6	1

Table C-1. Average National Integrity, Legal Structure, and Corruption Perception Index (CPI) Scores of Supplier's Country (cont.)

Country	National integrity	Legal structure	CPI	n
South Africa	4.5	4.0	5.1	2
South Korea	3.5	4.0	5.1	3
Spain	5.0	4.3	6.7	1
Switzerland	4.5	3.0	9.0	1
Taiwan	3.9	3.2	5.7	13
Thailand	5.0	4.0	3.3	1
Turkey	4.8	4.5	4.1	4
Ukraine	4.2	4.2	2.7	3
United Arab Emirates	3.5	3.2	5.7	4
United Kingdom	3.0	4.2	8.4	4
United States	4.0	3.7	7.2	19
Vietnam	3.0	2.7	2.6	1
Zambia	3.0	2.7	2.6	1

Note: The items that measure perceived national integrity and legal structure are on a scale of 1 (least favorable) to 5 (most favorable). The CPI index score ranges from 0 (high corruption) to 10 (low corruption).

Appendix D. Preliminary Analyses

Our survey respondents were from various countries in different continents. We used a Kruskal-Wallis test to assess whether there are differences among respondents from different countries. We found no significant differences in terms of company's sales ($H = 21.66$, $p > .10$), respondent's working experience ($H = 18.56$, $p > .10$), and B2B e-commerce experience ($H = 13.93$, $p > .10$) among respondents from different countries. However, the number of employees in the respondent's company ($H = 46.33$, $p < .01$) and their education ($H = 52.10$, $p < .01$) are statistically different, which reflects differences in economic and social structures across respondents' countries. Based on these results, we believe it is reasonable to pool our respondents across countries.

Next, we assessed the presence of common method variance in our data in two ways. First, we conducted Harman's one-factor test and found that the scale items load onto more than one factor (Podsakoff & Organ, 1986). Second, we compared (1) the covariance of buyer's trust in and likelihood of purchasing from one supplier (i.e., within-supplier covariance), and (2) the covariance of buyer's trust in one supplier and likelihood of purchasing from the other supplier (i.e., between-supplier covariance). The within-supplier covariance was at least 1.5 times the between-supplier covariance, which indicates that common method variance does not appear to account for the relationship between buyer's trust and purchase intention. The within-supplier covariance of buyer's trust in and likelihood of purchasing from the first supplier was .28; the between-supplier covariance of buyer's trust in the second supplier and the likelihood of purchasing from the first supplier was .18. The within-supplier covariance of buyer's trust in and likelihood of purchasing from the second supplier was .32; the between-supplier covariance of buyer's trust in the first supplier and the likelihood of purchasing from the second supplier was .11.

Appendix E.

Table E-1. Item-Level Descriptive Statistics and Correlation Matrix for Structural Equation Modeling

