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Developing and Validating Trust Measures for e-Commerce: An Integrative Typology

D. Harrison McKnight • Vivek Choudhury • Charles Kacmar
Accounting and Information Systems Department, The Eli Broad Graduate School of Management, Michigan State University, East Lansing, Michigan 48824-1121
Information Systems Department, College of Business Administration, University of Cincinnati, Cincinnati, Ohio 45221
Management Information Systems Department, College of Business, Florida State University, Tallahassee, Florida 32306-1110
mcknight@bus.msu.edu • vivek.choudhury@uc.edu • ckacmar@garnet.acns.fsu.edu

Evidence suggests that consumers often hesitate to transact with Web-based vendors because of uncertainty about vendor behavior or the perceived risk of having personal information stolen by hackers. Trust plays a central role in helping consumers overcome perceptions of risk and insecurity. Trust makes consumers comfortable sharing personal information, making purchases, and acting on Web vendor advice—behaviors essential to widespread adoption of e-commerce. Therefore, trust is critical to both researchers and practitioners. Prior research on e-commerce trust has used diverse, incomplete, and inconsistent definitions of trust, making it difficult to compare results across studies. This paper contributes by proposing and validating measures for a multidisciplinary, multidimensional model of trust in e-commerce. The model includes four high-level constructs—disposition to trust, institution-based trust, trusting beliefs, and trusting intentions—which are further delineated into 16 measurable, literature-grounded subconstructs. The psychometric properties of the measures are demonstrated through use of a hypothetical, legal advice Web site. The results show that trust is indeed a multidimensional concept. Proposed relationships among the trust constructs are tested (for internal nomological validity), as are relationships between the trust constructs and three other e-commerce constructs (for external nomological validity)—Web experience, personal innovativeness, and Web site quality. Suggestions for future research as well as implications for practice are discussed.
(*Trust*; *Trusting Beliefs*; *Trusting Intentions*; *Institution-Based Trust*; *Disposition to Trust*; *e-Commerce*; *Measure*; *Site Quality*; *Disposition*; *Nomological Network*; *Web Vendor*)

Introduction

> "The trust factor opens up or closes down the pace and nature of electronic commerce growth. . . . Trust is so multifaceted. . . . What exactly is trust? It's so easy to talk about, so hard to pin down.—Keen et al. (1999)

The Internet promises to revolutionize the shopping and information-gathering choices available to consumers. However, the enormous potential of B2C commerce (Wang et al. 1998) can only be realized if consumers feel comfortable transacting over the new medium with unfamiliar vendors (Gefen and Straub 2002). Yet, "almost 95% of consumers have declined to provide personal information to Web sites"—63% of these indicated this is "because they do not 'trust' those collecting the data" (Hoffman et al. 1999, p. 82). This suggests that consumer decisions to adopt B2C commerce involve not only

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perceptions of the technology (e.g., perceived usefulness and ease of use; Davis et al. 1989), but also beliefs about the e-vendor (Friedman et al. 2000). Lack of trust in Web vendors can deter consumer adoption of e-commerce (Bhattacherjee 2002). Similarly, the perceived risk of having one's personal identity or financial information stolen by hackers (O'Brien 2000) can deter Web site use. Thus, a lack of trust in the technical and institutional environments surrounding the Web can also hinder e-commerce adoption. Because Internet social cues are minimal, trust is difficult to establish (Gefen and Straub 2002). Web vendors must act purposefully to overcome consumer perceptions of uncertainty and risk by building trust—both in their own Web sites and in the broader Internet environment. Understanding the nature and antecedents of trust is, therefore, a major issue for both Internet researchers and practitioners (e.g., Fox 2000, Jarvenpaa and Tractinsky 1999, Stewart 1999).

Trust has traditionally been difficult to define and measure (Rousseau et al. 1998). Researchers have called the state of trust definitions a "confusing potpourri" (Shapiro 1987, p. 625), a "conceptual confusion" (Lewis and Weigert 1985, p. 975), and even a "conceptual morass" (Barber 1983, p. 1; Carnevale and Wechsler 1992, p. 473). Although some researchers have treated trust as a unitary concept (e.g., Rotter 1971), most now agree that trust is multidimensional (Mayer et al. 1995, Rousseau et al. 1998). Yet there is little agreement on the specific dimensions that constitute trust and little research on how the dimensions interrelate. Keen et al. (1999) noted that, ". . . the basic conclusion in all these fields [is] trust is becoming more and more important, but we still can't really say what it exactly is" (pp. 4–5). For years, trust researchers have called for conceptual clarity (Golembiewski and McConkie 1975, Kee and Knox 1970) but with little success (Wrightsman 1991). This lack of clarity is also seen in research on Web trust, in which diverse and inconsistent definitions of trust make it difficult to compare results across studies. Some e-commerce researchers have defined trust as a belief in an attribute of the trustee (Menon et al. 1999, Stewart 1999), whereas others have defined trust as a willingness to believe the trustee (Fung and Lee 1999). Some researchers have not provided a conceptual definition (Hoffman et al. 1999). Research progresses more quickly when constructs are well defined and measures correspond to conceptual definitions (Kaplan 1964, Schwab 1980).

This article contributes by developing and validating an instrument to measure a literature-grounded, cross-disciplinary typology of trust constructs that apply to the Web context. Validating instruments adds value in multiple ways (Straub 1989)—(a) it brings more rigor to research and allows research to be conducted in a more systematic manner; (b) it "promotes cooperative research efforts" (p. 148); (c) it makes research results more interpretable and clear; and (d) it helps assure that research results are valid or "can be trusted" (p. 148).

The cross-disciplinary nature of the trust typology in this study highlights the multiple, interrelated dimensions of e-commerce trust. Thus, trust, as a willingness to depend on a vendor to deliver on commitments, is not the same as trust as a belief that the vendor uses consumer data ethically, or the same as trust as a perception that the Internet is technologically secure. Each trust type has different implications for consumer behavior and for how trust is built. Therefore, it is important to distinguish among the multiple dimensions of trust.

Theory

Trust is important because it helps consumers overcome perceptions of uncertainty and risk and engage in "trust-related behaviors" with Web-based vendors, such as sharing personal information or making purchases. These perceptions may be especially salient when interacting with an unfamiliar vendor. Thus, a particularly critical form of trust in e-commerce may be a user's initial trust in a Web vendor. This paper focuses on initial trust.

Initial trust (McKnight et al. 1998) refers to trust in an unfamiliar trustee, a relationship in which the actors do not yet have credible, meaningful information about, or affective bonds with, each other (Bigley and Pierce 1998). Credible information is gleaned after parties have interacted for some time. In e-commerce, we posit that credible information is gained only after the truster (i.e., a Web user) has both engaged in trust-related behaviors (e.g., disclosing personal information) and assessed the "trustworthiness" of the vendor

by observing the consequences of those behaviors. The period during which a consumer visits and explores a vendor's Web site for the first time (the focus of this study) is clearly within the domain of initial trust. We apply an initial trust model because Web vendors need to engender sufficient trust to persuade first-time consumers to transact with them. In initial relationships, people use whatever information they have, such as perceptions of a Web site, to make trust inferences (McKnight et al. 1998).

The focus on initial trust also reflects our assumptions about how trusting beliefs form. The cognitive-based trust literature posits that trusting beliefs may form quickly (before parties have meaningful information about each other) because of social categorization, reputation, illusions (irrational thinking), disposition, institutional roles and structures, or out of the need to immediately cooperate on a task (McKnight et al. 1998, Meyerson et al. 1996). The knowledge-based trust literature (Blau 1964, Ring and Van de Ven 1994), on the other hand, indicates that trust develops gradually through experiential social exchange (Lewicki and Bunker 1995, Shapiro et al. 1992). The model of initial trust proposed in this paper adopts the assumptions of the cognitive-based literature, based on our conviction that people form trusting beliefs early, but that these may change as people gain experience with the trustee.

Definitions and Models of Trust

Various types of trust have been proposed (Butler 1991, Cummings and Bromiley 1996, Mayer et al. 1995). Most researchers have defined trust according to their specific disciplinary worldview. Psychologists define trust as a tendency to trust others (Rotter 1971). Social psychologists define trust as a cognition about the trustee (Rempel et al. 1985). Sociologists define trust as a characteristic of the institutional environment. Many variants of the above types exist, including a significant number in e-commerce research (McKnight et al. 2001–2002).

The confusing proliferation of trust types has prompted some researchers to develop composite trust definitions (e.g., Doney et al. 1998, Kee and Knox 1970, Mayer et al. 1995). For instance, Kee and Knox (1970) defined a set of five trust-related constructs: dispositional factors, situational factors, perceptions of the other, subjective trust, and behavioral trust. Mayer et al. (1995) included propensity to trust, trust (willingness to be vulnerable to another), and perceptions of trustworthiness (cognitions). What these models have in common is some combination of trusting dispositions, cognitions, and willingness/intentions.

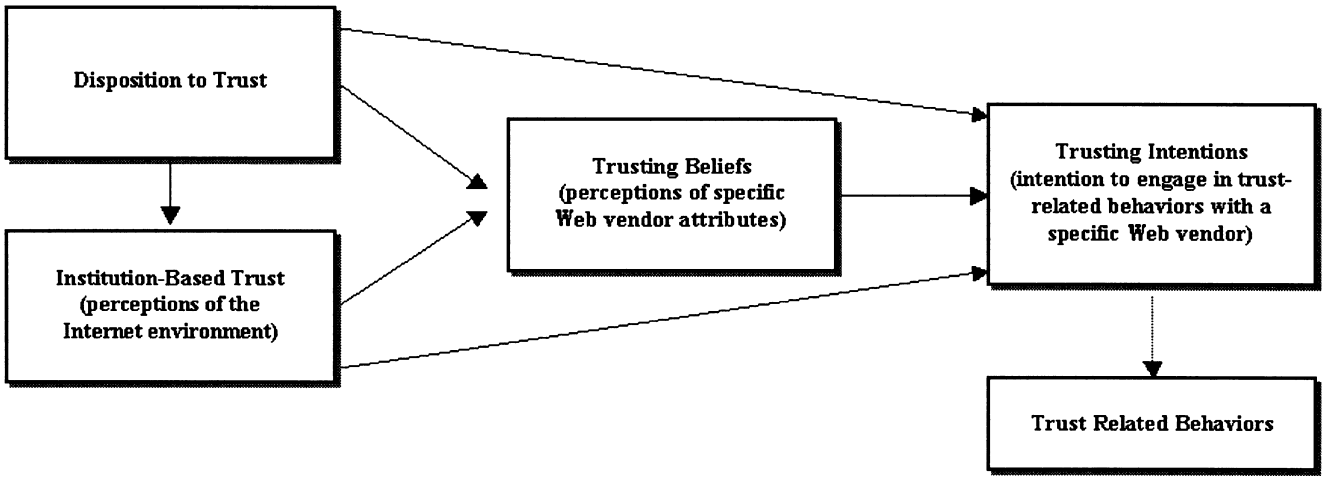
In this paper, we build on the integrative model proposed by McKnight et al. (1998), because it includes institution-based trust as well as the more common trust types—trusting intentions, trusting beliefs, and disposition to trust. This model was also chosen because it includes measurement-level subconstructs. Following McKnight et al. (1998), we integrate these trust constructs within the broad framework of the Theory of Reasoned Action (TRA) (Fishbein and Ajzen 1975) (Figure 1). TRA posits that beliefs lead to attitudes, which lead to behavioral intentions, which lead to the behavior itself. Davis et al. (1989) found that attitudes fell out of the model empirically, making their model more parsimonious. Applying this more parsimonious version of TRA, we posit that trusting beliefs (perceptions of specific Web vendor attributes) lead to trusting intentions (intention to engage in trust-related behaviors with a specific Web vendor), which in turn result in trust-related behaviors (extending McKnight et al.).

