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Trust in B2B Commerce: Taxonomy and Roles

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ABSTRACT

Research studying trust in B2B relationships is only starting to burgeon compared to its B2C counterpart. Updating the Saunders et al. (2004) review with a sample that includes more recent studies, we find an increase in studies on trust in B2B and interorganizational systems (IOSs). We group some commonalities we find into three types of trust: relationship, technology, and third-party, and fit them in a general framework. We also identify four patterns with which researchers operationalize and test B2B trust and evaluate the empirical support for each. We conclude by discussing some gaps we observed during our review of literature.

Keywords

Trust, B2B, IOS, IOIS.

I. INTRODUCTION

With business to business (B2B) electronic commerce on the rise, businesses are increasingly reaping benefits from the rapid advances in information technologies. Nevertheless, B2B benefits come in tandem with new risks. An informal, intangible, but effective way of mitigating those risks is interorganizational trust. Thus, research on how to enhance trust in B2B relationships is highly justified.

Sensing a lag in B2B trust research behind its B2C counterpart, Saunders, Wu, Li, and Weisfeld (2004) conducted a literature review. They found that, contrary to many researchers’ belief, researchers did agree on a number of common dimensions of trust in B2B relationships. However, at that time, there obviously were both a scarcity in the research on B2B trust and a lack of common themes among studies. A number of studies in their article pool dealt with B2B trust only peripherally or incidentally.

Both insufficiencies, fortunately, are being addressed. We updated the Saunders et al. (2004) review of the literature and found that, although B2B trust research still is in the exploration stage, the number of studies specifically focusing on trust in inter-organizational systems (IOSs) has dramatically increased. Also termed IOISs (inter-organizational information systems), IOSs are automated information systems that are shared among business partners to improve linkages between them (Choudhury, 1997; Soliman and Janz, 2004). IOS technologies such as electronic data interchange (EDI) and supply chain management (SCM) systems form the technological backbone for B2B relationships.

In addition to the increasing focus on IOSs, a few common themes surface from these studies. First, trust is widely recognized as a factor in using IOS technologies to establish successful B2B relationships. Second, the main areas where trust shows its effect on IOSs include (a) reduction of social uncertainties in the relationship between the IOS partners; (b) reduction of risks related to the execution of IOS, especially technology-related issues; and (c) provision of third-party guarantee for protection against execution uncertainties. Third, a number of researchers have delved into the formation process of trust, viewing it as a building process with participation from boundary spanning individuals from the partner organizations.

The following sections of this paper report these findings in more detail. Based on our review, we propose a framework as an attempt to consolidate the commonalities among the studies. In addition, we also identify four patterns with which researchers operationalize and test relationships in the framework.
II. METHODOLOGY

We followed the same methodology in Saunders et al (2004) and added more recent studies to their article pool of ten years. In particular, we reviewed articles from 1994 to 2005 that were selected when searching EBSCO and ProQuest with the terms “interorganizational systems,” “IOS,” “EDI,” “Electronic Data Interchange,” “B2B,” and “Business-to Business,” in conjunction with the term “trust.” We studied the abstracts to ensure that the articles were appropriate. At least two researchers coded each article to determine whether or not it should be included in our sample of articles. References in the back of appropriate articles were also checked to see if we could find additional articles for our sample. Our sample of 32 articles displays these common characteristics: (a) Most of them have an IOS focus; (b) They study interorganizational trust and B2B; and (c) They do not deal with B2C trust.

Appendix A offers a breakdown of the articles according to the types of B2B they cover. Most deal with e-commerce (Gallivan and Depledge, 2003; Gutek and Welsh, 2000; Hart and Saunders, 1997, 1998; Lee and Lim, 2005; Ratnasingam, 2001; Ratnasingam, Gefen, and Pavlou, 2005; Ruppel, Underwood-Queen, and Harrington, 2003; Soliman and Janz, 2004; Son, Narasimhan, and Riggins, 2005) or supply chain collaboration (Akkermans, Bogerd, and Van Doremalen, 2004; Carr and Smeltzer, 2002; Chae, Yen, and Sheu, 2005; Kumar, Dessel, and Bielli, 1998; McCutcheon and Stuart, 2000; O'Keefe, 1998; Ratnasingam, 2005b; Ratnasingam and Phan, 2003; Welty and Becerra-Fernandez, 2001). A couple deal with virtual corporations (Daellenbach and Davenport, 2004; Jones and Bowie, 1998; Kasper-Fuehrer and Ashkanasy, 2001) or R&D collaboration (Carson, Madhok, Varman, and John, 2003; Scott, 2000).