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	Purchase intention	1.00																		
2	Trust-A^	0.35	1.00																	
3	Trust-B^	0.37	0.86	1.00																
4	Trust-C^	0.37	0.84	0.85	1.00															
5	National integrity 1*	0.18	0.24	0.28	0.27	1.00														
6	National integrity 2*	0.19	0.22	0.26	0.24	0.53	1.00													
7	Legal S=structure 1*	0.11	0.15	0.24	0.21	0.27	0.36	1.00												
8	Legal structure 2*	0.17	0.24	0.29	0.29	0.35	0.47	0.54	1.00											
9	Legal structure 3*	0.16	0.25	0.30	0.28	0.38	0.48	0.55	0.87	1.00										
10	CPI*	0.03	0.10	0.13	0.13	0.09	0.18	0.22	0.26	0.26	1.00									
11	Supplier verification	0.11	0.08	0.13	0.11	0.07	0.12	0.19	0.13	0.15	-0.05	1.00								
12	Past Transactions*	0.08	0.23	0.19	0.20	0.06	0.09	0.10	0.04	0.05	0.16	-0.02	1.00							
13	Price performance	0.28	0.27	0.32	0.32	0.11	0.13	0.13	0.17	0.17	0.10	0.07	0.13	1.00						
14	Product performance	0.32	0.41	0.46	0.44	0.17	0.17	0.18	0.19	0.19	0.11	0.07	0.14	0.52	1.00					
15	Delivery performance	0.31	0.46	0.49	0.48	0.18	0.17	0.17	0.19	0.22	0.14	0.04	0.14	0.43	0.73	1.00				
16	Non-member	-0.02	0.09	0.08	0.10	0.06	0.09	0.08	0.11	0.11	0.37	-0.20	0.15	-0.02	0.03	0.04	1.00			
17	Paid member	-0.02	-0.10	-0.07	-0.10	-0.04	-0.01	0.01	-0.06	-0.05	-0.11	0.38	-0.08	-0.01	-0.05	-0.03	-0.24	1.00		
18	Same country	0.01	0.06	0.03	0.02	0.02	0.08	0.21	0.10	0.11	-0.06	0.00	0.24	-0.06	-0.06	-0.05	0.19	-0.04	1.00	
19	China supplier	-0.04	-0.12	-0.12	-0.16	-0.10	-0.19	-0.30	-0.27	-0.26	-0.55	0.06	-0.25	-0.04	-0.08	-0.08	-0.51	0.18	-0.41	1.00
	Mean	3.79	3.78	3.88	3.79	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	3.67	3.76	3.69	0.24	0.16	0.09	0.70
	Variance	1.10	0.58	0.66	0.64	1.11	1.44	1.44	1.43	2.18	2.18	0.10	1.65	1.04	0.90	0.95	0.18	0.13	0.08	0.21

Notes: ^: We assigned the ten survey items that measure buyer's trust into three parcels: Trust-A (4 items), Trust-B (3 items), and Trust-C (3 items).
*: Mean-centered.

Appendix F.

Table F-1. Measurement Model Results

Construct	Item	Loading	Std. error	Cronbach's α
Buyer's trust	Trust-A	0.92	0.01	.94
	Trust-B	0.93	0.01	
	Trust-C	0.91	0.01	
National integrity	National Integrity 1	0.66	0.07	.69
	National Integrity 2	0.80	0.06	
Legal structure	Legal Structure 1	0.59	0.05	.74
	Legal Structure 2	0.94	0.02	
	Legal Structure 3	0.92	0.02	
	CPI	0.28	0.04	
Supplier's performance	Price Performance	0.57	0.06	.81[a]
	Product Performance	0.87	0.03	
	Delivery Performance	0.83	0.04	

Chi-square = 55.20, d.f. = 48, p > .10
CFI = 0.99 RMSEA = 0.02 SRMR = 0.03
All item loadings are significant at p < .01
[a] Using casewise deletion for missing data (i.e. "not sure" responses)

Appendix G. Robustness Analyses[8]

Random Effects Model

We estimated random effects models with buyer's trust as dependent variable using Stata (version 10.1). We assumed that the unobserved effects affect a buyer's evaluations of both suppliers in the same manner. For instance, the (unobserved) importance of situational normality or structural assurance to a buyer should be the same for every supplier whom they were considering. This assumption justifies the use of random effects model to account for unobserved effects (Wooldridge, 2002) and minimizes the need to include control variables for buyer attributes in our models. We standardized items that measured legal structure and national integrity and then averaged to form the respective variables. We also standardized the item for the number of past transactions. We recoded the responses for each supplier's relative performance criterion into three dummy variables: (1) better than other suppliers, (2) worse than other suppliers, and (3) not sure about the performance, with the base category being the neutral "equal to other suppliers" response. We clustered the observations by respondent to obtain robust variance estimates (Wooldridge, 2002). Tables G-1 and G-2show the descriptive statistics and random effects model results, respectively.