We further posit institution-based trust and disposition to trust as antecedents to trusting beliefs/intentions. *Institution-based trust* is the sociological dimension of trust. It refers to an individual's perceptions of the institutional environment—in this case, the Internet. Perceptions of the structural characteristics of the Internet, such as safety and security, can influence trusting beliefs and trusting intentions towards a specific vendor (Keen et al. 1999). *Disposition to trust* means a general propensity to trust others, which can also influence an individual's beliefs and intentions towards a Web-based vendor and is, therefore, important to include in the model.

We discuss individual elements of the model in greater detail below.

Trust-Related Behaviors. *Trust-related behaviors* are actions that demonstrate dependence on a Web vendor, that make one vulnerable to the vendor, or increase one's risk (Mayer et al. 1995, Zand 1972). Numerous researchers have conceptualized trust as a

Figure 1 Web Trust Model—Overview



behavior (e.g., Anderson and Narus 1990, Deutsch 1973, Fox 1974). Commonly discussed trust-related behaviors in electronic commerce include sharing personal information, making a purchase, or acting on information provided by a Web site. Because of the difficulty of asking subjects to undertake such behavior, we did not measure actual behavior in this study. Instead, we measured trusting intentions, that is, intention to engage in trust-related behaviors with the Web vendor. This is not uncommon in TRA-based studies of technology acceptance (e.g., Agarwal and Prasad 1998, Karahanna et al. 1999, Venkatesh 1999, 2000). Prior research has confirmed a strong correlation between behavioral intentions and actual behavior (Sheppard et al. 1988, Venkatesh and Davis 2000).

Trusting Intentions: Intention to Engage in Trust-Related Behaviors. *Trusting intentions* means the truster is securely willing to depend, or intends to depend, on the trustee. *Willingness to depend* (volitional preparedness to make oneself vulnerable to the trustee) and *subjective probability of depending* (the perceived likelihood that one will depend on the other) form two distinct subconstructs of trusting intentions. Subjective probability of depending is the more concrete subconstruct, going beyond a stated willingness to rely on another to stated intentions of relying on them in specific ways. For example, Currall and Judge (1995), defining trust as a subjective probability of depending, measured the probability that one would share information with the other person. On the Web, a consumer would have willingness to depend if they agree to general statements about volitional preparedness to rely on the vendor. We propose that consumer subjective probability of depending involves the projected intention to engage in three specific risky behaviors—provide the vendor personal information, engage in a purchase transaction, or act on vendor information (e.g., financial advice).

Trusting Beliefs: Perceptions of Specific Web Vendor Attributes. *Trusting beliefs* means the confident truster perception that the trustee—in this context, a specific Web-based vendor—has attributes that are beneficial to the truster. Although many types exist in the literature (e.g., Butler 1991), three trusting beliefs are utilized most often (Bhattacherjee 2002, Gefen 1997, Mayer et al. 1995): competence (ability of the trustee to do what the truster needs), benevolence (trustee caring and motivation to act in the truster's interests), and integrity (trustee honesty and promise keeping).

These three beliefs were included based on a categorization of trusting beliefs in 32 trust articles or books. Fifteen types of trusting beliefs were found (Table 1). Because the difference between many of the types was small, we used conceptual clustering to group them into categories. We then picked the three that appeared most frequently and seemed most relevant. Thus, the first three columns in Table 1 relate to

Table 1 Clustering Types of Trusting Beliefs

	Competence			Benevolence			Integrity					Not Included			
Article/book	1 Compe-tence	2 Expert-ness	3 Dyna-mism	4 Good-will	5 Benev-olence	6 Respons-iveness	7 Integ-rity	8 Moral-ity	9 Cred-ibility	10 Reli-ability	11 Depend-ability	12 Predict-ability	13 Open-ness	14 Care-fulness	15 Attrac-tion
Anderson and Narus 1990	X											X			
Baier 1986	X			X											
Barber 1983	X							X							
Blakeney 1986		X	X	X			X						X	X	
Bonoma 1976					X				X	X	X				
Cummings and Bromiley 1996					X		X								
Dunn 1988				X											
Gabarro 1978	X			X			X					X	X	X	
Gaines 1980					X										
Giffin 1967		X	X	X						X	X	X			X
Heimovics 1984		X	X		X					X					
Holmes 1991					X	X									
Husted 1990								X							
Johnson-George and Swap 1982					X	X	X			X	X				
Kasperson et al. 1992	X				X							X			
Kee and Knox 1970	X				X										
Koller 1988	X				X		X			X					
Krackhardt and Stern 1988				X											
Lindskold 1978					X					X					
McGregor 1967					X										
McLain and Hackman 1995	X				X										
Mishra 1996	X				X					X			X		
Rempel et al. 1985					X	X	X				X	X			
Ring and Van de Ven 1994				X				X							
Sato 1988					X		X								
Sitkin and Roth 1993	X														
Solomon 1960					X										
Thorslund 1976	X			X				X							
Worchel 1979				X				X							
Yamagishi and Yamagishi 1994				X											
Zaheer and Venkatraman 1993							X	X							
Zaltman and Moorman 1988						X					X	X			
Column Totals	11	3	3	10	16	4	8	6	1	7	5	6	3	2	1
% of TOTAL [86]	13	3	3	12	19	5	9	7	1	8	6	7	4	2	1

Notes: Benevolence includes favorable motives and not acting opportunistically or manipulatively. Although most of the authors of these sources define trust as a belief or an expectancy, the definitions of Baier (1986), Giffin (1967), and Husted (1990) are stated in terms of behaviors or actions. Morality includes goodness. Integrity includes honesty and sincerity. Competence includes ability, capability, and good judgment. Predictability includes consistency. Carefulness includes keeping confidences safe. Attraction refers to Personal Attraction. Dynamism is used in the context of public speaking.

Coding Examples:

Ring and Van de Ven 1994: p. 93—". . .a view (of trust) based on confidence in another's goodwill [coded as goodwill]. . .faith in the moral integrity [coded as morality]. . .of others. . . . ;" Sitkin and Roth 1993, p. 373—"The model assigns the term 'trust' to refer to belief in a person's competence [coded as competence] to perform a specific task under specific circumstances. . . . ;" Yamagishi and Yamagishi, 1994, p. 132—"Trust is. . .an expectation of goodwill and benign intent [coded as goodwill]."

some kind of trustee capability. To be responsive and to have goodwill toward another is similar to trustee benevolence (Columns 4–6). Integrity, implying one is ethical, overlaps conceptually with morality and credibility, and with reliability and dependability to the extent that they have ethical overtones (Columns 7–11). Both integrity and benevolence reflect ethical traits. However, benevolence refers to trustee motives and is based on altruism (Mayer et al. 1995), whereas integrity refers to keeping commitments and not lying (implying reliability), traits that may be held for utilitarian, rather than altruistic, reasons. Openness, carefulness, and attractiveness were excluded from the model because few instances (Columns 13–15) were found. We also excluded predictability because it has to do with consistency, which is more relevant to an ongoing trust model than to an initial trust model.

The distinctions among belief types are important. Consider an e-vendor of music CDs versus a Web provider of medical information. The latter should be more concerned with consumer beliefs about competence than the former, because the risk from lack of "performance" is higher for the medical information consumer. On the other hand, the CD vendor requires disclosure of personal information, so consumers may be more concerned about vendor benevolence and integrity. The distinction is also important because the effects of third-party endorsements may differ. An endorsement from a professional association (e.g., the American Medical Association for a medical Web site) may promote high competence beliefs, whereas an endorsement from the Better Business Bureau (BBB) should influence integrity beliefs.

Institution-Based Trust: Perceptions of the Internet Environment. *Institution-based trust* is the belief that needed structural conditions are present (e.g., in the Internet) to enhance the probability of achieving a successful outcome in an endeavor like e-commerce. Institution-based trust comes from sociology,[1] which deals with the structures (e.g., legal protections) that make an environment feel trustworthy (e.g., the United States immigrant culture of the 1800s, Zucker 1986). Just as legal systems of justice and protection took time to set up in the "wild, wild west" of 19th-century America, so procedures and structures of security and protection are now being established in the "wild, wild Web" of the 21st century. Technological and legal safeguards that produce institution-based trust are as important to the Web consumer as was the quick-drawing sheriff who produced the security of institution-based trust for an 1850s frontier settlement.

Two dimensions of institution-based trust are defined: structural assurance and situational normality. *Structural assurance* means one believes that structures like guarantees, regulations, promises, legal recourse, or other procedures are in place to promote success (Shapiro 1987, Zucker 1986). For example, one with high Web-related structural assurance would believe that legal and technological Internet protections like data encryption safeguard one from loss of privacy, identity, or money. *Situational normality* means one believes that the environment is in proper order and success is likely because the situation is normal or favorable (Baier 1986, Garfinkel 1963, Lewis and Weigert 1985). A consumer who perceives high situational normality would believe the Internet environment is appropriate, well ordered, and favorable for doing personal business. They would believe that, *in general, vendors in the environment* have the attributes: competence, benevolence, and integrity.

The distinction between *trusting beliefs* about a specific vendor and *institution-based trust* is important. Third-party icons that address general security may enhance perceptions about the Internet, but not beliefs about a specific vendor. On the other hand, an icon from an entity such as BBB may influence a customer's trusting beliefs in a specific vendor, but may do nothing to appease the consumer's uneasiness about the general security of the Web.