We coded articles on a number of aspects, including definition of trust, dimensions of trust, level of trust (agent-agent, agent-organization, or organization-organization trust), time factor of trust (initial or knowledge-based trust), etc. Each article was coded by at least two coders. Where the two coders were unable to resolve differences in their coding, the entire research team discussed the different perspectives and finalized the code.

III. TRUST AS A SUCCESS FACTOR

Researchers have come to agree that trust is an important factor in IOS success. Common indicators of IOS success converge on commitment/adoptions (Lee and Lim, 2005; MacDonald and Smith, 2004; Ruppel, 2004; Son et al, 2005) and business benefits, such as synergy (Ibbott and O'Keefe, 2004) or information sharing (Chae et al, 2005). Trust may influence a business’ decision to enter an IOS relationship. Dallenbach and Davenport (2004) suggest that assessment of trustworthiness is the basis for the decision to enter an IOS. Some researchers take a transaction cost economics perspective (e.g., Kleist, 2004; Ratnasingam, 2005a) and suggest that higher level of trust between the partners reduces the transaction costs incurred in building the relationship and luring businesses into the IOS. Similarly, other researchers (e.g., Bunduchi, 2005; Gallivan and Depledge, 2003; Ibbott and O'Keefe, 2004) posit that higher level of trust reduces the need for explicit control mechanisms to be built into the IOS.

Increasingly, researchers are empirical testing trust relationships in B2B. Typical methodologies are surveys (e.g., Lee and Lim, 2005; Soliman and Janz, 2004) and case studies (e.g., Chae et al, 2005; Ibbott and O'Keefe, 2004). They differ mainly in whether trust should be treated as an antecedent (e.g., Ruppel, 2004), a mediator (e.g., MacDonald and Smith, 2004), a moderator (e.g., Chae et al, 2005), or as a factor involved in a number of emergent, recursive, even cyclic relationships (e.g., Gallivan and Depledge, 2003). In a later section we will compare empirical support for each of these conceptions so far.

IV. MAJOR TYPES OF TRUST

An important commonality we noticed among the studies is the differentiation between risks related to the execution of the IOS (transactional risks) and risks related to the business relationship between the partners (relationship risks). Correspondingly, different types of trust are proposed to address each of these risks.

This dichotomy is seen in Bunduchi (2005), Ibbott and O'Keefe (2004), O'Reilly and Finnegan (2005), Ratnasingam and Phan (2003), and Ratnasingam et al (2005). IOS is riskier than the traditional IS (Allen, Colligan, Finn, and Kern, 2000; Son et al, 2005). In the transactional dimension, uncertainties cloud the execution, especially the technical implementation, of the IOS. As more researchers focus on IOSs, the reliability and usability of IOS technologies, as well as the infrastructure on which they rely, become a major concern. In the relational dimension, engagement in B2B opens up a business’ information to partners and increases the level of integration of its business process with its partners’. Businesses are more vulnerable to their partners acting opportunistically. Thus, for a B2B relationship to be successful, both execution risks and relationship risks have to be reduced.

The transactional and relational dimensions are central to the framework we propose in Figure 1. The framework springs from the commonalities we observed in B2B trust studies. The model includes standards as a driver for both third-party trust
and technology trust and security as a driver for the technology trust. An important driver for building relationship trust, as evidenced by a number of studies in our sample, is the activities of boundary spanning individuals. Although these drivers certainly are not the only antecedents to their respective trust types, they are the most salient variables we observed repeatedly in the reviewed articles.

Figure 1. Types of Trust

1. Relationship Trust – Relational Dimension

The social uncertainties of IOSs warrant serious consideration (Allen et al, 2000). Relationship trust helps to reduce social uncertainties. Although the exact terminology may vary, such as trust in the partner (Ratnasingam and Phan, 2003), trust in the vendor (O’Reilly and Finnegan, 2005), or trust in another party (Ibbott and O’Keefe, 2004), relationship trust has been the focus of trust research.

The most common view of trust focuses on aspects of the relationship and is deeply rooted in the concept of expectations that a trading partner will act in the best interest of the other party, hence reduction of social uncertainties. More relationship trust also leads to higher information transparency and a virtuous cycle (Akkermans et al, 2004). A notable commonality among the studies is a few dimensions of relationship trust that have been well covered.

