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Trust Across Borders: Buyer-Supplier Trust in Global B2B E-commerce

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Working Paper

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ABSTRACT

Trust is important in all business, but especially in global e-commerce, even as it is more difficult to develop. This study examines two antecedents of trust in global B2B e-commerce highlighted by information signaling theory: (1) buyers' perceptions of the integrity and legal structure of the suppliers' country of origin, and (2) third-party verifications of suppliers. Findings from a survey of organizational buyers on a B2B exchange are: (1) perceptions of suppliers' country attributes and supplier verifications have direct and moderated effects on buyers' trust, and (2) buyers' trust in suppliers positively affects their supplier-selection decisions.

Keywords: trust, e-commerce, business-to-business, online exchanges, national integrity, legal structure, information signals

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A. INTRODUCTION

One of the great forces in the world today is globalization. Clearly the world is ‘flattening’ (Friedman 2005) as technology drives and facilitates the globalization of culture and markets. However, globalization is much more than reducing technical barriers and transaction costs; it also requires human interaction across cultures and national practices. Regardless of the technology and transaction costs, globalization ultimately is about two or more people interacting, communicating and trying to develop a cooperative venture across borders. That is our focus here. We look at a prototypic example of globalization facilitated by information technology - business-to-business (B2B) e-commerce, where buyers and suppliers from anywhere on the globe can exchange goods and services through the use of technology. In this context, we examine the ways in which perceived country characteristics of trading partners influence the relationships and outcomes of exchanges between them. Specifically, in a setting where information technology has largely eliminated barriers of communication and exchange, what role do perceived country characteristics play in trust formation and the quality of resulting relationships between buyers and suppliers in global B2B e-commerce?

Buyers’ trust in suppliers is critical in e-commerce due to information asymmetry, where buyers have incomplete information about suppliers. Under these conditions, buyers face the risks of selecting incompetent or opportunistic suppliers, impeding transactions between buyers and suppliers. In such situations, as in all commerce, trust is “an important lubricant” for economic exchanges to take place (Arrow 1974). The separation in time and space of transactions as well as the virtual and physical distances between buyers and suppliers –

particularly in cross-border, globalized e-commerce – raise the risks associated with information asymmetry and, consequently, the importance of trust.

Online trust has received significant research attention in recent years. Most studies, however, have focused on localized B2C or C2C e-commerce where buyers and sellers are in the same country (e.g. Gefen *et al.* 2003; McKnight *et al.* 2002; Pavlou and Dimoka 2006). Localized and globalized transactions have different implications for trust's formation and impact. In localized commerce, trading partners in the same country share common knowledge about cultural and legal structures, facilitating contract enforcement and access to legal recourse when transactions fail. Moreover, trading partners can more easily gather information about each others' competencies and reputation. Such conditions, which facilitate trust formation, often do not hold in globalized B2B commerce. Trust becomes more difficult to establish precisely when it may be more important. Furthermore, buyers' trust in suppliers may be influenced by factors that are otherwise not salient in localized e-commerce contexts.

One way to engender buyers' trust when there is information asymmetry is to close the information gap. Agency theory suggests one option is for buyers to gather information about suppliers (Eisenhardt 1989). Information signaling theory suggests that in markets that suffer from information asymmetries, suppliers can assure potential buyers of their abilities and intentions by signaling certain qualities or providing more credible information to reduce the asymmetries (Nayyar 1990). There are two types of information suppliers can provide for buyers: indices and signals (Spence 1973). In the B2B e-commerce context, indices are supplier attributes that are inherently fixed and unalterable (e.g. the supplier's country of origin). On the other hand, signals are characteristics that the supplier can potentially manipulate (e.g. web-seals that the supplier can pay for). Unlike indices, suppliers can invest or acquire signals at some

costs. Collectively, indices and signals can influence buyers' trust in suppliers. According to information signaling theory, these supplier attributes should influence trust only if they are costly to change (indices) or acquire (signals).

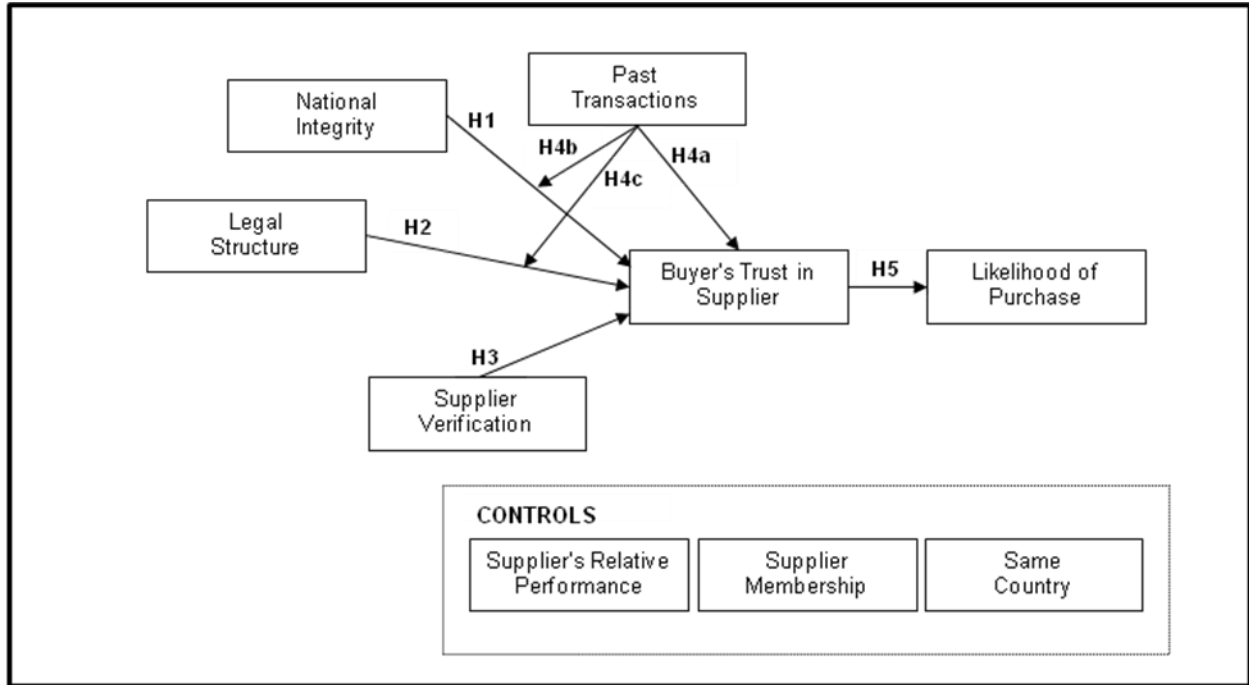
In this research, we study the antecedents and consequences of buyers' trust in suppliers in cross-border B2B e-commerce. Using Spence's (1973) distinction between information indices and signals, we look at how these types of information influence buyers' trust and how buyers' trust affects their purchase decisions. First, we ask how suppliers' country of origin influences buyers' trust. Suppliers cannot readily change their country of origin. To do so may require them to relocate to another country or set up foreign offices. Such moves are costly and challenging, and could disrupt their business operations or existing industry ties. 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 in the suppliers' countries.

Second, we look at how supplier signals can affect buyers' trust. On the Internet, suppliers can acquire signals through services provided by B2B exchanges. B2B exchanges are online intermediaries that facilitate transactions between buyers and suppliers. Many exchanges provide verification services that suppliers can use to increase buyers' trust. We examine the effectiveness of these services in achieving this objective.

Third, we examine situational opportunities and constraints that affect the influences of these trust-enhancing indices and signals (Johns 2006). It is essential to not only know whether and how country attributes and verifications engender buyers' trust, but also when they are more or less influential. Specifically, we look at how the effectiveness of perceived country attributes and verifications could be moderated by past transactions between buyers and suppliers. Finally,

we examine the impact of buyers' trust on their supplier-selection decisions. Figure 1 presents our research model.