Disposition to Trust. *Disposition to trust* is the extent to which a person displays a tendency to be willing to depend on others across a broad spectrum of situations and persons. We use two subconstructs of disposition to trust. *Faith in humanity* means one assumes others are usually upright, well meaning, and

[1]Some sociologists (e.g., Shapiro 1987) are concerned only with objective, behavioral institutional characteristics. Others research behavioral characteristics, but measure perceptions as proxies for the behaviors (e.g., Burt and Knez 1996). Finally, some (e.g., Barber 1983) research perceptions related to institutional characteristics. We view institution-based trust largely in perceptual terms, because we believe that, on the Web, perceptions ultimately determine trusting beliefs and trusting intentions.

dependable. Applying the idea that trusting beliefs refer to a specific person's integrity, competence, and benevolence, we extend the trust literature by suggesting that faith in humanity can be decomposed in the same way. Thus, we posit separate subconstructs for faith in *general others'* competence, benevolence, and integrity. *Trusting stance* means that, regardless of what one believes about peoples' attributes, one assumes better outcomes result from dealing with people as though they are well meaning and reliable (McKnight et al. 1998, Riker 1971). Trusting stance, an economic choice variable, is like the consumer who has a personal strategy to trust vendors until they prove him/her wrong, whether or not they have worthy characteristics. Faith in humanity is about attributes of general others; trusting stance is a personal approach to dealing with others.

Trust-building strategies may be different for individuals with low versus high disposition to trust. For instance, links to well-known corporate sites may enhance trusting beliefs in the eyes of a consumer with high disposition to trust, but may alienate one with low disposition to trust (who may be suspicious of any trust-building attempts).

Relationships Among Trust Constructs

Figure 2 depicts the subconstructs of, and linkages among, the trust constructs. Disposition to trust should influence trusting beliefs because it tends to color interpretations of the interpersonal relationship at hand. Gefen (2000) found that disposition to trust influences trust in vendors. Similarly, disposition to trust should positively influence perceptions of the institutional setting. Figure 2 also shows disposition to trust impacting trusting intentions directly, but this relation should be weak because it is largely mediated by trusting beliefs. The direct effect of disposition to trust on trusting beliefs is likely to be strongest when both the institutional context and the specific trustee are unfamiliar to the truster (Bigley and Pierce 1998, Rotter 1971). If one has sizeable experience with an institutional context (but not with a specific trustee), that experience will directly influence institution-based trust, and the impact of disposition to trust on trusting beliefs will be largely mediated by institution-based trust. If a Web user gains experience with a specific vendor, the experience may be the dominant influence on trusting beliefs, instead of dispositional or institution-based trust.

Institution-based trust is proposed to relate positively to both trusting beliefs and trusting intentions. When a situation feels safe, we tend to believe that those in the situation have trustworthy attributes (McKnight et al. 1998). Thus, a consumer who is comfortable with the Web situation and the security of its structures is likely to have high trusting beliefs in a specific vendor. Similarly, feelings of contextual security entice us to have trusting intentions.

Trusting beliefs will relate positively to trusting intentions because a consumer with high trusting beliefs perceives the Internet vendor to have attributes that enable the consumer to hold a secure willingness to depend on the vendor. Perceptions that the vendor is honest, for example, encourage the consumer to provide personal information. TRA research also supports this link, in that beliefs strongly predict corresponding intentions (Davis et al. 1989).

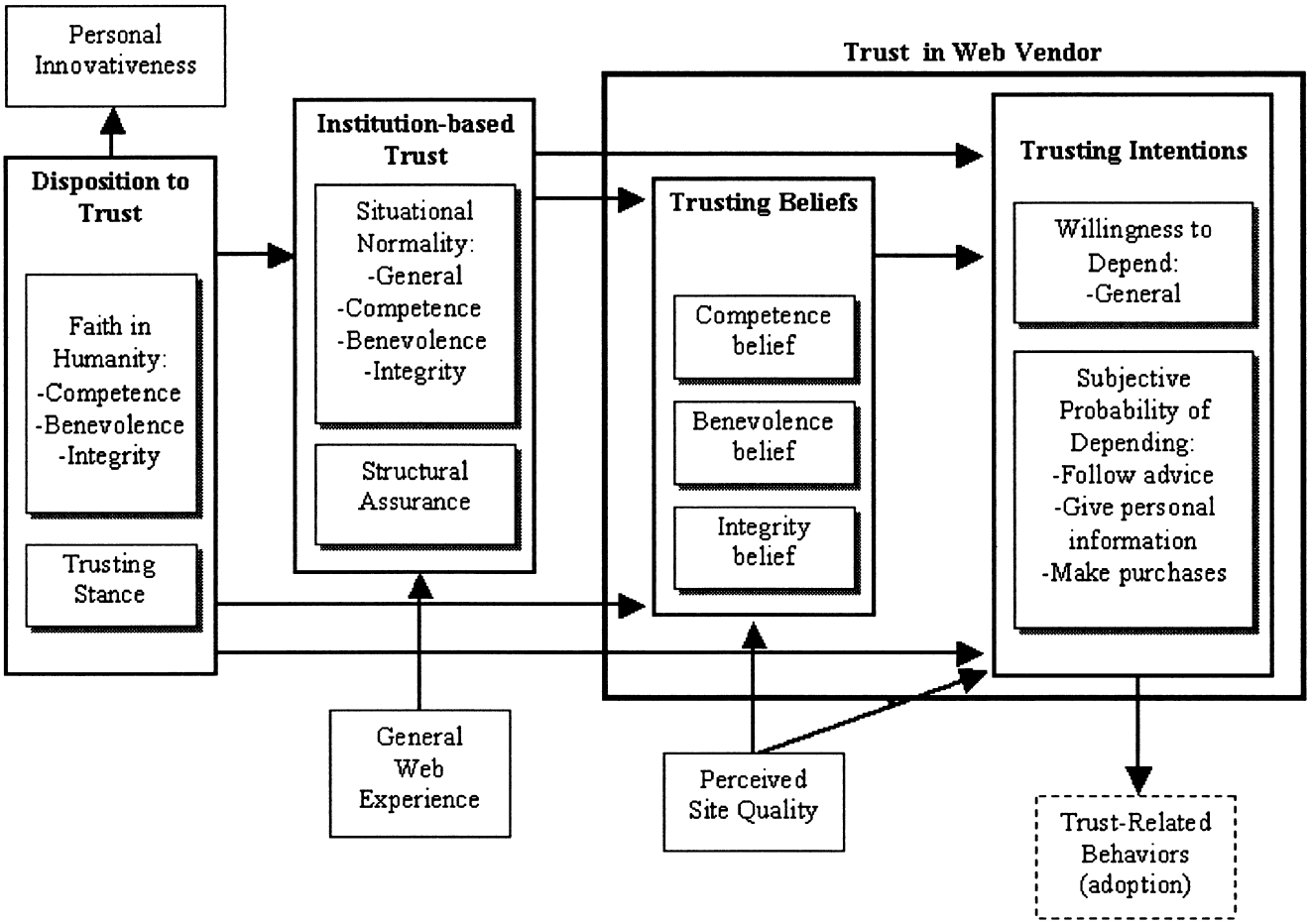
Relationships with Other e-Commerce Constructs

The Web trust model also needs to be understood in light of three existing e-commerce constructs: personal innovativeness, Web experience, and perceived site quality (Figure 2). Personal innovativeness (Agarwal and Prasad 1998) is a trait that reflects confidence or optimism regarding adoption of new ideas or technologies. Disposition to trust also reflects a general optimism (Uslaner 2000). Furthermore, disposition to trust allows one to adapt and influences the ability to learn new things (Erikson 1968). Hence, disposition to trust should positively affect personal innovativeness.

One of the most basic of trust-building tenets is that experience with the object of trust promotes trust in the object (Blau 1964, Luhmann 1979). This tenet applies to both institution-based trust and trust in the Web vendor. It suggests that general Web experience will be positively related to institution-based trust because experience provides the consumer a feeling that dealing with the Web is proper and normal, which is represented by situational normality. Also, Web experience will assure most people that the Web is safe, positively affecting structural assurance.

Perceived Web site quality should relate positively

Figure 2 **Web Trust Model—Constructs and Nomological Network**



Notes.
1. Each link is proposed to be positive.
2. The link from disposition to trust to trusting beliefs is proposed to hold only during the initial phase of a Web vendor-consumer relationship.

to both trusting beliefs and trusting intentions because using the Web site provides the first experiential taste of the vendor's presence, solidifying initial impressions. People make trust-related assumptions about others based on whatever they know (McKnight et al. 1998). Therefore, if consumers perceive that the Web site is of high quality, they will assume that the Web vendor has positive attributes and will form trusting intentions. Because experience conquers uncertainty (Luhmann 1979), site quality leads to trust in the vendor.

Methods

Scale Development

The items used to operationalize the constructs (see the Appendix) came from a number of sources. Because negatively worded trust items tend to factor separately into distrust (Wrightsman 1991), which is conceptually separate from trust (Lewicki et al. 1998, McKnight and Chervany 2001), we used all positively worded items.

We did not measure trusting behaviors, a limitation future research should address. For trusting intentions willingness to depend, we adapted a scale that we had

previously developed and tested (with Cronbach's alpha > 0.90) for use in organizations, with items largely from Dobing (1993). For trusting intentions-subjective probability of depending, new items were developed to measure three common trust-related Internet behaviors: provide personal information, buy from the vendor, and follow vendor advice. We felt respondents would perceive these intentions to embody vulnerability, as the definition of trusting intentions suggests (Mayer et al. 1995).

The trusting beliefs items were adapted from scales reviewed and summarized in Wrightsman (1991), especially Johnson-George and Swap (1982) and Rempel et al. (1985). In selecting items, we tried to capture the aspects of the belief that were most relevant to the Web context. Thus, for competence, we measured perceptions of how well the vendor did its job or how knowledgeable the vendor was (expertness/competence). We excluded dynamism (as a speaker), because it is not relevant to the Internet. The integrity items captured perceptions of vendor honesty, truthfulness, sincerity, and keeping commitments (reliability/dependability). Finally, the benevolence items focused on the vendor acting in the customer's best interest, trying to help, and being genuinely concerned.

No specific structural assurance or situational normality items were located. Typically, sociologists have either observed this kind of trust or, in Garfinkel's (1963) case, experimentally created it.[2] We developed situational normality items to capture the same three dimensions—competence, benevolence, and integrity—by adapting the trusting beliefs items to reflect perceptions about *Web vendors in general* (instead of *a specific Web vendor*). For structural assurance, we utilized terms like "safeguards," "protect," "robust," and "encryption" to refer to the structures making the Web safe.

As with trusting beliefs, we dimensionalized faith in humanity into competence, benevolence, and integrity. Existing items were adapted from scales compiled in Wrightsman (1991). The items refer to attributes of *people in general*, distinguishing them from beliefs about a *specific* Web-based vendor. No items corresponding to the definition of trusting stance were found, so we created a new scale for this subconstruct with three items.

Nontrust items were adapted from existing scales: Agarwal and Prasad (1998) for personal innovativeness and Cheskin (1999) for perceived site quality. Web experience was operationalized as the frequency of use of Web newspapers, news groups, information on products, and shopping, based on Georgia Institute of Technology's Graphics, Visualization, and Usability surveys of Web usage ⟨www.cc.gatech.edu/gvu/user_surveys/⟩.