BENEVOLENCE. Benevolence is “[t]he belief that one partner is genuinely interested in the other partner’s welfare and has intentions and motives beneficial to the other party even under adverse conditions for which a commitment was not made (Ba and Pavlou, 2002, p. 246).” A main purpose for benevolence is to guard against opportunism on the part of the trustee, which is a “universal assumption” by some (Kumar et al, 1998). In B2B relationships, an organization is almost certain to be exposed to the risk of opportunistic behaviors, especially after it makes relationship-specific investments in the IOS (Ratnasingam, 2005a). A partner with more information or expertise can take advantage of it with low likelihood of being detected (Jones and Bowie, 1998; McCutcheon and Stuart, 2000). A trustee with benevolent intentions, however, does not take advantage of such opportunities at the expenses of the trusting party.
**PREDICTABILITY.** Predictability is the “belief in trading partners’ consistent behaviors that provide sufficient knowledge for other trading partners to make predictions and judgments based on prior experiences (Ratnasingam and Phan, 2003, p. 42).” It is the extent to which the trustee’s behavior is predictable and compliant with the trustee’s expectations. Due to the complexity of B2B relationships, ex post revisions to contracts may not always be practical. Higher predictability allows the partners to deal with unforeseen contingencies with more flexibility and confidence (Carson et al, 2003).

**COMPETENCE.** Competence refers to the trading partners’ skills, technical knowledge, and ability to operate B2B applications correctly (Ratnasingam, 2003). A number of researchers suggest that a trustor forms an opinion about the trustee’s ability to use the technology appropriately even before commencing the relationship (Gallivan and Depledge, 2003; Ratnasingam, 2005b; Ratnasingam and Phan, 2003).

**INTEGRITY.** Integrity “means that one believes that the other party makes good-faith agreements, tells the truth, acts ethically, and fulfills promises (McKnight and Chervany, 2002, p. 49).” In the articles we reviewed, integrity most notably emerged in the articles on the virtual corporation, which is “a temporary network of independent companies-suppliers, customers, even erstwhile rivals - linked by information technology to share skills, costs, and access to one another’s markets (Byrne, 1993, p.99).” The emphasis of virtual corporations on speed, flexibility and transience makes them poor candidates for developing the long term, stable relationships upon which organizational theorists insist mutual trust depends. To address this paradox, Jones and Bowie (1998) and Kasper-Fuehrer and Ashkanasy (2001) argue that virtual corporations need to behave ethically and to consider trading partner trustworthiness.

**OPENNESS.** B2B partners with mutual trust also demonstrate reciprocal openness and share information and knowledge over time (Scott, 2000). This leads to a continuous process of obtaining new knowledge about the relationship from experience and to the habituation of trusting acts. Collaboration reinforces trust and deeper trust promotes even further collaboration (Chae et al, 2005; Scott, 2000).

**BUILDING RELATIONSHIP TRUST.** Building relationship trust requires continuous and conscious effort and it does not occur by itself. Rather, it requires purposeful, diligent efforts from all partners to start and maintain the learning and sharing process (Akkermans et al, 2004). There is a strong presence of human interaction in the formation process of trust. As Ring and Van de Ven (1994) adeptly put it, interorganizational relationships “only emerge, evolve, grow, and dissolve over time as a consequence of individual activities (p. 95).” Zaheer et al’s (1998) seminal work suggests that the interactions among key individuals in organizations (boundary spanners) cultivate interpersonal trust that helps to build interorganizational trust through an institutionalization process. This view seems to be gaining popularity with researchers (Bunduchi, 2005; Chae et al, 2005; Daellenbach and Davenport, 2004; Ibbott and O’Keefe, 2004; MacDonald and Smith, 2004; Ratnasingam, 2005b). The critical role of human agency was especially obvious in two case studies (Chae et al. 2005; Ibbott and O’Keefe, 2004). Ibbott and O’Keefe (2004) paint a particularly vivid picture of the ways relationships are formed between organizations and how the “Club” of human agents was used to further the use of a global IOS.

Thus, interpersonal and interorganizational trust are positively related. However, Zaheer et al (1998) also maintain that they are distinct. Interorganizational trust is uniquely associated with higher perceptions of a partner’s performance and help to reduce conflict and negotiation costs between B2B partners (Daellenbach and Davenport, 2004). In addition to this important benefit in the relationship dimension, interorganizational trust also includes a transactional dimension that is absent in the interpersonal trust.