Figure 1: Research Model



B. TRUST

We adapt Rousseau *et al.*'s (1998) definition of trust, and define buyers' trust in a supplier as the buyers' intention to accept vulnerability to the supplier based upon positive expectations of the intention or behavior of the supplier. Buyer-supplier trust has multiple impacts on transactions between organizations. It affects transaction costs (Chiles and McMackin 1996), governance choice, exchange performance (Gulati and Nickerson 2008), cooperation and commitment (Morgan and Hunt 1994), information sharing (Dyer and Chu 2003), negotiation and conflict (Zaheer *et al.* 1998) between organizations. Interorganizational trust has also been conceptualized as an organizing principle that affects the organization and coordination of economic activities (McEvily *et al.* 2003).

What constitutes trust is an important question. Mayer *et al.* (1995) identify three frequently proposed components of trust: ability, benevolence, and integrity. In the context of buyer-supplier trust, ability refers to the supplier's skills and competencies in meeting the buyer's organizational needs. Ability is thus context-dependent. In the case of B2B transactions, the buyer would focus on the supplier's ability to satisfy his purchase requirements. Benevolence reflects the overall goodwill of the supplier towards the buyer. A benevolent supplier is one who would not behave opportunistically towards the buyer for self-interested benefits. Rather, the supplier is concerned for the well-being of the buyer, even if it is not necessary to do so. Integrity is the supplier's adherence to principles (such as being honest and fair) that are acceptable to the buyer. The supplier's integrity is judged by the consistency in his behaviors, the credibility of his communication, and his commitments to justice and fairness (Mayer *et al.* 1995).

C. ANTECEDENTS OF BUYER'S TRUST

Indices: Suppliers' Country Attributes

Indices are observable, fixed and relatively unalterable attributes of an individual, such as race or nationality (Spence 1973). Spence argues that such attributes are immutably fixed – although attributes that do change but not at the discretion of the individual (e.g. age) also qualify as indices. He further points out that there is nothing an individual can do about indices.

In global B2B e-commerce, two suppliers' attributes that meet the definition of indices are the levels of (1) national integrity and (2) legal structure in a suppliers' country. These indices could influence buyers' perceptions of the norms, culture, or institutional structures in the suppliers' country, which in turn affects buyers' trust in suppliers. Societal norms can, and often do, limit deviant behaviors (Doney *et al.* 1998). Hence when a buyer perceives that the norms in a supplier's country encourage positive behaviors such as cooperation or honesty, he would

expect the supplier to behave likewise, leading to greater trust. Moreover, there is evidence of cultural differences in business practices and orientations across countries (e.g., Hofstede 1980; Xiao and Tsui 2007) and expectations of trustworthiness can and do vary by country (Fukuyama 1995; Mackie 2001). Country characteristics do affect trust in international alliances, where differences in business procedures (such as decision making processes) due to different national cultures cause trust between alliance partners to build slowly (Parkhe 1998b). Prior research also shows that country-of-origin has strong influences on evaluations of products (Bilkey and Nes 1982) and people (Madon *et al.* 2001).

Like international alliances, cross-border buyer-supplier transactions bring together individuals who may have “different patterns of behaving and believing, fundamentally different cognitive blueprints for interpreting the world, and, differences in the very structure of perceiving, thinking, and reasoning” (Parkhe 1998a). This motivates us to examine how buyers’ trust in suppliers in e-commerce transactions is influenced by their perceptions of the national integrity and legal structure in suppliers’ countries.

Perceived National Integrity

Integrity is an important component of trust (see Mayer *et al.* 1995). Most studies of integrity focus on how an individual actor’s integrity affects the trust that another actor places in him. Trust could also be related to the perceived² level of integrity in the society to which the actor belongs (Fukuyama 1995; Mackie 2001). We term this integrity that is present at a broader societal level *national integrity*, or the extent to which typical actors in a particular country are presumed to adhere to some sets of moral or ethical principles in their actions (e.g. fair and honest towards others).

² Unless otherwise indicated, in this paper level of national integrity is always perceived.

In B2B commerce, a buyer's perception of the national integrity in a supplier's country could shape his judgments and expectations of the moral character of typical suppliers in that country. These judgments and expectations, in turn, affect the buyer's cognition-based trust in a supplier's reliability and dependability (McAllister 1995). Suppliers from countries with a high level of national integrity may be expected to adhere to certain moral or ethical principles, showing integrity at the individual level. Furthermore, the higher the national integrity of a country, the greater would be the expected deterrence of deviant behaviors by the typical supplier. As this supplier seeks to conform to societal norms, he would engender others' trust in him. Conversely, in a country with low level of national integrity, deviant behaviors are expected to be more accepted or tolerated. Therefore, the level of national integrity is expected to be positively related to the level of intrinsic inclination and extrinsic pressure for personal integrity. Thus we hypothesize that:

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

Perceived Legal Structure

The supplier's country attributes can also influence institution-based trust formation—where the buyer's trust in the supplier is influenced by his trust in formal mechanisms (Parkhe 1998a; Zucker 1986). Trust in transactional relationships depends on the presence of stable legal, political, and social institutions (Lane and Bachmann 1996). For instance in e-commerce, institutional and structural factors such as encryption and feedback systems influence buyers' trust in suppliers (McKnight *et al.* 2002; Pavlou 2002). As the economy moves from local to national markets, transactions span longer social and geographical distances – this requires the production of institutional, formal trust (Zucker 1986). Extending this line of argument, we

expect that when transactions take place in international markets, institutional-based trust plays a significant role.

There are two ways in which perceived legal structure in a supplier's country affects a buyer's trust in that supplier. First, the level of legal structure affects the types of firms that operate in the country because legal structure influences various facets of business operations. For example, when a country has formalized licensing policies governing how businesses are formed and operate, opportunities for those that do not meet the requirements to operate are reduced. A buyer may expect suppliers from countries with effective business laws and regulations to be more competent. This is consistent with Zucker's assertion that "the emergence of licensing standards... increased the certainty of performance characteristics" (Zucker 1986: 94) – in other words, licensing provides some assurance of a licensee's ability to fulfill the buyer's requirements.

Second, the legal structure in a country affects the extent to which contracts are enforceable, and provides effective legal recourse when disputes arise. This is important to foreign buyers since trade disputes are more likely to occur given the separation in time and space of cross-boundary transactions. Regulations, laws and legislation are the mechanisms that provide broader societal guarantees needed by buyers and suppliers. Therefore, when the legal system in a country has rules and regulations in place and enforced, entities that are inclined towards behaving opportunistically or dishonestly may opt out of participating in the economy. A buyer may thus expect a supplier that operates in such an environment to be more benevolent and ethical.

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

Signals: Supplier Verification

Signals are information that a supplier can obtain to better communicate his ability, benevolence, or integrity to the buyer. For such signals to be credible (after all, talk is cheap), a critical prerequisite is that signaling costs must be negatively correlated with the capability that is being signaled (Spence 1973). Consider, for example, the provisions of product warranties by suppliers. For warranties to be effective signals of suppliers' quality, the costs of providing warranties must be high for low-quality suppliers, and low for high-quality suppliers.

Signals that are effective should create a separating equilibrium, where high-quality and low-quality suppliers have incentives to choose different signals (Boulding and Kirmani 1993). When such effective signals are in place, buyers can then distinguish between high-quality and low-quality suppliers based on the signals and make their assessments and decisions accordingly. Ineffective signals would create a pooling equilibrium, in which high-quality and low-quality suppliers share incentives to invest in same signals. Buyers would then be unable to differentiate the suppliers on the basis of those signals.