[8] In the interest of space, we summarize the results for most of the robustness analyses in this appendix. Detailed results are available from the authors.

Table G-1. Descriptive Statistics and Correlation Matrix for Random Effects Model

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Buyer's trust	1.00																	
2	National integrity	0.30	1.00																
3	Legal structure	0.30	0.48	1.00															
4	Supplier verification	0.11	0.11	0.14	1.00														
5	Past transactions	0.22	0.09	0.12	-0.02	1.00													
6	Price performance (better)	0.28	0.10	0.18	0.09	0.19	1.00												
7	Price performance (worse)	-0.17	-0.09	-0.05	-0.02	-0.03	-0.37	1.00											
8	Price performance (not Sure)	-0.17	-0.05	-0.02	0.01	-0.24	-0.44	-0.14	1.00										
9	Product performance (better)	0.40	0.15	0.19	0.09	0.21	0.45	-0.17	-0.30	1.00									
10	Product performance (worse)	-0.32	-0.11	-0.11	0.03	0.10	-0.17	0.39	-0.08	-0.25	1.00								
11	Product performance (not Sure)	-0.24	-0.09	-0.08	-0.02	-0.23	-0.27	-0.10	0.65	-0.45	-0.10	1.00							
12	Delivery performance (better)	0.45	0.17	0.22	0.03	0.31	0.40	-0.11	-0.29	0.65	-0.16	-0.35	1.00						
13	Delivery performance (worse)	-0.28	-0.11	-0.12	0.01	0.04	-0.12	0.26	-0.11	-0.20	0.55	-0.11	-0.25	1.00					
14	Delivery performance (not sure)	-0.21	-0.09	-0.07	0.00	-0.35	-0.24	-0.10	0.59	-0.28	-0.11	0.68	-0.50	-0.15	1.00				
15	Non-member	0.10	0.09	0.22	-0.20	0.15	-0.04	0.06	-0.02	0.04	0.05	-0.06	0.08	0.03	-0.10	1.00			
16	Paid member	-0.10	-0.03	-0.07	0.38	-0.08	-0.02	0.05	0.05	-0.07	0.09	0.04	-0.08	0.00	0.02	-0.24	1.00		
17	Same country	0.04	0.06	0.12	0.00	0.24	-0.01	0.16	-0.08	-0.01	0.16	-0.05	0.04	0.11	-0.10	0.19	-0.04	1.00	
18	China dupplier	-0.04	-0.16	-0.45	0.06	-0.25	-0.05	-0.07	0.03	-0.08	-0.06	0.04	-0.15	-0.05	0.10	-0.51	0.18	-0.41	1.00
	Mean	3.81	0.00	0.00	0.12	0.00	0.53	0.11	0.15	0.53	0.05	0.15	0.45	0.07	0.23	0.24	0.16	0.09	0.70
	Minimum	1.00	-2.17	-1.38	0	-0.68	0	0	0	0	0	0	0	0	0	0	0	0	0
	Maximum	5.00	1.36	2.00	1	3.21	1	1	1	1	1	1	1	1	1	1	1	1	1
	Variance	0.56	0.76	0.59	0.10	1.00	0.25	0.10	0.13	0.25	0.05	0.13	0.25	0.06	0.18	0.18	0.13	0.08	0.21