Data Collection

Data for the study were collected through questionnaires[3] administered in the context of an experiment. The specific setting for the study, a created artifact of a legal advice site, was devised for two reasons. First, a growing number of sites offer advice to consumers in such sensitive fields as law and medicine. These sites introduce an interesting aspect of trust—whether or not the user is willing to act on the advice such Web sites provide. Second, trust becomes more salient as the level of risk to the consumer increases. Acting on legal advice from a Web site entails much more long-term personal risk (i.e., potential legal liability) than does, for example, buying a music CD online.

The subjects began by completing a questionnaire that included measures of disposition to trust, institution-based trust, Web experience, and personal innovativeness. Subjects were then told that they have a malfunctioning air-conditioner in their apartment but, after repeated calls to the landlord, it has not been fixed. They were asked to investigate their legal rights in this situation by visiting a legal advice Web site for which they had seen an advertisement in the local newspaper. After the subjects explored the Web site to find the relevant information, they answered questions about their trusting beliefs/intentions and perceived site quality. The entire study was conducted online.

Subjects for the study were undergraduate and graduate students at three large universities. Two pilot

[2]In a similar vein, Gefen (1997) used a *PC Magazine Editors' Choice* award (with permission from the publisher) as an imprimatur for the hypothetical freeware that was being used as his experimental stimulus.

[3]Although such instruments are sometimes called surveys, following Boudreau et al. (2001), we suggest referring to instruments used during experiments as questionnaires (or experimental instruments) and reserving the term surveys for the context of field studies.

tests ($n = 71$ and 80) provided feedback to make improvements (mostly minor) to the items. For the final sample, 1,729 subjects participated; 1,403 responses (81%) were usable. To ensure that respondents had sufficient Web experience, 1,141 of the 1,403 respondents were from a university-wide required computer literacy class that delivered course materials on the Web. The other respondents were information systems majors. The incentive for participating was extra credit (0.8 to 2% of the course grade). Table 2 provides respondent demographics.

The use of student subjects has sometimes been questioned on grounds of external validity (Gordon et al. 1986). However, multiple reasons suggest that, in this case, the use of student subjects does not present a significant threat to validity. First, students are sometimes considered poor surrogates for the "real world" because they are asked to imagine themselves in an organizational context (e.g., as a CEO). This study does not require an imagined organizational context. Rather, consumer electronic commerce is an individual decision-making situation. Second, students are often asked to respond to questions about situations that are both unrealistic and completely unfamiliar (e.g., the hiring or firing of employees or the acquisition of companies). In this study, respondents were familiar with the Web, averaging almost four years of Web experience. Online consumers are generally younger and more highly educated than conventional consumers, which makes student samples closer to the online consumer population (OECD 1998).

Third, the problem presented to the subjects (landlord/tenant dispute) was specifically designed for a student population. Because most students are or have been directly involved with tenant issues, they can identify with the situation of a failed air-conditioning unit and responsibility for repairs. The act of seeking legal advice may not be as familiar, but here too individuals must often turn to the Web to seek information on unfamiliar situations.

Fourth, to ensure that the students took the experiment seriously, they were informed by course instructors that special software would be deployed to "grade" selected responses (the questionnaire asked students about the content of the advice they had read). They were told that the percentage of extra credit awarded would be based on the number of correct responses. Although this was not enforced, it enhanced the probability that students would take the study seriously. Students did not know it was not enforced until after all data were collected. The pilot studies indicated that approximately 25–35 minutes were needed to complete the study. Results indicated an average response time of 29.3 minutes, affirming that the subjects took the task seriously. In addition, we tested whether the subjects had skipped any aspect of the study or had essentially circled the same number. Cases that failed on these points were discarded. The length and quality of responses to several qualitative questions also enhanced the researchers' confidence that respondents were serious about the study.

As Lynch (1999) has noted: "Findings from single real-world settings and specific sets of 'real' people are no more likely to generalize than are findings from single laboratory settings with student subjects. Just as in the laboratory, the real world varies in background facets of subject characteristics, setting, context, relevant history, and time" (p. 368). That is, because any sample involves subjects with specific attributes, results from a single real-world study may not generalize to the broader population, with diverse characteristics, any better than results from a single study using student subjects. Ultimately, complete generalizability must be established by replication in multiple settings with multiple samples.

Because the experiment was conducted over a period of several weeks, one thing we were not able to prevent was subjects talking to each other about the study, or what Cook and Campbell (1979) refer to as the threat of "compensatory rivalry." We felt that telling students not to discuss the study might have

Table 2 Respondent Demographics

	Mean	Mode	Standard Deviation
Years of Web experience	3.6	3.5	0.91
Years of college	2.5	2	1.1
Age	20.7	19	3.74
Weekly use of Web	1.6 hours	<0.5 hours	1.14
Gender		56% Women, 44% Men	

drawn more attention to the issue. Thus, to verify ex post whether this was a problem, we performed means-difference tests to compare the responses from subjects completing the study at an earlier date to responses from those who completed the study later. The rationale was that any systematic biases introduced by students discussing the study would be reflected in significant differences among the variables. The sample was divided into six cells, representing each of the six weeks within the study period. An analysis of variance was performed on the dependent variables using the week number (1–6) as the independent, categorical variable. No significant differences were found on the major dependent variables.[4]

Analysis

Data analysis took place in three phases, as described below. In the process, we analyzed three types of validity: convergent, discriminant, and nomological. Together, these types of validity constitute construct validity, or "the extent to which an operationalization measures the concept it is supposed to measure" (Bagozzi et al. 1991, p. 421). Convergent validity means the extent to which the measures for a variable act as if they are measuring the underlying theoretical construct because they share variance (Schwab 1980). Internal consistency reliability is generally considered a necessary, but not sufficient, condition for convergent validity (Schwab 1980). Discriminant validity means the degree to which measures of two constructs are empirically distinct (Bagozzi et al. 1991, Davis 1989). Nomological validity refers to whether the construct performs as expected within its nomological network (Schwab 1980), such as relating to other constructs as theory suggests (Boudreau et al. 2001, Webster and Martocchio 1992).

Phase 1: Principal Components Analysis (PCA)

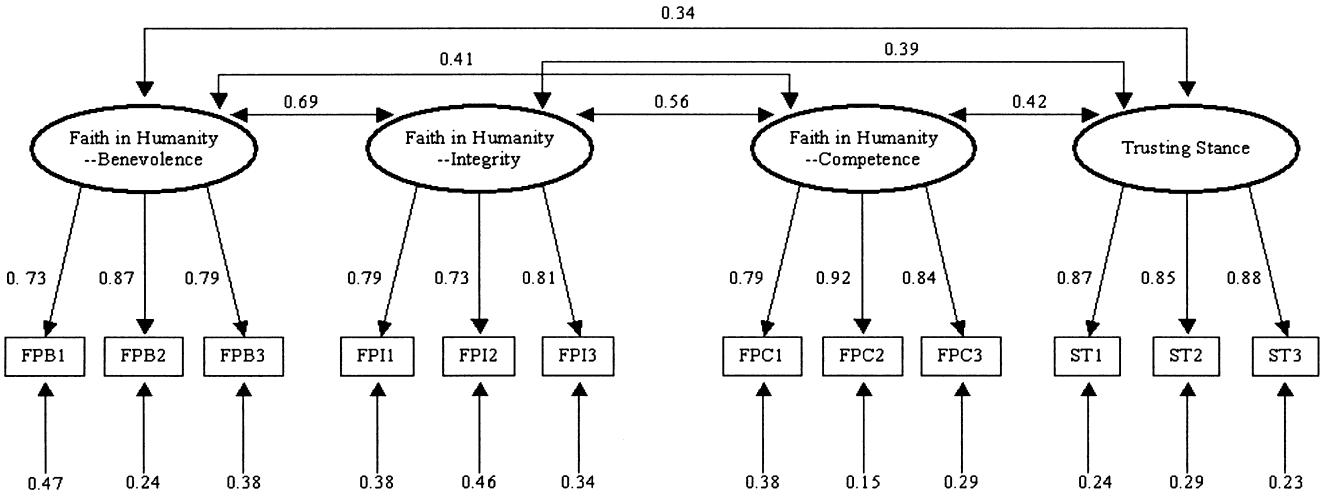
In the first phase, exploratory, principal components factor analysis and internal consistency reliability analysis were conducted to determine the extent to which the high-level trust constructs were discriminant. Our objective with the PCA was to cull out items that did not load on the appropriate high-level construct (Churchill 1979). The PCA was performed using an oblique rotation for theoretical reasons. McKnight et al. (1998) argued that these trust constructs form a model of causally linked variables, which implies positive correlations. Mayer et al. (1995) also argued the relatedness of dispositional, belief, and intentional trust constructs. Orthogonal rotation assumes constructs are not correlated. Thus, if theory predicts the constructs are correlated, as is the case here, it is less appropriate to use an orthogonal rotation (Kerlinger 1986, McDonald 1985). More interpretable factors result with an oblique rotation (Dillon and Goldstein 1984). Because theory did not suggest a specific degree of obliqueness, the SPSS default degree of rotation (delta value of zero) was used.

Phase 2: Confirmatory Factor Analysis (CFA)

The second phase was a CFA, using Structural Equation Modeling to assess the convergent and discriminant validity of the latent subconstructs (e.g., competence, benevolence, and integrity) within each of the four high-level trust constructs (disposition to trust, institution-based trust, trusting beliefs, and trusting intentions). We conducted this analysis by creating a LISREL 8.3 path diagram for each construct (Figures 3–6), its constituent subconstructs, and their items. We applied the following indices and standards to assess model fit: goodness-of-fit index (GFI) and normed fit index (NFI) greater than 0.90, adjusted goodness-of-fit index (AGFI) greater than 0.80 (Gefen et al. 2000), comparative fit index (CFI) greater than 0.90 (Jiang and Klein 1999/2000), and root mean square of approximation (RMSEA) lower than 0.08 for a good fit and lower than 0.05 for an excellent fit (Browne and Cudeck 1992). The RMSEA is particularly well suited to determining the number of latent subconstructs in a construct because it decreases when an additional sub-construct reduces the F_0 (minimal population discrepancy function) substantially, but increases, showing poorer model fit, if including the additional subconstruct only reduces F_0 slightly (Steiger and Lind 1980). Thus, it is used to provide guidance on the number of optimal subconstructs to use (Lievens and Van Keer 2001), which was central to our objective of confirming the constituent dimensions of the high-level trust constructs.

[4]The significance level for the overall *F*-statistic was 0.29, whereas the *p* values for the individual constructs ranged from 0.13 to 0.84.

Figure 3 Disposition to Trust Model



Chi-Square = 112.46; df = 48; p = 0.00000; RMSEA = 0.043; GFI = 0.97; AGFI = 0.96; NFI = 0.98; CFI = 0.99.