In global B2B e-commerce, online intermediaries that facilitate the transmission of signals are B2B exchanges. These exchanges function as market-aggregators, makers and facilitators (Bakos 1998; Dai and Kauffman 2002). They increase the pool of potential trading partners for buyers and suppliers by creating centralized marketplaces (Spulber 1999), and help firms bypass traditional distribution channels and extend their reach globally (Senn 2000). B2B exchanges also help reduce search costs through information discovery and/or price matching services (Lucking-Reiley and Spulber 2001). In addition, these exchanges can facilitate the formation of buyer-supplier trust. For example, some exchanges implement feedback mechanisms that buyers use to evaluate suppliers' trustworthiness (Pavlou 2002). Many B2B

exchanges also offer services that may serve as trust-building signals, such as third-party verifications of suppliers.

Supplier verifications play an important role in buyer-supplier trust, particularly in transactions that occur on B2B exchanges. Many exchanges 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).³ Compared to the suppliers' annual sales volumes or the values of typical B2B orders, the costs of B2B exchange memberships are relatively low. The ease and affordability of exchange memberships lead to issues such as (1) identity theft/misrepresentation, where a user intentionally and wrongfully submits a legally-existing supplier's information, or (2) phantom suppliers, where a user creates an account for a non-existing company. Buyers who purchase from such "suppliers" face the risks of non-performance and usually have limited options for legal recourse. For example, it is difficult for a buyer to locate or take legal actions against a non-existing company in a foreign country. However, due to the virtual nature and distance between trading partners in global B2B exchanges, buyers are unable to easily and directly verify suppliers' identities, which then may affect whether they trust these suppliers.

Buyers therefore rely on the 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 that would verify if that particular supplier on the exchange is a registered company. In addition, the verification process may involve

³ We compared the annual paid membership fees in the following B2B exchanges: Alibaba.com (www.alibaba.com: US\$7,300 for Gold Supplier; US\$600 for TrustPass), EC Plaza (www.ecplaza.com: US\$420), gsm Exchange (www.gsmexchange.com: US\$380). These exchanges also provide free membership options. This comparison was conducted in November 2008.

inspecting the supplier's production capabilities, premises and factories to ensure that information posted by the supplier in the B2B exchange is true. Such verifications can serve as signals of the legality of the supplier and authenticity of the information about him in the exchange. A supplier who passes the verification check usually receives a web-seal on his company's profile page in the B2B exchange to indicate that the information has been verified. Typically, the web-seal is valid for one year, after which the supplier would need to be recertified to maintain his verified status. This is to ensure that verified information is kept up-to-date.

Third-party supplier verifications are potentially credible signals as the costs to be verified could be significant. Although the fees to initiate verification checks may be relatively low, the costs associated with having the documentations, procedures or investments to pass the verification requirements are high. For instance, the supplier needs to register the business and be subject to regulation, demonstrate that he has the production capacity, and/or show the certifications that he claims to have (e.g. ISO 9001). In other words, the supplier has to invest a non-trivial amount of time and resources to pass the verification check. Suppliers that are unable to incur these associated costs would either fail or avoid undertaking the verification checks. Moreover, the third-party companies that provide verification services should have a continuing reputational stake in the verifications being accurate and untainted. This stake in their reputation is of greater value than acting opportunistically in any single context. As such, this helps ensure that independent verifications are being conducted with due care. Thus third-party verifications serve as a form of implicit guarantee (Parkhe 1998a) and contribute to the formation of firm-specific trust (Zucker 1986), much as is done by outside auditors in the context of managing the principal-agent problem in management settings (Antle 1982, 1984; DeFond *et al.* 2002).

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

Moderating Indices

A buyer's trust in the supplier can also be built through the accumulation of knowledge about the supplier (Lane 1998; Zucker 1986). In B2B e-commerce, such knowledge is often developed through direct and repeated interactions between the buyer and supplier (Koehn 2003). Hence the extent of repeated interactions – specifically the number of transactions between the buyer and supplier – represents the degree of accumulated knowledge and familiarity, and should therefore be positively related to the buyer's trust (Gefen 2000).

H4a: The number of transactions between the buyer and supplier is positively related to the buyer's trust in the supplier.

Of greater interest is how the number of transactions between the buyer and supplier interacts with the two country-level indices. When there are no transactions between the buyer and supplier or few of them, the buyer's trust is likely to be influenced by his expectations of the performance and behaviors of typical suppliers in the supplier's country. Such expectations can come from the buyer's perceptions of the national integrity and legal structure in that country. As they deal with each other more, the buyer would rely less on these indices in assessing the supplier's trustworthiness. Instead, he would base his assessment on the supplier's performances in past transactions as these provide more accurate cues of future performance. Thus as the number of transactions between them increases, perceptions of national integrity and legal structure in the supplier's country should have less influence on the buyer's trust.

H4b: Increased transactions between the buyer and supplier attenuate the effects of perceived level of national integrity in the supplier's country on the buyer's trust.

H4c: Increased transactions between the buyer and supplier attenuate the effects of perceived level of legal structure in the supplier's country on the buyer's trust.

It may seem reasonable to also hypothesize that information signals in the form of supplier verifications become less influential as the number of transactions between the buyer and supplier increases. However, the importance of supplier-specific signals to the buyer could hold even when his experience with the supplier increases. In our case, the legality of the supplier and the authenticity of his claims, which can be ascertained through third-party verifications, are important criteria for the buyer regardless of the length and strength of the buyer-supplier relationship.⁴ The buyer may interpret that something is amiss when the supplier fails to be verified – for example, he may wonder whether the supplier's license has been revoked, or his production capacity has changed.

Hence, unlike country-level indices, we do not expect repeat transactions between buyers and suppliers to negatively moderate the influences of supplier-specific signals on buyers' trust. These signals should remain relevant in buyers' evaluations of suppliers' trustworthiness even as buyer-supplier relationships mature. Specifically in our case, buyers' concern with suppliers' verification status should not diminish with more transactions.

D. CONSEQUENCES OF BUYER'S TRUST

Previous studies show that trust positively affects the relationships between buyers and suppliers (Doney and Cannon 1997). Similarly, Morgan and Hunt (1994) show that higher trust increases a retailer's commitment to and cooperation in the relationships with his supplier. In addition, they observe that trust increases the number of conflicts that are amiably resolved. Such conflict resolution serves to increase the productivity in the retailer-supplier relationship. Buyers

⁴ It is not uncommon for companies to purchase only from verified suppliers. For example, Starbucks would only purchase from suppliers that are independently audited and verified by a third-party company (<http://www.starbuckscoffeesupplier.com/index.asp>).

allocate a higher share of their businesses to suppliers whom they trust (Doney *et al.* 2007) Going beyond dyadic buyer-supplier relationships, Pavlou (2002) finds that a buyer's trust in the population of suppliers in a B2B exchange has positive influences on his satisfaction, perceived risk, and expectation of future transactions with those suppliers.

Buyers often consider and even purchase from multiple potential suppliers when making interorganizational procurement decisions. While earlier studies suggest that suppliers that are more trusted are more likely to be included in the buyers' supplier-selection *choice set* (e.g. Doney and Cannon 1997; Pavlou 2002), it is not clear which of these suppliers would be ultimately chosen. Therefore an important question is whether buyers' trust in the suppliers affects their supplier-selection *decisions*. We expect a buyer's supplier-selection decision to be related to his trust in the individual suppliers. The buyer's trust in the supplier provides self-assurance that the supplier could and would deliver the goods/services purchased (McKnight *et al.* 2002). Thus, the buyer is more likely to select the supplier in whom he has more trust.

H5: A buyer's trust in a supplier is positively related to the likelihood that the buyer selects the supplier for a purchase.

E. METHOD

Overview

Data were collected using an online survey of buyers on a global B2B exchange. This exchange started in the late 1990s, and provides an online platform for organizations worldwide to trade globally. It covers 24 key industries, such as agriculture, computer products, electronics, minerals and textiles. Buyers and suppliers can search for and post products, request for quotations, and make contact with one another through the exchange. Among the services that the exchange offers to suppliers are premium membership (US\$4,500 per annum) and third-party

verification services (US\$1,400 per annum). The exchange also offers other services such as banner advertising and reports of individual verified suppliers.