Table G-2. Random Effects Model Results

Dependent variable: buyer's trust	Model 1	Model 2	Model
	Coeff.	Coeff.	Coeff.
γ_1: Constant	3.69** (0.10)	3.69** (0.10)	3.69** (0.10)
γ_2: National integrity	0.14** (0.04)	0.13** (0.04)	0.13** (0.04)
γ_3: National integrity x past transaction	-	-0.01 (0.05)	-0.01 (0.04)
γ_4: Legal structure	0.06 (0.04)	0.08+ (0.04)	0.08+ (0.04)
γ_5: Legal structure x past transactions	-	-0.06* (0.03)	-0.06* (0.03)
γ_6: Supplier verification	0.23* (0.11)	0.23* (0.11)	0.24* (0.11)
γ_7: Supplier verification x past transactions	-	-	0.08 (0.08)
γ_8: Past transactions	0.08* (0.03)	0.09** (0.03)	0.09** (0.03)
γ_9: Relative price (better)	0.05 (0.07)	0.06 (0.06)	0.06 (0.06)
γ_{10}: Relative price (worse)	-0.04 (0.11)	-0.03 (0.11)	-0.03 (0.11)
γ_{11}: Relative price (not sure)	-0.04 (0.11)	-0.04 (0.11)	-0.04 (0.11)
γ_{12}: Relative product (better)	0.02 (0.07)	0.02 (0.07)	0.03 (0.07)
γ_{13}: Relative product (worse)	-0.69** (0.20)	-0.70** (0.20)	-0.69** (0.20)
γ_{14}: Relative product (not sure)	-0.26* (0.10)	-0.26* (0.10)	-0.25* (0.10)
γ_{15}: Relative delivery (better)	0.35** (0.07)	0.34** (0.07)	0.33** (0.07)
γ_{16}: Relative delivery (worse)	-0.22 (0.16)	-0.22 (0.16)	-0.23 (0.16)
γ_{17}: Relative delivery (not sure)	0.09 (0.09)	0.10 (0.09)	0.09 (0.09)
γ_{18}: Non-exchange member	0.03 (0.07)	0.03 (0.07)	0.04 (0.07)
γ_{19}: Paid membership	-0.11 (0.09)	-0.10 (0.09)	-0.10 (0.09)
γ_{20}: Same country	0.05 (0.12)	0.07 (0.12)	0.06 (0.12)
γ_{21}: China supplier	-0.03 (0.07)	-0.03 (0.07)	-0.02 (0.07)
R-sq (within)	0.27	0.29	0.29
R-sq (between)	0.40	0.39	0.39
R-sq (overall)	0.36	0.36	0.36
Wald χ^2 (d.f.)	233.36 (17)	243.19 (19)	246.99 (20)
Prob > χ^2	0.00	0.00	0.00
Sargan-Hansen statistic	17.61	25.42	25.37
p-value	0.41	0.15	0.19

+ p < .10 * p < .05 ** p < .01
Note: Robustness standard errors in parentheses.

We estimated a baseline model with only the main-effects (Model 1), and a model that included the national integrity and legal structure interaction terms (Model 2). The Sargan-Hansen statistic does not reject the null hypothesis that the orthogonality assumption is valid for both models (test statistic =

17.61, p-value = .41 for Model 1; test statistic = 25.42, p-value = .15 for Model 2). This implies that the random effects estimator is consistent[9].

The results using SEM (Model 2 in Table 3) and random effects models (Model 2 in Table G-2) are consistent with each other. Perception of national integrity was positively related to buyer's trust (γ_2 = .13, p < .01), but this relationship was not moderated by past transactions (γ_3 = -.01, p > .10). These results support H1 but not H4a. We also find that past transactions negatively moderate the relationship between perception of legal structure and buyer's trust (γ_4 = .08, p < .10 and γ_5 = -.06, p < .05). Therefore, H2 and H4b are supported. Similarly, supplier verification had a positive impact on buyer's trust (γ_6 = .23, p < .05), which supports H3.

We also examined whether the relationship between supplier verification and buyer's trust was moderated by past transactions. We added the interaction term "supplier verification x past transactions" in Model 3 (Table G-2), and found that it was not statistically significant (γ_7 = .08, p > .10). Once again, there is no evidence that supplier verification becomes less important to a buyer with increased transactions.