Convergent validity was assessed using three criteria: individual item lambda coefficients greater than 0.70, a significant (0.05 level) t statistic for each path (Gefen et al. 2000), and each path loading greater than twice its standard error (Anderson and Gerbing 1988). Discriminant validity among the latent variables is shown without question if the intercorrelations are less than 0.60 (Carlson et al. 2000). Because this was not always the case, two additional analyses were conducted. First, a more detailed discriminant validity test was performed using a constrained analysis method (Sharma 2000), which involves setting the correlation between one pair of variables (e.g., benevolence and integrity in the case of disposition to trust) to unity (1.0) and running the model again. A χ^2 difference test is used to compare the results from the constrained and original models (Anderson and Gerbing 1988). Discriminant validity is evidenced if the χ^2 difference is significant (supporting the original model). Second, following Gefen et al. (2000), we ran alternate models in which we combined two (or more) latent subconstructs into one and compared the resulting χ^2's to that of the original model (with the subconstructs modeled separately). If the χ^2 difference test shows the original model to be a better fit, discriminant validity among the subconstructs is established.

Phase 3: Second-Order Models

In the third phase, we used second-order models (using LISREL 8.3) to analyze cross-construct relationships and reaffirm discriminant validity among the constructs. This analysis was performed at both the item and scale levels to ensure cross-validation and interpretation of results. We assessed internal nomological validity by testing proposed relationships among the trust constructs themselves, and external nomological validity by examining relationships between the trust constructs and other e-commerce variables (Figure 2).

Finally, we were able to leverage our large sample size to provide greater confidence in the results. The sample was divided approximately in half by randomly selecting cases. The randomly selected sample (n = 724) was used in the tests, with the remaining items (n = 679) used as a hold-out sample for confirmation testing.

Results

Principal Components Analysis

Discriminant validity of the high-level trust constructs—disposition to trust, institution-based trust, trusting beliefs, and trusting intentions—was assessed

through an exploratory, principal components factor analysis (PCA) with SPSS 9.0 direct oblimin rotation, as described above. We were primarily looking for problem items—those whose loading on the intended construct was lower than one or more cross-loadings. No problem items were found; in fact, no items had cross-loadings above 0.4 (Boudreau et al. 2001, Hair et al. 1998) on the "wrong" trust construct.

We then examined the factor structure within each high-level trust construct. Ten factors with eigenvalues above 1.0 resulted. Disposition to trust formed three factors, with no cross-loadings above 0.4. Faith in humanity-benevolence and faith in humanity-integrity factored together. Institution-based trust split by situational normality and structural assurance. One item from the situational normality factor had a cross-loading of -0.42 on structural assurance, but this cross-loading was still much lower than the loading of the item on the main factor (>0.60). Furthermore, dropping the item did not improve the reliability of this subconstruct. Therefore, the item was retained.

The trusting beliefs items all loaded strongly together into a single factor. A second analysis was performed using just the items forming trusting beliefs and specifying the number of factors based on theory (Fabrigar et al. 1999, Wayne and Liden 1995). When a two-factor solution was specified, competence belief split cleanly from benevolence and integrity beliefs. When a three-factor solution was specified, all items loaded by the types in the model, with loadings above 0.55 on the intended subconstruct and cross-loadings below 0.4. Thus, no items were changed.

Trusting intention formed three well-defined factors: intention to make purchases, intention to follow advice/willingness to depend, and intention to give personal information. The only cross-loading above 0.4 was the second item for Give Information (GI), which loaded at 0.42 on willingness to make purchases. Factor 10 consisted of weak loadings from items for trusting intention-willingness to depend, indicating that this subconstruct may not have been fully captured by the "intention to follow advice/willingness to depend" factor noted here. Once again, a second analysis was conducted using just the items designed to measure trusting intention. Initially, we obtained the same three factors as described, with no cross-loadings above 0.4. When a four-factor solution was specified, trusting intentions split cleanly into the four subconstructs in the model. However, one item that was designed to measure willingness to follow advice loaded instead on the factor willingness to depend. Examining this item suggested that it had been worded to be closer to willingness to depend. Thus, this item was reassigned for the CFA. We again found that the second item designed to measure GI had a cross-loading of 0.40 and a relatively low loading of 0.49. However, the item was retained because the cross loading was lower than the loading, and because reliability analysis showed that dropping this item only improved the alpha for GI from 0.70 to 0.73.

Next, internal consistency reliability analyses were conducted, using Cronbach's alphas. Table 3A reports results based on the factor pattern in the PCA, and Table 3B reports alphas based on more detailed breakdowns. All constructs are reliable by Nunnally's (1978) heuristics.

Confirmatory Factor Analysis

Disposition to Trust. Figure 3 shows the results of the CFA analysis of the disposition to trust part of the model. With GFI, NFI, and CFI statistics above 0.9, AGFI above 0.8, and an RMSEA below 0.08, model fit was good. Convergent validity for each of the four subconstructs is shown by the criteria discussed above—the item lambda coefficients were above 0.70 (0.73–0.92), each path was significant (t values between 21.4 and 31.0), and each path loading was greater than twice its associated standard error (0.035–0.058).

Five of the six pairs of latent variables passed the discriminant validity test, with intercorrelations less than 0.60. However, benevolence and integrity were highly correlated (0.69). Thus, the two additional tests for discriminant validity described previously were conducted. We ran six different constrained models, each time setting to unity the correlation between one pair of the four subconstructs. For all six pairs, the χ^2 was significant ($p < 0.01$), supporting discriminant validity. We then ran a model combining the two subconstructs of benevolence and integrity. The model fit indicators worsened significantly (RMSEA = 0.10). The

Table 3 Construct Reliability Results

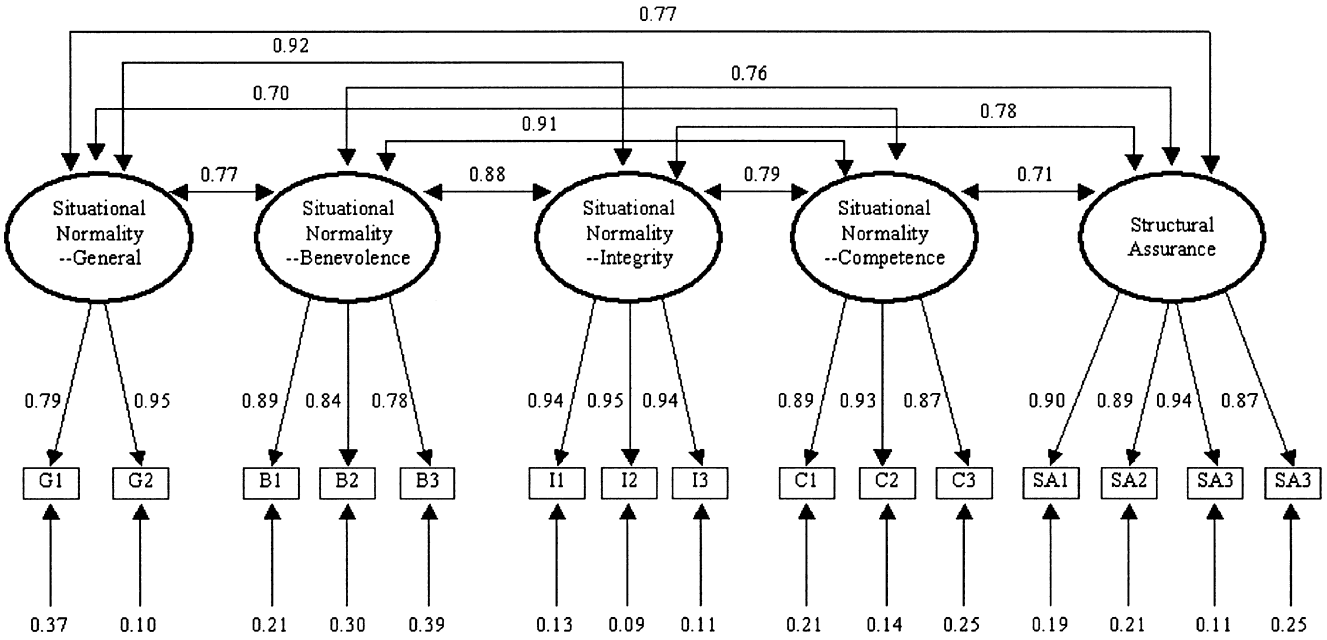
Construct	Subconstruct (no. items in parentheses)	Alpha (n = 724)
	A. Grouped by PCA Factor Pattern	
Disposition to Trust	Faith in Humanity-Benevolence, Integrity (6)	0.86
	Faith in Humanity-Competence (3)	0.88
	Trusting Stance (3)	0.90
Institution-Based Trust	Situational Normality (11)	0.96
	Structural Assurance (4)	0.94
Trusting Beliefs	Benevolence, Integrity, and Competence (11)	0.96
Trusting Intentions	Willingness to Depend, Follow Advice (10)	0.95
	Willing to Share Information (3)	0.92
	Willing to Pay for Advice (3)	0.70
	B. Grouped by Detailed Variable Proposed in Model	
Disposition to Trust	Faith in Humanity-Benevolence (3)	0.84
	Faith in Humanity-Integrity (3)	0.82
	Faith in Humanity-Competence (3)	0.88
	Trusting Stance (3)	0.90
Institution-Based Trust	Situational Normality-General (2)	0.85
	Situational Normality-Benevolence (3)	0.96
	Situational Normality-Integrity (3)	0.88
	Situational Normality-Competence (3)	0.92
	Structural Assurance (4)	0.94
Trusting Beliefs	Trusting Belief-Benevolence (3)	0.91
	Trusting Belief-Integrity (4)	0.92
	Trusting Belief-Competence (4)	0.95
Trusting Intentions	Trusting Intentions-Willing to Depend (5)	0.92
	Trusting Intentions-Willing to Act on Advice (5)	0.92
	Trusting Intentions-Willing to Share Information (3)	0.70
	Trusting Intentions-Willing to Pay for Advice (3)	0.84
Comparison Constructs	Personal Innovativeness-Web (5)	0.89
	General Web Experience (4)	0.69
	Site Quality (5)	0.86

χ^2 difference test confirmed ($p < 0.01$) that the four subconstruct model is a significantly better fit. Models with other combinations of subconstructs were also tested, but in each case the model fit was significantly worse ($0.16 <$ RMSEA < 0.19) than the original model, as confirmed through χ^2 difference tests.

Institution-Based Trust. Figure 4 shows the CFA results for institution-based trust. The model fit was good, with GFI, NFI, and CFI statistics above 0.9, AGFI above 0.8, and an RMSEA of 0.065. Convergent validity was demonstrated through the criteria stated above: all path t values (24.7–34.5) were significant, the item lambda coefficients were above 0.70 (0.78–0.95), and each path loading was greater than twice its standard error (0.034–0.054).

Discriminant validity among the subconstructs could not be assured by reviewing the intercorrelations, which were each greater than 0.60. Thus, we ran multiple models, constraining the correlations between subconstructs to 1.00—for all pairs, the χ^2 difference was significant ($p < 0.01$). We then ran multiple models combining two subconstructs. The model fit statistics worsened in each case. For each combination of situational normality subconstructs, the original RMSEA (0.065) increased to 0.075–0.130. Combining a situational normality variable with structural assurance worsened the RMSEA to 0.14 or 0.15. Combining

Figure 4 Institution-Based Trust Model



Chi-Square = 327.31; df = 80; p = 0.00000; RMSEA = 0.065; GFI = 0.94; AGFI = 0.91; NFI = 0.98; CFI = 0.98.