To develop the survey instrument, we first conducted a preliminary test among four 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 pretests that involved 600 randomly selected buyers in the B2B exchange. We enhanced the instrument after each pretest, and worked with the exchange to improve communication with the buyers. Since communication on the exchange (and in international trade) is primarily in English and we worked closely with the B2B exchange to fine-tune the survey instrument, we did not translate the instrument into various languages. The response rate during the pretests ranged from 2.5% in the first pretest to 8.5% in the final pretest.

5,250 buyers were randomly selected and invited by the B2B exchange to participate in the actual survey. The buyers were eligible to participate in the survey if they were members of the exchange, had made at least one posting in the exchange, and had logged in at least once within the three months before the survey. The buyers were given two weeks to complete the survey. A first reminder email was sent one week after the initial invitation, and a second reminder email was sent two days before the end of the survey. 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 results would be reported only after responses were aggregated across large categories of respondents. In addition, no identifying information was collected during the survey. To further encourage participation, respondents who completed the survey received a US\$20 credit to purchase supplier reports from the exchange.

In the survey instrument, the buyers were first asked to list company names or initials of two suppliers that they would consider for an imminent corporate purchase. At least one of the suppliers must be listed in the exchange, so that we could examine the influences of third-party verifications. Buyers who were not making such a purchase would exit the survey and be given the US\$20 credit by the B2B 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), evaluated each supplier's performance in past transactions (if any), and rated their trust in each supplier. Finally, the buyers were asked their perceptions of the national integrity and legal structure in each of the supplier's country.

287 buyers completed the survey, providing information about 574 distinct suppliers (two suppliers per respondent). Another 113 buyers exited the survey as they were not about to make a corporate purchase in which two suppliers would be considered. Hence our effective response rate is 5.6%. Low response rates in cross-national industrial surveys are not unusual (Dillman 2000; Harzing 2000), as respondents may be unwilling to participate due to lack of time or interest (e.g. Doney *et al.* 2007). The average buyer in our dataset had 3 to 5 years of B2B e-commerce experience. On average, the buyer's company has between 10 and 19 employees and sales between US\$500,000 and US\$999,000 in the previous financial year. 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.

Measures

The items used in this study are presented in Table 1.⁵

⁵ Correlation matrix of the survey items is available upon request.

Table 1: Study Measures

| Construct | Items (Measure: Scale ^a /Nominal/Ordinal) | Cronbach's Alpha |
|-------------------------------------|---|---------------------|
| Likelihood of Purchase | PURC1. Is it likely that you would buy from the supplier for the purchase that you are thinking about? (Scale: <i>Very unlikely – Undecided – Very likely</i>) | - |
| Trust | To what extent do you agree with the following statements: (Scale: <i>Strongly disagree – Neither agree nor disagree – Strongly agree</i>) TRUS1. The supplier is very capable of performing its job. TRUS2. I am confident about the supplier's capabilities. TRUS3. The supplier is well qualified. TRUS4. The supplier would not knowingly do anything to hurt me. TRUS5. The supplier really looks out for what is important to me. TRUS6. The supplier will go out of its way to help me. TRUS7. I never have to wonder whether the supplier will stick to its word. TRUS8. The supplier tries to be fair in dealings with others. TRUS9. Sound principles seem to guide the supplier's behavior. TRUS10. The supplier can be trusted. | .926 |
| National Integrity | In your opinion, how likely would suppliers from the supplier's country do the following? (Scale: <i>Very unlikely – Neither likely nor unlikely – Very likely</i>) NINT1. Behave with integrity NINT2. Do the right things in business deals always, even when no one is watching | .685 |
| Legal Structure | LEGL1. How confident are you with the legal system in the supplier's country? (Scale: <i>Not confident – Moderately confident – Very confident</i>) In your opinion, how effective are the laws and regulations in the supplier's country concerning the following activities? (Scale: <i>Very ineffective – Neither effective nor ineffective – Very effective</i>) LEGL2. Governing operations of the suppliers LEGL3. Resolving business disputes | .851 |
| Supplier Verification | VERF1. What is the verification status of the supplier in the exchange? (Nominal: <i>Verified, Not verified</i>) | - |
| Past Transactions | PTXN1. How many times has your company purchased from the supplier in the last 12 months? (Ordinal: <i>0, 1 to 4, 5 to 9, 10 to 19, 20 to 29, 30 or more</i>) | - |
| Supplier's Performance | How does the supplier compare to other suppliers in terms of price? ^b (Nominal: <i>Yes, No</i>) | - |
| Relative Price (Better) | PRIC1. Better than other suppliers in price performance | |
| Relative Price (Worse) | PRIC2. Worse than other suppliers in price performance | |
| Relative Price (Not Sure) | PRIC3. Not sure about supplier's relatively price performance | |
| | How does the supplier compare to other suppliers in terms of product availability? ^b (Nominal: <i>Yes, No</i>) | |
| Relative Product (Better) | PRDT1. Better than other suppliers in product availability performance | |
| Relative Product (Worse) | PRDT2. Worse than other suppliers in product availability performance | |
| Relative Product (Not Sure) | PRDT3. Not sure about supplier's relatively product availability performance | |
| | How does the supplier compare to other suppliers in terms of delivery? ^b (Nominal: <i>Yes, No</i>) | |
| Relative Delivery (Better) | DLVR1. Better than other suppliers in delivery performance | |
| Relative Delivery (Worse) | DLVR2. Worse than other suppliers in delivery performance | |
| Relative Delivery (Not Sure) | DLVR3. Not sure about supplier's relatively delivery performance | |

| | | |
|---------------------|--|---|
| Non-Member | MEMB1. Is supplier listed in the B2B Exchange? ^c (Nominal: Yes, No) | - |
| Paid Member | MEMB2. What is the membership type of the supplier in the exchange? (Nominal: Paid member, Free member) | - |
| Same Country | SAME1. Are the supplier and buyer from the same country? ^c (Nominal: Yes; No) | - |

Notes:
^a All scales are based on a 5-point Likert scale.
^b The responses were initially measured on a 5-point Likert scale (*Much worse than other suppliers – Equal to other suppliers – Much better than other suppliers*) with an additional “Not sure” option. We recoded these into 3 dummy variables (not sure, worse than, better than).
^c Not an actual item in the survey – the value is obtained from the buyer’s responses to items concerning his and the suppliers’ demographic profiles.

Likelihood of Purchase: Buyers estimated on a 5-point Likert scale their likelihood of making the imminent purchase with the particular supplier. Verbal statements of purchase intentions are excellent predictors of actual purchase behavior. Sheppard *et al.* (1998) found in a meta-analysis of 79 studies with a sample size 11,669 that the frequency-weighted average correlation of estimation of intentions to perform an act and actual behavior was .57.

Trust: We use the scales developed by Mayer and Davis (1999), which are based on Mayer *et al.* (1995), to measure the buyer’s trust in the supplier.

National Integrity: Two items are used to measure the buyer’s perceptions of the national integrity in a particular supplier’s country: the likelihood that suppliers in that country would (i) behave with integrity and (ii) do the right things in business deals. Appendix A shows the average national integrity rating for each country in our sample.

Legal Structure: Three items are used to measure the buyer’s perception of the legal structure in the supplier’s country: (i) the buyer’s confidence in the legal systems in that country, and the perceived effectiveness of the laws and regulations in that country to (ii) govern the suppliers’ operations and (iii) resolve business disputes. Appendix A shows the average legal structure rating for each country in our sample.

We also check the correlation of our perceived legal structure measure with the Global Competitiveness Index (GCI).⁶ This index covers 131 countries and measures twelve macroeconomic and microeconomic components of national competitiveness, such as financial market sophistication and technological readiness. The institution component in GCI takes into account the efficiency of countries' legal framework, and it correlates positively with our aggregated measure of perceived legal structure ($r = .22, p < .005$). Given that our aggregated measure is based on small numbers of raters, this is a reasonable result.

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

Past Transactions: We account for the buyer's experience with the supplier using the number of transactions between them over the last 12 months.