Archival Data

Of the 574 suppliers in our dataset, 439 were listed in the B2B exchange. We could uniquely identify 194 (44.2 percent) of these suppliers in the exchange's online directory, and obtain information about their membership type and third-party verification status. Excluding cases in which buyers were "not sure" about suppliers' membership types or verification status, 61 percent of the membership type indicator and 66 percent of the verification status indicator in our dataset match the information from the exchange[10]. These are conservative estimates of correct matches because membership types and verification status could have changed between the time the buyer saw the signals and the time we obtained the information on the exchange. We checked the robustness of our results by using the B2B exchange's data in two cases: (1) whenever exchange and survey data differed, and (2) only when buyers indicated that they were not sure of a supplier's membership type or verification status. In both cases, the results from the recoded dataset are qualitatively similar to those from the original dataset.

Alternative SEM Specifications

We checked the robustness of our structural model to changes in specifications of the latent Buyer's Trust variable. There are two ways to re-specify buyer's trust. First, we could directly set the ten survey items that measure trust as indicators of buyer's trust instead of assigning them to parcels trust-A, trust-B, and trust-C. Second, we could impose a hierarchical structure for the construct buyer's trust. This is achieved by modeling buyer's trust as a second-order factor with presumed direct causal effects on three first-order factors, and then assigning the ten survey items to these first-order factors. We estimated our models using these two re-specifications of buyer's trust and obtained results that are similar to our original findings in both cases. Both the re-specified models have adequate model fit. The fit indices for the model with the first re-specification were CFI = .93, RMSEA = .05, SRMR = .04. The fit indices for the model using the second re-specification were CFI = .94, RMSEA = .04, SRMR = .04.

We also re-specified the measurement model for the latent legal structure variable by using the three survey items and removing CPI from our model. The model fit of the resulting structural model was

[9] If the orthogonality assumption is not satisfied (i.e., unobserved effects do correlate with independent variables), random effects estimators are not consistent but fixed effects estimators are. However, if the orthogonality assumption is satisfied, random effects estimators are consistent and also more efficient than fixed effects estimators. The Sargan-Hansen test statistic is a heteroskedastic- and cluster-robust form of Hausman test that compares random effects and fixed effects estimators (Schaffer & Stillman, 2010). Failure to reject the null hypothesis in the Sargan-Hansen test (as in our case) implies using random effects is appropriate.

[10] Using logistic regression, we found that the odds that a supplier was a paid member according to the exchange's data are three times larger when a buyer indicated that the supplier was a paid member than when he indicated that the supplier was not. The predicted probability that a supplier was a paid member based on the exchange's data was .57 when a buyer indicated that the supplier was a paid member, and .30 when they indicated that the supplier was not. We could not analyze supplier verification data as buyers "predicted" non-verified status perfectly (i.e. when they indicated that a supplier was not verified, this was so according to the exchange's data). Thus, supplier membership and verification status seem to be salient to buyers, and our survey data is reasonably robust.

adequate (CFI = .99, RMSEA = .02, SRMR = .03) and our original results still hold qualitatively. We then dropped legal structure from our model and used CPI as the sole proxy for buyers' perceptions of the legal system in suppliers' country. The estimates for CPI and interaction between CPI and past transactions are not significant statistically. Therefore, it is important to measure perceptions of legal structure at the individual buyers' level and not rely on global indices such as CPI alone.

Next, we checked the sensitivity of the SEM results to lower assumed reliability of indicators when fixing the error variance of single-indicator variables. We reduced the assumed reliability of these variables from .85 to .75 and re-estimated Model 2. The interaction between perceived legal structure and past transactions was then weakly supported at .10 level (β_5 = -.11, p = .054), while the other results continued to hold at same level of statistical significance.

Multilevel Mixed Effects Model

Because the observations of suppliers are nested within buyers, we used multilevel mixed effects model to check the robustness of our results. In the multilevel model, we allowed random coefficients on national integrity, legal structure, supplier verification and past transactions at the buyer level. The multilevel mixed effects results are consistent with the random effects model results.

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