**2. Technology Trust – Transactional Dimension**

While relationship trust reduces uncertainties resulting from factors endogenous to the partners, another category of uncertainties exists as the result of exogenous factors, such as the business environment and technological infrastructure. Even when B2B partners have sufficient motivation to trust each other, the execution of B2B exchanges may still run into problem if such exogenous factors cause anomalies such as frequent technical breakdown, breach of confidentiality, or unfriendly business environments. Technology trust and third-party trust have been proposed as means to reduce execution uncertainties.

**SECURITY AND STANDARDS.** Security mechanisms and technical standards ensure a uniform, secure, and reliable technological platform for B2B. Security mechanisms protect the confidentiality of information, preserve data integrity, authenticate users’ access to the IOS, and control the proper authorization of access to information resources. Particularly pertinent to electronic relationships is non-repudiation, which prevents a party from reneging prior commitments (Kleist, 2004; Ratnasingam, 2005a).

Security mechanisms also strive to protect the availability of technologies so that businesses have access to the IOS when they are needed. IT connectivity is an important venue to guarantee availability by addressing IT compatibility.
telecommunication infrastructure, and internal integration issues. Technical standards and uniform product descriptions also enhance technology trust (Ratnasingam et al, 2005).

3. Third-Party Trust – Transactional Dimension

Also known as institutional trust, third-party trust reflects McKnight and Chervany’s (1998) notion of structural assurance. It builds the belief that there are impersonal structures in the form of third parties to enable an entity to act in anticipation of successful future endeavors. Third parties include entities such as Trust-e and Verisign that have emerged to protect B2B relationships. They also include commercial institutions such as payment systems, delivery services, and insurance companies. While these institutions can help decrease the opportunism of a trading partner, more importantly they provide ways for parties without prior relationship to establish initial trust and to initiate an IOS relationship.

Some technology standards also provide instruments for establishing third-party trust. For instance, public key infrastructure (PKI) provides third party trust in that a partner’s identity can be verified by widely accepted certification authorities (CAs) PKI is based on a few sets of standards, such as PKIX, PKCS, and X.509, which define, among other things, ways to bind an entity’s identity to the entity’s public key.

V. OPERATIONALIZATION PATTERNS IN B2B TRUST MODELS

As Figure 1 shows, relationship, technology, and third-party trust all may influence the use of IOS technologies to establish fruitful B2B relationships. Figure 1 represents a general framework we abstracted from the studies we reviewed. Individual researchers, however, have particular interest in one type of trust or the other; one dimension of trust or the other; and one IOS technology or the other. Depending on the researcher’s perspective, what and how a researcher operationalizes and tests in a B2B trust model can vary substantially.

Despite the ostensible differences, we still were able to identify four typical patterns in how researchers operationalize their models (Figure 2).

![Figure 2. Patterns in B2B Models](image_url)

1. Trust as Independent Variable (Pattern A)

Most of the reviewed studies postulate trust as one of a number of independent variables (IVs) affecting B2B success. Moreover, this effect is mediated by some other variables (Figure 2, A). For example, Ratnasingam (2003) examines trust’s role in small-medium enterprises’ participation in e-commerce for customs clearance. Relationship trust and technology trust are IVs and their effects are mediated by two other variables - perceived benefits and perceived risks of e-commerce. Similarly, in Lee and Lim’s (2005) study of EDI relationships, relationship trust is one of the three IVs, whose effects on EDI performance are mediated by EDI integration, EDI utilization, and EDI diversity. Other examples include Zaheer et al (1998) and Ruppel (2004). This type of models generally has good support from data.
2. Trust as Mediator (Pattern B)

In some other researcher’s models, trust itself is positioned as a mediator (Figure 2, B). An example is MacDonald and Smith’s (2004) study of how technology-mediated communication (STMC) affects channel partner relationships. Trust is thought to mediate STMC’s effect on future purchase intentions. Ibbott and O’Keefe (2004) use this pattern in their case study as well. Support for trust’s mediation effect, however, is mixed at best. MacDonald and Smith (2004) do not find support from their data and, quite interestingly, they suggest that trust’s influence is mediated by commitment, another variable in their model.