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 performances (Doney and Cannon 1997). The responses for each relative performance criteria are measured on a 5-point Likert scale, ranging from *performing much worse* to *performing much better*. The neutral point is that the supplier's performance is equal to other suppliers'. Alternatively, the buyer can indicate "not sure" if he was unable to ascertain the supplier's relative performance. To account for this valid response, we recoded the responses 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"

⁶ The index is developed by World Economic Forum (<http://gcr.weforum.org/gcr/>). We use the scores in the 2007-2008 Global Competitiveness Index report.

response. Compared to the base category, we expect buyer's trust to be positively related to relative performance that is better than other suppliers, and negatively related to relatively performance that is worse than other suppliers or cannot be ascertained.

Supplier Membership: We use dummy coding to control for different categories of supplier membership. Suppliers who are not on the B2B exchange are in the *non-member* category. Among suppliers who are listed on the exchange, those with paid memberships are in the *paid member* category. The buyer indicated "not sure" if he could not recall the supplier's membership type in the B2B exchange. The variables for *non-member* and *paid member* are included in our analysis; the reference category is suppliers on the exchange with free membership or whose membership types could not be recalled by buyers.

Same Country: As cultural or ethnical similarity could influence trust, we control for whether the buyer and supplier are from the same country using a dummy variable. Since the buyer indicated his and the supplier's countries during the survey, we matched his responses to code this dummy variable. The variable takes the value of 1 if the buyer and supplier are from the same country and 0 otherwise.

F. ANALYSES AND RESULTS

The descriptive statistics and correlation matrix of the principal constructs are presented in Table 2. We mean-centered the measures for national integrity, legal structure, and past transactions before entering the interaction terms to control for multicollinearity. We calculated Cronbach's α to estimate the reliability for all multi-item scales – trust, national integrity, and legal structure – and list these in Table 1. The estimates suggest the items have reasonable internal consistency. In addition, the variance inflation factors are all less than 3.0 and within acceptable range (Table 2). Finally, we assessed the presence of common method variance in two

ways. First, we conducted Harman's one-factor test and found that the scale items load onto more than one factor (Podsakoff and 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).⁷ The within-supplier covariance is at least 1.5 times the between-supplier covariance, indicating that common method variance does not appear to completely account for the relationship between buyer's trust and likelihood of purchase.

Antecedents of Buyer's Trust

Table 3 shows our models that test the first four hypotheses. The data are hierarchically structured, with two suppliers nested within each buyer, violating assumptions of independence. To account for the non-independence of the data reported, we use mixed effects regression, also known as hierarchical linear models (Raudenbush and Bryk 2002). We fit models using restricted maximum likelihood to correct for the degrees of freedom used in estimating the independent regression parameters. This results in less biased estimates of the variance-covariance and more conservative hypothesis tests than OLS regression (Raudenbush and Bryk 2002).

⁷ The within-supplier covariance of buyer's trust in and likelihood of purchasing from the *first* supplier is .28; the between-supplier covariance of buyer's trust in the *second* supplier and the likelihood of purchasing from the *first* supplier is .18. The within-supplier covariance of buyer's trust in and likelihood of purchasing from the *second* supplier is .32; the between-supplier covariance of buyer's trust in the *first* supplier and the likelihood of purchasing from the *second* supplier is .11. The correlation/covariance matrix is available upon request.

Table 2: Descriptive Statistics and Correlation Matrix of Principal Constructs

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | |
|---------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|
| 1 Likelihood of Purchase | 1.00 | | | | | | | | | | | | | | | | | | |
| 2 Trust | 0.38 | 1.00 | | | | | | | | | | | | | | | | | |
| 3 Relative Price (Not Sure) | -0.11 | -0.17 | 1.00 | | | | | | | | | | | | | | | | |
| 4 Relative Price (Worse) | -0.22 | -0.17 | -0.14 | 1.00 | | | | | | | | | | | | | | | |
| 5 Relative Price (Better) | 0.23 | 0.28 | -0.44 | -0.37 | 1.00 | | | | | | | | | | | | | | |
| 6 Relative Product (Not Sure) | -0.11 | -0.24 | 0.65 | -0.10 | -0.27 | 1.00 | | | | | | | | | | | | | |
| 7 Relative Product (Worse) | -0.20 | -0.32 | -0.08 | 0.39 | -0.17 | -0.10 | 1.00 | | | | | | | | | | | | |
| 8 Relative Product (Better) | 0.23 | 0.40 | -0.30 | -0.17 | 0.45 | -0.45 | -0.25 | 1.00 | | | | | | | | | | | |
| 9 Relative Delivery (Not Sure) | -0.06 | -0.21 | 0.59 | -0.10 | -0.24 | 0.68 | -0.11 | -0.28 | 1.00 | | | | | | | | | | |
| 10 Relative Delivery (Worse) | -0.17 | -0.28 | -0.11 | 0.26 | -0.12 | -0.11 | 0.55 | -0.20 | -0.15 | 1.00 | | | | | | | | | |
| 11 Relative Delivery (Better) | 0.22 | 0.45 | -0.29 | -0.11 | 0.40 | -0.35 | -0.16 | 0.65 | -0.50 | -0.25 | 1.00 | | | | | | | | |
| 12 Non-Member | -0.02 | 0.10 | -0.02 | 0.06 | -0.04 | -0.06 | 0.05 | 0.04 | -0.10 | 0.03 | 0.08 | 1.00 | | | | | | | |
| 13 Paid Member | -0.02 | -0.10 | 0.05 | 0.05 | -0.02 | 0.04 | 0.09 | -0.07 | 0.02 | 0.00 | -0.08 | -0.24 | 1.00 | | | | | | |
| 14 Same Country | 0.07 | 0.05 | -0.08 | 0.03 | 0.07 | -0.05 | -0.03 | 0.02 | -0.04 | 0.00 | 0.04 | 0.03 | 0.04 | 1.00 | | | | | |
| 15 National Integrity | 0.21 | 0.30 | -0.05 | -0.09 | 0.10 | -0.09 | -0.11 | 0.15 | -0.10 | -0.11 | 0.17 | 0.09 | -0.03 | 0.09 | 1.00 | | | | |
| 16 Legal Structure | 0.16 | 0.30 | -0.02 | -0.04 | 0.18 | -0.07 | -0.11 | 0.19 | -0.05 | -0.10 | 0.20 | 0.11 | -0.04 | 0.10 | 0.51 | 1.00 | | | |
| 17 Supplier Verification | 0.11 | 0.11 | 0.01 | -0.02 | 0.09 | -0.02 | 0.03 | 0.09 | 0.00 | 0.01 | 0.03 | -0.20 | 0.38 | -0.04 | 0.11 | 0.18 | 1.00 | | |
| 18 Past Transactions | 0.08 | 0.22 | -0.24 | -0.03 | 0.19 | -0.23 | 0.10 | 0.21 | -0.35 | 0.04 | 0.31 | 0.15 | -0.08 | 0.00 | 0.09 | 0.08 | -0.02 | 1.00 | |
| Mean | 3.79 | 3.81 | 0.15 | 0.11 | 0.53 | 0.15 | 0.05 | 0.53 | 0.23 | 0.07 | 0.45 | 0.24 | 0.16 | 0.49 | 0.00 | 0.00 | 0.11 | 0.00 | |
| S.D. | 1.05 | 0.75 | 0.35 | 0.31 | 0.50 | 0.36 | 0.23 | 0.50 | 0.42 | 0.25 | 0.50 | 0.42 | 0.37 | 0.50 | 1.00 | 1.05 | 0.32 | 1.28 | |
| Min | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -2.45 | -2.05 | 0 | -0.87 | |
| Max | 5 | 5 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.55 | 1.95 | 1 | 4.13 | |
| VIF | 1.25 | 1.66 | 2.42 | 1.54 | 1.93 | 2.81 | 1.79 | 2.45 | 2.90 | 1.62 | 2.76 | 1.15 | 1.27 | 1.04 | 1.43 | 1.50 | 1.31 | 1.24 | |