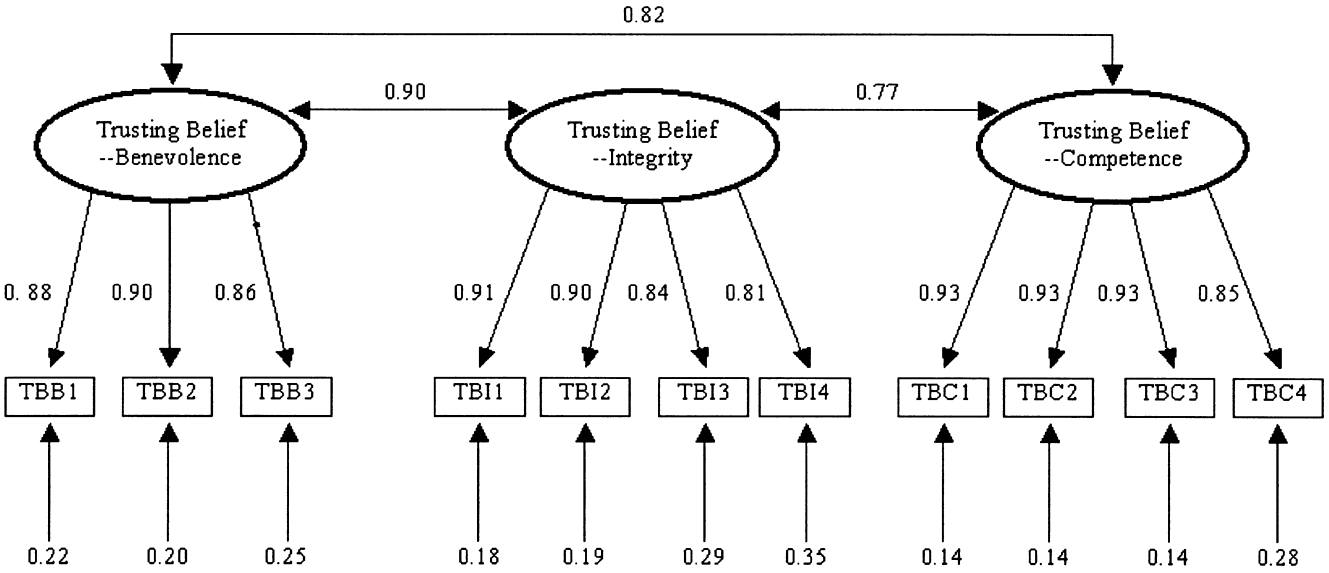
all situational normality items into one variable and the four structural assurance items into one variable worsened the RMSEA to 0.18. Combining all the variables together produced an RMSEA of 0.19. Combining the situational normality-general and -integrity subconstructs worsened the fit the least (0.075), followed by combining benevolence and competence (0.083). In each case, a χ^2 difference test confirmed that the original model was a significantly better fit. Thus, the model demonstrates discriminant validity. However, given the marginal declines in model fit when general and integrity are combined, or when benevolence and competence are combined, these alternatives may be worth considering in the interest of parsimony.

Trusting Beliefs. Figure 5 shows the CFA results for trusting beliefs. Convergent validity was demonstrated: path t values (25.9–32.7) were significant, the item lambda coefficients were between 0.81–0.93, and each path loading was greater than twice its standard error (0.035–0.050). Although the GFI, NFI, and CFI statistics were above 0.9, and AGFI was above 0.8, the RMSEA was 0.101, indicating the model fit was not as good.

Discriminant validity among the subconstructs could not be assessed simply by looking at the subconstruct intercorrelations, because each was greater than 0.60. The constrained analyses showed that, for all pairs, the χ^2 difference was significant ($p < 0.01$). Thus, the model shows discriminant validity. Next, we ran three models that each combined two subconstructs. The model fit statistics worsened in each case, with the RMSEA increasing to 0.13 for the benevolence/integrity combination, 0.18 for benevolence/competence, and 0.21 for competence/integrity. The model RMSEA was 0.22 when all three subconstructs were combined. χ^2 difference tests confirmed the superior fit of the original model. Although the original model fit is not optimal, combining elements of the model did not improve fit.

One possible explanation for the less-than-good fit may be that, with limited exposure to the vendor's Web site, subjects may not have had the time to develop trusting beliefs in the vendor at the posited level of granularity. It is possible that more time and experience are needed for trusting beliefs to evolve along the discriminant lines (competence, benevolence, and

Figure 5 Trusting Beliefs Model



Chi-Square = 343.09; df = 41; p = 0.00000; RMSEA = 0.101; GFI = 0.92; AGFI = 0.87; NFI = 0.96; CFI = 0.96.

integrity) proposed in the model. This issue calls for further investigation.

Trusting Intentions. Figure 6 shows the results for trusting intentions. Items for willingness to depend had high lambdas, as did most of those for the Follow Advice latent variable. Overall, 13 of 16 items had lambdas above 0.70. The model had a reasonable fit (GFI/NFI/CFI above 0.9; AGFI above 0.8; RMSEA = 0.073). As before, the lambdas were significant and higher than double their standard errors, indicating convergent validity.

Although only one subconstruct intercorrelation was greater than 0.60, all models with constrained correlations of 1.0 between pairs of subconstructs were run—the χ^2 difference was significant ($p < 0.01$) in each case. We also ran all combinations of models combining two subconstructs. The model-fit statistics worsened in each case. The RMSEA increased to 0.12 for the willing to depend/follow advice combination, which the correlations indicated as the most hopeful one. The model RMSEA was 0.17 when all four subconstructs were combined. χ^2 difference tests confirmed the superior fit of the original model, demonstrating discriminant validity.

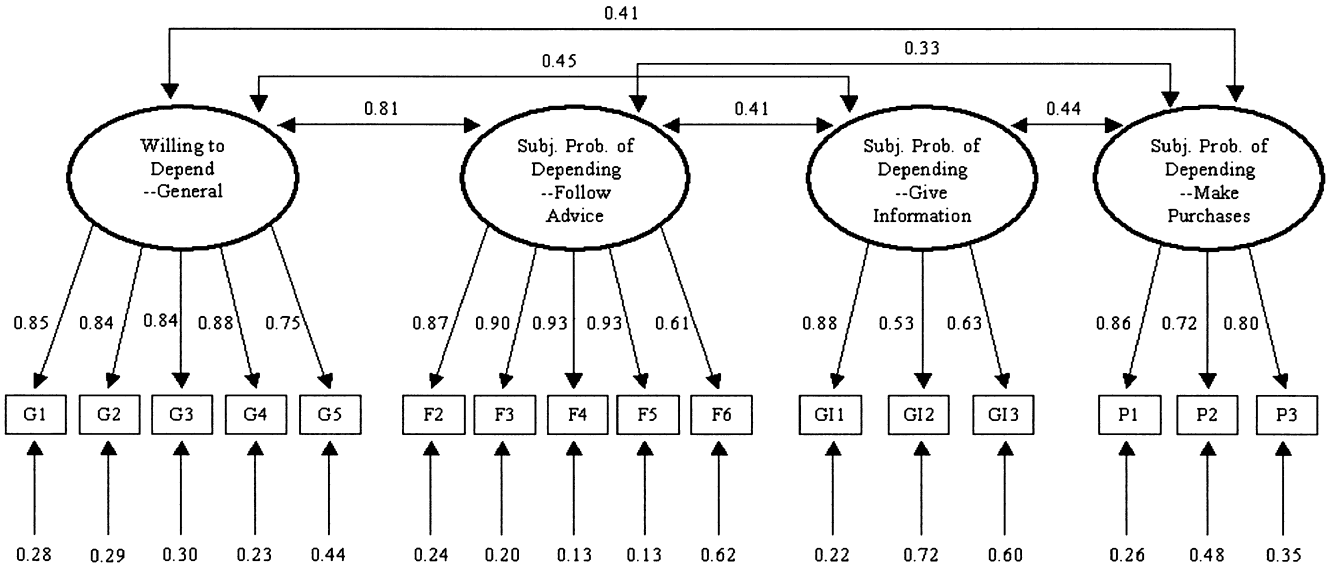
Hold-out Sample Analysis. As noted previously, we had set aside a hold-out sample to reconfirm the results. We ran the models using this hold-out sample. In general, the hold-out sample had comparable statistics with the original sample, but with slightly worse fit. For example, the RMSEA increased from 0.043 to 0.058 for disposition to trust, 0.065 to 0.069 for institution-based trust, 0.101 to 0.114 for trusting beliefs, and 0.073 to 0.076 for trusting intentions. None of these, in our judgment, indicate that the instrument has psychometric problems.

Second-Order Model and Internal Nomological Validity

Figure 7 shows the results for the second-order model, testing internal nomological validity[5] by examining relationships among the trust constructs. The model had a close fit by the criteria indicated previously (GFI/NFI/CFI above 0.9; AGFI above 0.8; RMSEA = 0.049). The fit with the hold-out sample was slightly inferior, but still good. The lambdas for most subconstructs were above 0.7. One exception was trusting stance,

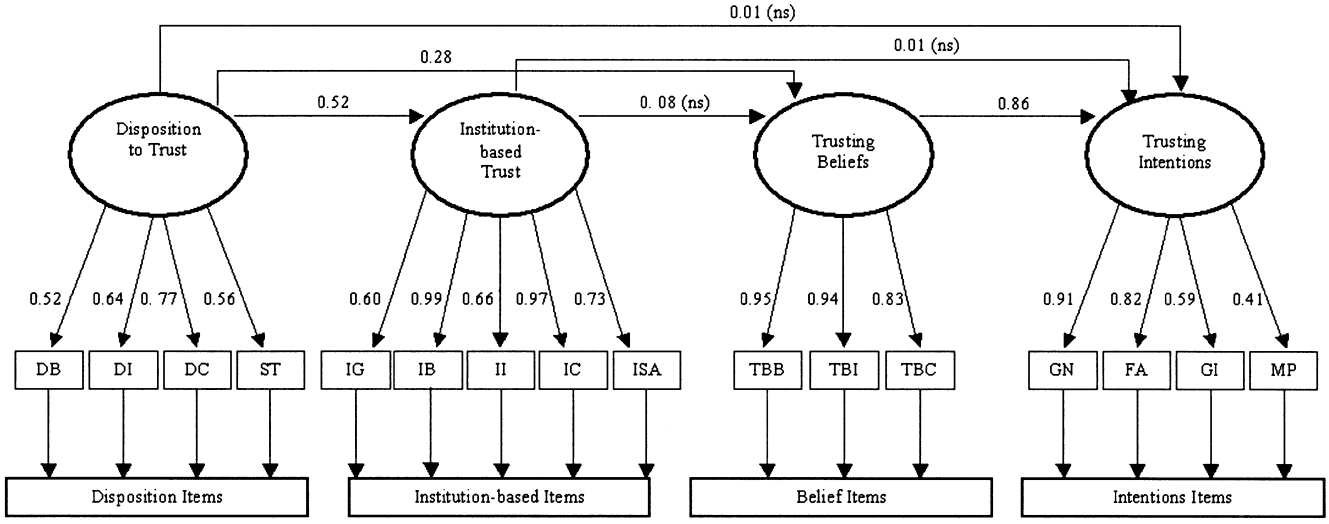
[5]We divided tests on nomological validity into internal and external, based on whether the relationships tested were within the network of trust constructs, or between the trust constructs and other variables. As far as we know, this is not an established practice, but made sense in this context.