3. Trust as Moderator (Pattern C)

Trust can also be construed as moderating IOS technology and other IVs’ effects on B2B success (Figure 2, C). Chae et al (2005) suggest such a model when they study the relationship between IOS technology and interorganizational collaboration in supply chain. Their case study results support this position.

Son et al (2005) formulate a complex model that is a hybrid of Patterns A and C. The main effect in their model is the one between EDI-specific relational factors and EDI usage. Trust does not directly moderate this effect. However, together with two other channel climate IVs, trust influences cooperation, which in turn, moderates the main effect. Since they also suggest that cooperation directly affects EDI usage, trust has a mediated, indirect effect (Pattern A) on EDI usage as well. This indirect effect is supported. Also, for the supported relationships between a relational factor and an EDI usage dimension, cooperation’s moderation effect is supported and trust is found to be significantly related to cooperation. Thus, empirical support for Pattern C also is good.

4. Recursive Models (Pattern D)

The complexity of Son et al’s (2005) model speaks to the richness of the interplay between trust and other factors in B2B contexts. It is no surprise, therefore, that some researchers try to reflect this richness in their models by including a large number of variables and/or relationships which typically are bidirectional. Allen et al (2000), Gallivan and Depledge (2003), O’Reilly and Finnegan (2005), and Scott (2000) are representative of this pattern. The relationships can even be cyclic or spiral, such as in Akkermans et al (2004) and Bunduchi (2005).

By its very nature, empirical testing models of this pattern may well go beyond the scope of one single study. Nevertheless, a Pattern-D study often suggests support for its model based on a single case study. Notable exceptions are Gallivan and Depledge (2003), which analyzes a number of secondary data, and Scott (2000), which uses a grounded theory approach.

To sum up, Patterns A, where trust is an IV and mediated by other variables, and Pattern C, where trust moderates a main effect between an IV and B2B success, appear to enjoy the best empirical support so far. Empirical testing of the most ambitious Pattern D seems to be insufficient to date. Sufficient testing probably may involve longitudinal studies. As for Pattern B, the lack of support may stem from using the incorrect antecedents to trust. For example, MacDonald and Smith’s (2004) use of satisfaction with communication technologies as the only antecedent to trust may not have captured the right drivers for trust in the study’s context.

VI. CONCLUSION

We highlighted some common perspectives researchers share. In the mean time, some gaps that warrant further consideration exist. First, trust research has traditionally focused on relationship trust. Future research may pay more attention to technology trust and third-party trust, as they address an important dimension of IOSs and B2B. Second, we see only superficial coverage of mistrust or distrust, though abuse of trust on the part of one of the parties can have serious consequences. Third, most research does not explore the process by which trust established early in the relationship matures into knowledge-based trust. Now that the field apparently has reached a consensus on the definitional aspects of trust, more effort needs to be devoted to how trust morphs from initial trust to knowledge-based trust. Related to this, the role of third-party trust in the formation of initial trust should be sufficiently researched.

Our review found a recent and growing interest in studying trust in B2B relationships. We integrate some commonalities we observe into a framework, as well as patterns of how researchers operationalize trust’s roles in B2B in their models. Evaluation of each pattern’s empirical support also is provided.

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REFERENCES


### APPENDIX A. STUDIES IN SAMPLE

<table>
<thead>
<tr>
<th>Study</th>
<th>IOS Type</th>
<th>Time Factor of Trust</th>
<th>Level</th>
</tr>
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<tbody>
<tr>
<td>Daellenbach and Davenport (2004)</td>
<td>Virtual Corporation</td>
<td>Initial</td>
<td>Org-Org</td>
</tr>
<tr>
<td>Jones and Bowie (1998)</td>
<td>Virtual corporation</td>
<td>Initial</td>
<td>Agent-Agent</td>
</tr>
<tr>
<td>Kasper-Fuehrer and Ashkanasy (2001)</td>
<td>Virtual corporation</td>
<td>Initial</td>
<td>Agent-Org</td>
</tr>
<tr>
<td>Son et al. (2005)</td>
<td>Electronic Commerce (EDI)</td>
<td>Knowledge-based</td>
<td>Org-Org</td>
</tr>
<tr>
<td>Welty and Becerra Fernandez (2001)</td>
<td>Supply Chain Collaboration</td>
<td>Knowledge-based; Initial</td>
<td>Org-Org</td>
</tr>
</tbody>
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