Table 3: Antecedents of Trust (Hierarchical Linear Models)

| TRUST | Model 1A | | | Model 1B | | | Model 1C | | | Model 1D | | |
|--|----------|--------------|-----|----------|--------------|-----|----------|--------------|-----|----------|--------------|-----|
| | Coef. | P> z | | Coef. | P> z | | Coef. | P> z | | Coef. | P> z | |
| Constant | 3.61 | 0.00 | *** | 3.67 | 0.00 | *** | 3.66 | 0.00 | *** | 3.66 | 0.00 | *** |
| Relative Price (Not Sure) | -0.01 | 0.91 | | -0.04 | 0.72 | | -0.04 | 0.70 | | -0.04 | 0.69 | |
| Relative Price (Worse) | -0.05 | 0.64 | | -0.04 | 0.70 | | -0.03 | 0.79 | | -0.03 | 0.73 | |
| Relative Price (Better) | 0.08 | 0.23 | | 0.05 | 0.44 | | 0.05 | 0.43 | | 0.05 | 0.46 | |
| Relative Product (Not Sure) | -0.26 | 0.03 | ** | -0.26 | 0.02 | ** | -0.25 | 0.03 | ** | -0.22 | 0.05 | ** |
| Relative Product (Worse) | -0.69 | 0.00 | *** | -0.68 | 0.00 | *** | -0.67 | 0.00 | *** | -0.68 | 0.00 | *** |
| Relative Product (Better) | 0.06 | 0.39 | | 0.02 | 0.75 | | 0.03 | 0.69 | | 0.04 | 0.63 | |
| Relative Delivery (Not Sure) | 0.04 | 0.72 | | 0.09 | 0.36 | | 0.09 | 0.37 | | 0.06 | 0.51 | |
| Relative Delivery (Worse) | -0.21 | 0.09 | * | -0.22 | 0.07 | * | -0.24 | 0.05 | ** | -0.23 | 0.06 | * |
| Relative Delivery (Better) | 0.40 | 0.00 | *** | 0.35 | 0.00 | *** | 0.34 | 0.00 | *** | 0.35 | 0.00 | *** |
| Non-Member | 0.11 | 0.05 | * | 0.06 | 0.30 | | 0.06 | 0.26 | | 0.07 | 0.19 | |
| Paid Member | -0.05 | 0.54 | | -0.11 | 0.18 | | -0.10 | 0.20 | | -0.10 | 0.18 | |
| Same Country | 0.03 | 0.67 | | 0.01 | 0.91 | | 0.01 | 0.83 | | 0.01 | 0.91 | |
| National Integrity | | | | 0.11 | 0.00 | *** | 0.11 | 0.00 | *** | 0.07 | 0.04 | ** |
| Legal Structure | | | | 0.06 | 0.05 | ** | 0.07 | 0.03 | ** | 0.07 | 0.04 | ** |
| Supplier Verification | | | | 0.23 | 0.01 | ** | 0.24 | 0.01 | ** | 0.18 | 0.06 | * |
| Past Transactions | | | | 0.07 | 0.00 | *** | 0.07 | 0.00 | *** | 0.07 | 0.01 | ** |
| Past Transactions * National Integrity | | | | | | | 0.00 | 0.98 | | 0.00 | 0.84 | |
| Past Transactions * Legal Structure | | | | | | | -0.04 | 0.04 | ** | -0.04 | 0.03 | ** |
| Past Transactions * Supplier Verification | | | | | | | 0.08 | 0.21 | | 0.08 | 0.22 | |
| National Integrity * Supplier Verification | | | | | | | | | | 0.17 | 0.03 | ** |
| Legal Structure * Supplier Verification | | | | | | | | | | 0.06 | 0.54 | |
| Random-effects Parameters | Estimate | [95% CI] | | Estimate | [95% CI] | | Estimate | [95% CI] | | Estimate | [95% CI] | |
| var(Constant) | 0.17 | [0.12, 0.23] | | 0.15 | [0.11, 0.20] | | 0.14 | [0.10, 0.19] | | 0.14 | [0.10, 0.20] | |
| var(Residual) | 0.24 | [0.20, 0.28] | | 0.22 | [0.19, 0.26] | | 0.22 | [0.19, 0.26] | | 0.22 | [0.19, 0.26] | |
| Wald χ^2 | | 213.12 | | | 281.15 | | | 287.85 | | | 302.20 | |
| AIC | | 1111.52 | | | 1091.17 | | | 1106.80 | | | 1108.02 | |
| BIC | | 1176.80 | | | 1173.87 | | | 1202.56 | | | 1212.49 | |

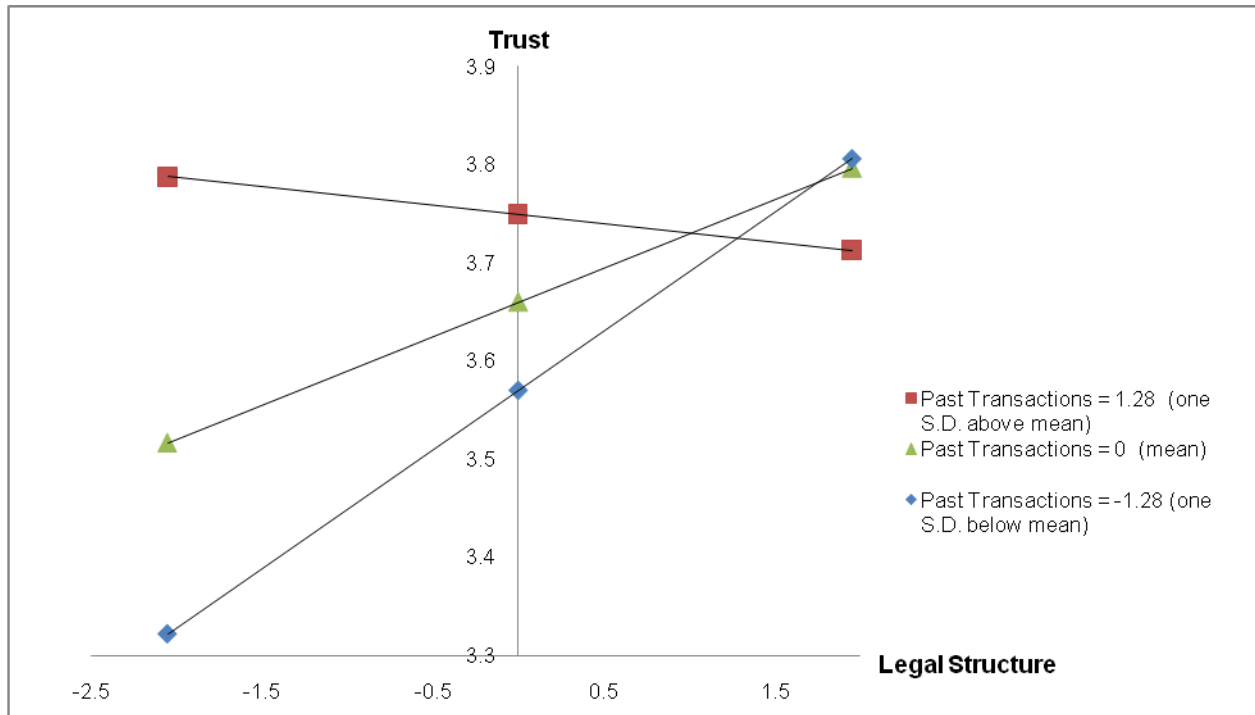
* $p < .10$ ** $p < .05$ *** $p < .01$

Model 1A is the baseline model containing only control variables: the reference supplier's performance relative to other suppliers, whether the supplier has a membership in the exchange, and if so whether it is paid or unpaid, and whether the supplier and buyer are from the same country. Trust is associated with buyers' beliefs about the supplier's performance relative to others in terms of product quality and delivery, but not price. Surprisingly, buyers trusted suppliers that were members of the exchange less than non-member. However, this effect goes away once we account for past transactions between buyers and suppliers. Suppliers' paid membership status and their match to the buyer's country of origin were not related to trust.