Figure 6 Trusting Intentions Model



Chi-Square = 471.87; df = 98; p = 0.00000; RMSEA = 0.073; GFI = 0.92; AGFI = 0.90; NFI = 0.95; CFI = 0.96.

Figure 7 Second-Order Model



Chi-Square = 219.38; df = 80; p = 0.00000; RMSEA = 0.049; GFI = 0.96; AGFI = 0.94; NFI = 0.97; CFI = 0.98.

which indicates that this subconstruct may be somewhat different from faith in humanity. In the trusting intentions conceptual category, GI and Make Purchases (MP) had low loadings, indicating that these subconstructs may differ slightly from willingness to depend or to follow advice. Because the MP loadings were only 0.41, we ran an alternate model without MP and found it was significantly better (based on the χ^2 difference test)—the fit statistics were, however, similar to the original model (CFI = 0.93, GFI = 0.98, AGFI = 0.98, NFI = 0.92, RMSEA = 0.044).

One possible explanation for the low loadings may

be that our hypothetical Web site was a free advice-giving site. To respond to questions about making purchases or sharing personal information, the subjects had to project their likely behavior in a unique scenario. Would they be willing to pay for advice from the site in case of a future legal dilemma? Would they be willing to share personal information if it earned them a 15-minute telephone consultation with one of the lawyers behind the site? Responding to these scenarios may have required too great an inferential leap for subjects. Thus, the validity of these items needs to be tested in the context of a different site whose primary purpose is to sell something and that requires the user to disclose personal information, such as name or credit card number.

Data strongly support the proposed links from disposition to trust to institution-based trust and trusting beliefs, and from trusting beliefs to trusting intention (all $p < 0.01$). However, the link from institution-based trust to trusting beliefs was not significant in the primary sample (although it was in the hold-out sample). This was surprising. Because the respondents had substantial experience (3.6 years, on average) with the Internet (the institutional context), we would have expected that the link from institution-based trust to trusting beliefs would be significant, and that institution-based trust would mediate much of the impact of disposition on trusting beliefs. Yet this was not the case.

One possible explanation may be that most respondents' experience with the Internet was acquired through the use of simple information-based and shopping sites, not advice-giving sites like the one used in this study. Thus, the respondents may have perceived that the institutional context with which they had experience was not the same as the institutional context in this study. As a result, dispositional factors influenced trusting beliefs more than institution-based trust did. Institutional factors were not, however, irrelevant. One indication of this was the significant result in the hold-out sample. To explore the issue in greater detail, we ran the model without disposition to trust—the links from institution-based trust to both trusting beliefs and trusting intentions were significant. These findings suggest that, in e-commerce, institution-based trust may be important, but the relevant institutional context may need to be defined in more specific terms than just general beliefs about the Internet, particularly as the Internet begins to be utilized for more specialized applications (such as advice sites). This deserves further research.

External Nomological Validity

Based on the previously discussed theoretical development of relationships between the trust constructs and other e-commerce variables, external nomological validity was assessed as follows. Personal innovativeness was added to the disposition to trust model. General Web experience was added to the institution-based trust model. Perceived site quality was added to the combined trusting beliefs and trusting intentions model. Table 4 shows the results—the numbers reported in the bottom half of the table are the path coefficients between the external and trust constructs.

All the expected relationships were found. Personal innovativeness was significantly ($p < 0.001$) related to disposition to trust. Web experience related to institution-based trust, and site quality related strongly to both trusting beliefs and trusting intention (all $p < 0.001$). Thus, the constructs displayed adequate external nomological validity.

Table 4 Results from Nomological Validity Analysis—Other Constructs

	Personal Innovativeness	Web Experience	Site Quality
Lambda coefficients:			
Item 1	0.85	0.48	0.85
Item 2	0.87	0.41	0.59
Item 3	0.76	0.75	0.82
Item 4	0.65	0.74	0.80
Item 5	0.78	—	0.64
Model RMSEA	0.055	0.062	0.061
Path Coefficients:			
Disposition to Trust to Personal Innovativeness	0.31***	—	—
Web Experience to Institution-Based Trust	—	0.49***	—
Site Quality to Trusting Beliefs	—	—	0.78***
Site Quality to Trusting Intentions	—	—	0.50***

Note. *** $p < 0.001$.

We found, however, that loadings for the first two items that measured Web experience were low. We ran an alternate model that split Web experience into two constructs—items 1 and 2 (reading newspapers and reading/posting to news groups) as one construct, and items 3 and 4 (accessing information about products/services and shopping) as a second construct. The model fit improved significantly, per a χ^2 difference test. However, the reliability for the construct with items 1 and 2 was only 0.56. We then ran a model without the first two items for Web experience. The model fit improved again, and per a χ^2 test, was significantly better than the fit with all four items. Thus, we recommend that future researchers drop these two items from the scale for Web experience—it is possible that even users with high levels of Web usage and experience do not spend much time reading newspapers or participating in newsgroups.[6] However, this results in a two-item scale for Web experience, which should be augmented.

Discussion and Conclusions

This paper began with the premise that trust is critical to consumer adoption of e-commerce. Yet, current studies on trust in e-commerce may not account for the complex, multidimensional nature of trust. This study proposed and empirically validated measures for a multidimensional definition of trust with four high-level interrelated trust constructs, comprised of 16 cross-disciplinary, literature-grounded subconstructs. Having a comprehensive, consistent set of measures with sound psychometric properties should enable e-commerce trust research to progress more quickly by allowing results to be compared across studies.

The study shows that, far from being unitary, trust has many dimensions. It contributes by validating empirically the distinction among the three dimensions of competence, benevolence, and integrity, showing that e-commerce consumers gauge Web vendors not in broad, sweeping terms, but in terms of specific attributes. Trusting beliefs demonstrated statistical separation even in the initial relationship, when respondents had only one interaction with the Web site. Thus, it is possible for a consumer to believe quickly that a Web-based vendor is honest and benevolent, but not competent enough to earn the consumer's business or vice-versa. These distinctions should become more pronounced as the relationship matures, because trusting beliefs differentiate with familiarity. The fact that the three "faith in humanity" subconstructs were more discriminant than the three trusting beliefs supports this. Subjects developed faith in general others' benevolence, competence, and integrity over a lifetime, making these more discriminant than trusting beliefs in a specific vendor, developed in one brief interaction with the vendor's Web site. In addition, the paper shows that these three attributes apply not only to the interpersonal domain, but also to the dispositional and institutional domains. That is, even when it comes to Internet vendors in general, people hold specific beliefs with respect to particular attributes rather than broadly trusting or not trusting.

Furthermore, more than previous empirical trust studies, this work shows that trust constructs relate to each other in organized, meaningful ways. This is important because the word trust is commonly used to describe both detailed phenomena (e.g., "I trust him to keep his promise.") and higher order phenomena (e.g., "I just don't trust the Web."). With the measures presented in this study, trust research can be conducted at either level of analysis.

The findings also empirically define the role of trust among three constructs already important in e-commerce. Disposition to trust is positively related to personal innovativeness, Web experience relates positively to institution-based trust in the Web, and perceived site quality is highly correlated with trusting beliefs and intentions in the vendor. The site quality findings show that, in the context of initial relationships, people make judgments about little-known trustees on the basis of whatever they know. Thus, users formed beliefs about the attributes of an unknown vendor partly on the basis of perceptions about Web site quality. People in an uncertain situation seek assurance for their beliefs through experiential evidence (Fazio and Zanna 1981) such as that supplied by viewing a Web site.

The study suggests a number of *opportunities for further research*. Some of these relate directly to overcoming the limitations of this study. First, the current study

[6]We thank a reviewer for this excellent insight.

did not directly measure behaviors. It would clearly be desirable to conduct a study in which the ultimate outcome of interest—trust-related behavior (Lewis and Weigert 1985)—is directly measured. We identified a handful of commonly discussed trust-related behaviors in e-commerce—there may be others. Particularly interesting would be a longitudinal study that tracks how trusting beliefs are formed, how they lead to trusting intentions, and how these, in turn, lead to actual behavior.

The loadings for two trusting intentions subconstructs—make a purchase or disclose personal information—were low, perhaps because these functions did not directly relate to the advice-giving Web site presented to the subjects. It would be interesting to test these measures in the context of other Web-based tasks, such as shopping (Bhattacherjee 2002), where sharing information and making purchases are more directly supported.

The specific focus on advice giving may also explain why we did not see a significant, direct relationship between trusting beliefs/intentions and institution-based trust, as defined and measured in this study in terms of beliefs about Web vendors in general. Two possible avenues for future research present themselves. Because vendor type matters (Noteberg et al. 1999), the first would be to test the link from institution-based trust to trusting beliefs in a Web vendor selling books, CDs, or airline tickets (Gefen and Straub 2002), because these vendors may be closer to what subjects had in mind when answering questions about institution-based trust. A second approach would be to adapt the measures of institution-based trust to be more specific to the context of a particular trustee and then examine the same relationship. For instance, instead of measuring this construct in terms of perceived attributes of Web-based vendors in general, the items could be changed to measure or manipulate structural perceptions of advice-giving sites on the Web (Palmer et al. 2000). The latter may become particularly useful as consumers begin to use the Web for increasingly specialized tasks.

The model for trusting beliefs, although indicative of multiple underlying subconstructs, did not have a very good fit and may require adjustments. The Web experience scale could also be modified. Finally, the measures developed here could benefit from testing with different subjects (Cook and Campbell 1979), specifically nonstudent subjects with more (and less) experience with the Web. In addition, while the scenario presented (landlord/tenant) was familiar to our subjects, the act of seeking legal advice likely was not. Thus, it would be interesting to explore how familiarity (Gefen 2000) with the task influences user trust in the vendor.

Further research could expand on the finding that trusting beliefs are significantly affected by disposition to trust. Specifically, do people with low versus high disposition to trust respond differently to trust-building treatments, such as icons from third parties (Palmer et al. 2000)? Can those with low disposition to trust be persuaded to transact with unfamiliar vendors without, for instance, referrals from trusted friends or relatives?