Model 1B introduces the direct effects of national integrity, legal structure, supplier verification, and the number of past transactions between the buyer and supplier. Buyers trust suppliers more if they perceive their country has higher national integrity ($b = .11, p < .01$) and legal structure ($b = .06, p < .05$) and if they believe the supplier has been verified by a third party ($b = .23, p < .05$). Hence hypotheses 1 to 3 are supported. The number of transactions between the buyer and supplier is also positively related to trust ($b = .07, p < .01$), supporting H4a.

In Model 1C, we add the interactions between the number of past transactions and national integrity, perceived legal structure, and verification. The interaction between the number of past transaction and perceived legal structure is negative, indicating that as the number of transactions between the buyer and supplier increases, the buyer's perception of the legal structure in the supplier's country has less influence on the buyer's trust ($b = -.04, p < .05$). These results support H4c. Figure 2 shows the relationships between buyer's trust and perceived legal structure at three levels of past transactions: the sample mean, and one standard deviation above and below the mean. The slopes become less steep as the level of past transactions increases, implying that buyer's trust is less sensitive to changes in perceived legal structure.

Figure 2: Interaction between Legal Structure and Past Transactions



The interaction between past transactions and national integrity is not significant ($b = .00$, $p > .10$), providing no support for H4b. As expected, the interaction between number of past transaction and verification is not significant ($b = .08$, $p > .10$), indicating that the associations of past transactions and verification on trust are independent of each other.

Consequences of Buyer's Trust

We use an ordered probit regression to examine the relationship between a buyer's trust in the referent supplier and the likelihood of purchasing from that supplier. To control for intraclass correlation between observations from the same buyer, we use clustered robust standard errors when running the ordered probit regression (Wooldridge 2002). The results are shown in Table 4. As indicated in Model 2B, buyer's trust in the supplier is positively related to the likelihood that the buyer would purchase from that supplier ($b = .48$, $p < .01$). H5 is thus supported.

Table 4: Consequence of Trust (Ordered Probit Regression)

| LIKELIHOOD OF PURCHASE | Model 2A | | | Model 2B | | |
|---|-----------------------|---------|-----|----------|------|-----|
| | Coef. | P> z | | Coef. | P> z | |
| Trust | | | | 0.48 | 0.00 | *** |
| Relative Price (Not Sure) | -0.24 | 0.17 | | -0.24 | 0.18 | |
| Relative Price (Worse) | -0.45 | 0.01 | *** | -0.46 | 0.00 | *** |
| Relative Price (Better) | 0.15 | 0.23 | | 0.13 | 0.30 | |
| Relative Product (Not Sure) | -0.20 | 0.21 | | -0.06 | 0.71 | |
| Relative Product (Worse) | -0.26 | 0.40 | | 0.07 | 0.79 | |
| Relative Product (Better) | 0.06 | 0.62 | | 0.06 | 0.65 | |
| Relative Delivery (Not Sure) | 0.28 | 0.07 | * | 0.24 | 0.13 | |
| Relative Delivery (Worse) | -0.14 | 0.55 | | -0.04 | 0.87 | |
| Relative Delivery (Better) | 0.30 | 0.05 | * | 0.13 | 0.43 | |
| Non-Member | -0.05 | 0.65 | | -0.11 | 0.31 | |
| Paid Member | -0.08 | 0.58 | | -0.02 | 0.89 | |
| Same Country | 0.09 | 0.37 | | 0.09 | 0.37 | |
| National Integrity | 0.16 | 0.01 | *** | 0.12 | 0.06 | * |
| Legal Structure | 0.03 | 0.65 | | 0.00 | 0.96 | |
| Supplier Verification | 0.46 | 0.03 | ** | 0.34 | 0.13 | |
| Past Transactions | 0.08 | 0.21 | | 0.05 | 0.40 | |
| Past Transactions * National Integrity | 0.09 | 0.16 | | 0.08 | 0.24 | |
| Past Transactions * Legal Structure | -0.03 | 0.55 | | -0.01 | 0.84 | |
| Past Transactions * Supplier Verification | -0.18 | 0.31 | | -0.24 | 0.20 | |
| | Wald χ^2 | 93.31 | | 102.77 | | |
| | Pseudo R ² | 0.07 | | 0.10 | | |
| | AIC | 1464.01 | | 1427.31 | | |
| | BIC | 1564.12 | | 1531.78 | | |
| * $p < .10$ ** $p < .05$ *** $p < .01$ | | | | | | |

Robustness Check

Of the 574 suppliers in our dataset, 439 are listed in the B2B exchange. We could uniquely identify 194 (44.2%) 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 are “not sure” about suppliers' membership types or verification status, 61% of membership type indicator and 66% of verification status indicator in our dataset match the information from the exchange. These are conservative estimates of correct matches since 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. To check the robustness of

our results, we recoded our dataset with the exchange data whenever buyers indicate that they are not sure of a supplier's membership type or verification status. We do not find significant differences in the results between using the recoded dataset and original dataset.

Post-hoc Analysis

Apart from their direct effects, information indices and signals could jointly affect buyers' trust in suppliers. Specifically, the effectiveness of supplier verifications on buyers' trust could be positively moderated by the level of national integrity. The expectation that suppliers in countries with high level of national integrity are likely to adhere to acceptable moral and ethical principles should reinforce the positive effects of verifications on buyers' trust.

However, the presence and direction of interaction between legal structure in the suppliers' countries and verifications is less predictable. When the level of legal structure is low, it could be more critical for buyers to identify suppliers who satisfy the minimum requirements in business formation and/or operations. On the other hand, verifications could also be less meaningful to buyers when business regulations in the suppliers' countries appear to be weak or lacking, since verified suppliers who meet the legal requirements may not necessarily be competent enough to meet buyers' needs.

We test the interactions between verification and country characteristics in Model 1D. The significant positive interaction between verification and perceived national integrity indicates that these two sources of trust augment each other; verification has a stronger impact on trust when the supplier comes from a country with higher integrity ($b = .17, p < .05$). The interaction between verification and perceived legal structure, while also positive, was not reliably different from zero ($b = .06, p > .10$).

G. DISCUSSION

To the best of our knowledge, this is the first study that examines trust formation in global B2B e-commerce, where buyers and suppliers may be from different countries. Building on Spence's (1973) work on information signaling, we classify perceived level of national integrity and legal structure in the supplier's country as indices that are inherently unalterable by the supplier, and third-party verifications on B2B exchanges as signals that the supplier can manipulate at his discretion at some costs. We find that indices and signals have positive effects on buyers' trust. Contrary to our expectations, only perceptions of legal structure interacts negatively with the number of transactions between buyers and suppliers ($b = -.04, p < .05$). Lastly, we find that buyers' trust positively affects their supplier-selection decisions. Buyers are more likely to purchase from suppliers whom they trust more ($b = .48, p < .01$).

Theoretical Implications

One key contribution of Internet and e-commerce technologies is that they help people and businesses to overcome geographical limitations. Businesses can now easily look beyond their local markets for new buyers and suppliers on the Internet. However, although being able to participate in the global marketplace is an attractive proposition, the risks and uncertainties that come with it are qualitatively different from those that arise in domestic trade. By focusing on globalized B2B e-commerce, this study examines important factors of trust that are not salient in localized e-commerce. Our results show that perceptions of country attributes are influential in affecting buyers' trust. It is thus important to account for such indices and signals when studying information asymmetry and signaling. Often, indices are treated as given. This study shows that they have informational impacts even though – or perhaps precisely because – they are relatively unalterable by suppliers (Spence 1973).

Interestingly, the two perceptions of suppliers' country attributes have different influences on buyers' trust as experience with the supplier (as measured by past transactions) increases. Whereas the effects of legal structure on buyers' trust diminish with repeat transactions, national integrity remains influential. These differences could be a result of the basis of trust that each perception represents. In our case, perceived legal structure is an institution-based trust mechanism. Such third-party, institutional mechanisms provide less specific cues of individual suppliers' competency especially when buyers gain firsthand and direct experiences with the suppliers. Furthermore, buyers and suppliers often 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 peacefully through direct negotiations. Hence buyers' reliance on the legal system in suppliers' countries decreases with repeat transactions.

Perceived national integrity, on the other hand, is a cognition-based trust mechanism. Wicks *et al.* (1999) point out that social norms could affect the optimal level of trust. An individual could be highly rated in terms of his ability, benevolence and/or integrity, but the larger context may make trusting him unwise or indicate the need for lower trust. For example, when opportunism is common in a culture, high integrity and benevolence of an individual may be insufficient assurance that the individual will not be opportunistic (Wicks *et al.* 1999). Hence cognitive judgments, even those of the board-level environment in which suppliers operate, could remain relevant in assessing specific suppliers' trustworthiness with increased transactions. The fact that the other cognition-based trust mechanism in our study – supplier verification – is not significantly moderated by repeat transactions lends some supports to this proposition.

Our findings also contribute to our understanding of institution-based trust. Institution-based trust mechanisms are strong determinant of initial trust in e-commerce (McKnight *et al.* 2002). Our results support this observation yet, more importantly, show that the influences of institution-based trust mechanisms on buyers' trust may diminish with increased transactions. This suggests that it is necessary to account for the length and strength of buyer-suppliers relationships when examining institution-based trust.

Managerial Implications

Apart from third-party verification, another potential signal for suppliers in B2B exchanges is paid membership. It is interesting, however, that the relationship between buyer's trust and paid membership is not significant ($b = -.11, p > .10$). Unlike verification services, the associated costs for paid memberships are usually just the membership fees – which may not be effective barriers for low-trustworthy suppliers. Membership costs could be too low to separate types of suppliers, leading to a pooling equilibrium. In fact, the negative sign of the estimated coefficient for paid membership indicates that buyers may distrust suppliers that are on paid memberships. We observe this phenomenon among B2B exchange users. For instance, a participant in an online community shared his experiences with paying members (Gold member) in a B2B exchange (Alibaba.com):

“Bear in mind that I have succesfully [*sic*] dealt with a Alibaba Gold member, and still do this day, so I was taken in by the belief that Gold membership meant that the compnay [*sic*] I was dealing with would be more genuine, then [*sic*] say a free member seller. I now know that this is not the case!”⁸

Paid memberships are important revenue sources for B2B exchanges. Granted that there are various 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

⁸Directly quoted from The Wholesale Forum: <http://www.thewholesaleforums.co.uk/forum/bad-supplier-experiences/15465-alibaba-gold-member-scam.html#post110823>, accessed on December 27, 2008.

for exchanges to explore how they can help those trustworthy suppliers who take up paid membership to 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 records on the exchanges. This might help buyers differentiate among suppliers based on paid memberships.

Our post-hoc analysis indicates that suppliers should be aware of how the effectiveness of third-party verifications in influencing buyers' trust depends on the buyers' perceptions of the national integrity in their countries. However, while initiating a verification check is a supplier's decision, influencing perceived national integrity is essentially beyond an individual supplier's control. Moreover, perceptions of national integrity in a particular country may differ among buyers, making it more challenging for suppliers to maximize the benefits of third-party verifications. As such, what might be needed is a concerted effort to improve the integrity reputation of suppliers at the industry or country level. This would benefit both individual suppliers and the respective countries as a whole. This can sometimes be done through voluntary business associations developing accreditation standards and self-regulation. Knack and Keefer (1997) find that a 10% increase in the level of trust in a society is associated with a .8% rise in annual growth in per capita income.

Limitations and Suggestions for Future Studies

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, the recent safety issues in China's toys and dairy industries could affect the trustworthiness of suppliers in these industries (Wall Street Journal 2007, 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 high-level perceptions influence trust at dyadic levels.

The results from this study indicate that the influences of various antecedents of trust change as the number of transactions between the buyer and supplier increases. However, our one-time cross-sectional survey of buyers limits us from examining the how such changes occur. Longitudinal studies would help to reveal the evolution of buyer-supplier trust and relationships in global B2B exchanges. These findings would also have important implications on the roles and relevancy of B2B exchanges at different stages of buyer-supplier relationships.

H. CONCLUSION

So, is the world flat? Maybe not so much. Although physical geographical boundaries are now less of an obstacle in economic exchanges with the advancement of technology, 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 e-commerce are shaped by country characteristics. Increasingly, transactions are taking place globally, and this is not restricted to B2B e-commerce. Consumers in various parts of the world can now purchase from US-based online retailers (e.g. Amazon.com) or individuals (e.g. through eBay). Yet most research in e-commerce focuses mainly on deals that occur locally (particularly in the US). Adopting a cross-boundary and global perspective in e-commerce studies not only would enrich research but also help to further maximize the benefits that the Internet and e-commerce bring to the global marketplace.

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Appendix A: Average National Integrity and Legal Structure Ratings by Country

| Country | National Integrity | Legal Structure | <i>n</i> | Country | National Integrity | Legal Structure | <i>n</i> |
|-------------------|--------------------|-----------------|----------|----------------------|--------------------|-----------------|----------|
| Armenia | 5 | 4.33 | 1 | Mexico | 3.5 | 3 | 1 |
| Australia | 4 | 3.67 | 4 | New Zealand | 5 | 4.33 | 1 |
| Austria | 4 | 4 | 1 | Nigeria | 3.28 | 3.7 | 9 |
| Bahrain | 5 | 5 | 1 | Norway | 4.5 | 4.33 | 1 |
| Belgium | 3.5 | 4.56 | 3 | Pakistan | 3.5 | 2.89 | 3 |
| Benin | 3 | 3.33 | 1 | Peru | 4 | 3.67 | 1 |
| Botswana | 2.5 | 2.33 | 1 | Qatar | 4.5 | 4.67 | 1 |
| Brazil | 3.17 | 2.11 | 3 | Romania | 4 | 4.33 | 1 |
| Bulgaria | 3 | 3 | 1 | Russia | 4.5 | 3.87 | 5 |
| Canada | 3.5 | 3.5 | 2 | Saudi Arabia | 3 | 3 | 1 |
| China | 3.34 | 2.84 | 403 | Singapore | 3 | 3.67 | 2 |
| Congo (Dem. Rep.) | 3 | 2.33 | 1 | Slovenia | 4 | 2.33 | 1 |
| Denmark | 5 | 4.33 | 1 | South Africa | 4.5 | 4 | 2 |
| Egypt | 3 | 2 | 1 | South Korea | 3.5 | 4 | 3 |
| Finland | 5 | 4.67 | 1 | Spain | 5 | 4.33 | 1 |
| France | 4.5 | 4.33 | 1 | Switzerland | 4.5 | 3 | 1 |
| Germany | 4.06 | 4.19 | 9 | Taiwan | 3.88 | 3.21 | 13 |
| Hong Kong | 3.5 | 3.73 | 10 | Thailand | 5 | 4 | 1 |
| India | 3.35 | 3.25 | 34 | Turkey | 4.75 | 4.5 | 4 |
| Indonesia | 3.38 | 2.5 | 4 | Ukraine | 4.17 | 4.22 | 3 |
| Iran | 3 | 2.33 | 1 | United Arab Emirates | 3.5 | 3.17 | 4 |
| Italy | 3.5 | 3.67 | 2 | United Kingdom | 3 | 4.17 | 4 |
| Japan | 4 | 3.67 | 1 | United States | 4 | 3.72 | 19 |
| Kuwait | 4 | 4 | 1 | Vanuatu | 3 | 2.67 | 1 |
| Malaysia | 2.75 | 2.83 | 2 | Zambia | 3 | 2.67 | 1 |