Opportunities exist to *extend* the results of this study. For instance, whereas Figure 7 depicts relationships among the second order trust constructs, researchers could profitably examine relationships among specific subconstructs of these constructs (e.g., structural assurance as related to willingness to provide personal information). It would also be interesting to examine how the model presented here might change as we move beyond the domain of initial trust to trust in ongoing relationships. Clearly, experience would need to be added to the model (Blau 1964, Cheskin 1999). Beyond that, we believe the constructs included in the model would still be relevant, but the relationships among them, and their relative influence, may change. We speculated earlier that both dispositional and institutional factors would become less important influences on trusting beliefs than the truster's prior experience with the same trustee (Gefen 2000). Furthermore, the model for trusting beliefs may become more discriminant (Lewicki et al. 1998). Additional trusting beliefs (e.g., predictability—McKnight et al. 1998) may also need to be considered. Will certain trusting beliefs become more significant influences than others on trusting intentions? How will buyers react if a vendor demonstrates competence, but is not perceived as honest or vice-versa? In addition, the model should be applied in the B2B environment.

There are opportunities to *apply* the trust constructs

and measures to studies of trust-building strategies. The multidimensional nature of trust suggests that researchers need to study the relationship between different trust-building mechanisms and the specific trust constructs influenced by these mechanisms. Finally, for research on Internet adoption, it may be interesting to understand the relative importance of trust vis-à-vis previously studied adoption constructs, such as relative advantage, perceived usefulness, and perceived ease of use (Gefen and Straub 2002).

The study also has *implications for practitioners.* The most important is again the recognition that trust has many dimensions (Rousseau et al. 1998). A clear implication of multidimensionality is that a differentiated trust-building strategy may be necessary, depending, in part, on the nature of the target audience. For instance, if the target community is less experienced with the Internet, seals touting the security of the Internet and clear explanations of structural and technological safeguards may be used to promote institutional trust. In an industry where the audience is likely to be more technology savvy (e.g., in the digital imaging industry) and Web-based interaction is common, a vendor should probably focus more on building beliefs about its own competence through such mechanisms as endorsements from respected customers, seals of approval from professional associations, or a very high-quality Web site (Shneiderman 2000). Of course, in many cases, multiple (or all) dimensions may need to be addressed in a multipronged, trust-building strategy. For instance, in an industry that consumers may perceive as being high risk, (e.g., online banking), vendors need to promote both trust in the Internet environment and beliefs about the honesty and/or benevolence of the vendor (Keen et al. 1999) e.g., through seals from agencies such as Trust-e that attest to the privacy policies adhered to by the Web vendor.

Practitioners also need to recognize the relationship among dimensions of trust and their differential effect on consumer behavior. For example, in the data, the subjective probability of giving personal information and of making purchases were more strongly correlated with situational normality-benevolence than with competence or integrity. This suggests that perhaps vendors need to join forces, in trade associations or industry groups, to enhance consumer perceptions of the benevolence of Web-based vendors. Similarly, beliefs about vendor integrity correlate more with consumer intentions to purchase than beliefs about vendor competence. Thus, interventions that promote integrity beliefs may have the greatest promise in getting customers to the purchase stage. Finally, the high correlation between site quality and trusting beliefs underscores the importance of a high-quality Web site. Rational or not, we found that a high-quality Web site creates consumer beliefs that the vendor is not only competent, but also honest and benevolent.

Overall, then, this article contributes by validating a diverse set of consistent, literature-based trust measures and by showing how these measures relate to each other and to other e-commerce constructs. We believe the model and the measures hold significant promise to help practitioners and researchers better understand the dimensions, antecedents, and consequences of trust in the e-commerce domain.

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Appendix. Measures

	Disposition to Trust
Benevolence (denoted DB in Figure 7)	1. In general, people really do care about the well-being of others. 2. The typical person is sincerely concerned about the problems of others. 3. Most of the time, people care enough to try to be helpful, rather than just looking out for themselves.
Integrity (DI)	1. In general, most folks keep their promises. 2. I think people generally try to back up their words with their actions. 3. Most people are honest in their dealings with others.
Competence (DC)	1. I believe that most professional people do a very good job at their work.

Appendix (cont'd.)

	2. Most professonals are very knowedgeable in their chosen field.
	3. A large majority of professional people are competent in their area of expertise.
Trusting Stance (ST)	1. I usually trust people until they give me a reason not to trust them.
	2. I generally give people the benefit of the doubt when I first meet them.
	3. My typical approach is to trust new acquaintances until they prove I should not trust them.
	Institution-Based Trust
Situational Normality-General (IG)	1. I feel good about how things go when I do purchasing or other activities on the Internet.
	2. I am comfortable making purchases on the Internet.
Situational Normality-Benevolence (IB)	1. I feel that most Internet vendors would act in a customers' best interest.
	2. If a customer required help, most Internet vendors would do their best to help.
	3. Most Internet vendors are interested in customer well-being, not just their own well-being.
Situational Normality- Integrity (II)	1. I am comfortable relying on Internet vendors to meet their obligations.
	2. I feel fine doing business on the Internet since Internet vendors generally fulfill their agreements.
	3. I always feel confident that I can rely on Internet vendors to do their part when I interact with them.
Situational Normality-Competence (IC)	1. In general, most Internet vendors are competent at serving their customers.
	2. Most Internet vendors do a capable job at meeting customer needs.
	3. I feel that most Internet vendors are good at what they do.
Structural Assurance (ISA)	1. The Internet has enough safeguards to make me feel comfortable using it to transact personal business.
	2. I feel assured that legal and technological structures adequately protect me from problems on the Internet.
	3. I feel confident that encryption and other technological advances on the Internet make it safe for me to do business there.
	4. In general, the Internet is now a robust and safe environment in which to transact business.
	Trusting Beliefs
Benevolence (TBB)	1. I believe that LegalAdvice.com would act in my best interest.
	2. If I required help, LegalAdvice.com would do its best to help me.
	3. LegalAdvice.com is interested in my well-being, not just its own.
Integrity (TBI)	1. LegalAdvice.com is truthful in its dealings with me.
	2. I would characterize LegalAdvice.com as honest.
	3. LegalAdvice.com would keep its commitments.
	4. LegalAdvice.com is sincere and genuine.
Competence (TBC)	1. LegalAdvice.com is competent and effective in providing legal advice.
	2. LegalAdvice.com performs its role of giving legal advice very well.
	3. Overall, LegalAdvice.com is a capable and proficient Internet legal advice provider.
	4. In general, LegalAdvice.com is very knowledgeable about the law.
	Trusting Intentions
Willingness to Depend (GN)	1. When an important legal issue or problem arises, I would feel comfortable depending on the information provided by LegalAdvice.com.
	2. I can always rely on LegalAdvice.com in a tough legal situation.
	3. I feel that I could count on LegalAdvice.com to help with a crucial legal problem.
	4. Faced with a difficult legal situation that required me to hire a lawyer *(for a fee)*, I would use the firm backing LegalAdvice.com.
Subjective Probability of Depending—Follow Advice (FA)	1. If I had a challenging legal problem, I would want to use LegalAdvice.com again.*
	2. iI would feel comfortable acting on the landlord/tenant information given to me by LegalAdvice.com.
	3. I would not hesitate to use the landlord/tenant information LegalAdvice.com supplied me.
	4. I would confidently act on the legal advice I was given by LegalAdvice.com.

Appendix (cont'd.)

	5. I would feel secure in using the landlord/tenant information from LegalAdvice.com. 6. Based on the advice I just read, I would serve notice, wait, go ahead and get the repair done, and then deduct the cost of the repair from my rent.
Subjective Probability of Depending—Give Information (GI)	Suppose you wanted more specific information about landlord/tenant relationships and you could consult (one time only) by telephone with one of the LegalAdvice.com lawyers for 15–30 minutes *(free of charge)*. For this service, please answer the following: 1. I would be willing to provide information like my name, address, and phone number to LegalAdvice.com. 2. I would be willing to provide my social security number to LegalAdvice.com. 3. I would be willing to share the specifics of my legal issue with LegalAdvice.com.
Subjective Probability of Depending—Make Purchases (MP)	Suppose the LegalAdvice.com site was *not* free, but charged to access information on the site. Answer the following questions: 1. Faced with a difficult legal situation, I would be willing to pay to access information on the LegalAdvice.com Web site. 2. I would be willing to provide credit card information on the LegalAdvice.com Web site. 3. Given a tough legal issue, I would be willing to pay for a 30-minute phone consultation with a LegalAdvice.com lawyer.

Personal Innovativeness

1. I like to explore new Web sites.
2. When I hear about a new Web site, I often find an excuse to go visit it.
3. Among my peers, I am usually the first to try out new Internet sites.
4. In general, I am not interested in trying out new Web sites.
5. When I have some free time, I often explore new Web sites.

General Web Experience

On average, how much time per week do you spend on each of the following Web activities?
(Scale: None, 0–30 minutes, 30–60 minutes, 1–2 hours, 2–4 hours, 4–8 hours, 8 + hours)
1. . . . reading newspapers on the Web?
2. . . . reading and/or posting messages to news groups?
3. . . . accessing information on the Web about products and services you may buy?
4. . . . shopping (i.e., actually purchasing something) on the Web?

Perceived Site Quality

1. Overall, this site worked very well technically.
2. Visually, this site resembled other sites I think highly of.
3. This site was simple to navigate.
4. On this site, it was easy to find the information I wanted.
5. This site clearly showed how I can contact or communicate with LegalAdvice.com.

*This item was later switched to Willingness to Depend.

References

Agarwal, R., J. Prasad. 1998. A conceptual and operational definition of personal innovativeness in the domain of information technology. *Inform. Systems Res.* **9**(2) 204–215.

Anderson, J. C., D. W. Gerbing. 1988. Structural equation modeling in practice: A review and recommended two-step approach. *Psych. Bull.* **103**(5) 411–423.

——, J. A. Narus. 1990. A model of distributor firm and manufacturer firm working partnerships. *J. Marketing* **54**(1) 42–58.

Bagozzi, R. P., Y. Yi, L. W. Phillips. 1991. Assessing construct validity in organizational research. *Admin. Sci. Quart.* **36**(3) 421–458.

Baier, A. 1986. Trust and antitrust. *Ethics* **96** 231–260.

Barber, B. 1983. *The Logic and Limits of Trust*. New Rutgers University Press, Brunswick, NJ.

Bhattacherjee, A. 2002. Individual trust in online firms: Scale development and initial test. Forthcoming, *J. Management Inform. Systems*.

Bigley, G. A., J. L. Pearce. 1998. Straining for shared meaning in organization science: Problems of trust and distrust. *Acad. Management Rev.* **23**(3) 405–421.

Blakeney, R. N. 1986. A transactional view of the role of trust in organizational communication. *Trans. Anal. J.* **16**(1) 95–98.

Blau, P. M. 1964. *Exchange and Power in Social Life*. John Wiley & Sons, New York.

Bonoma, T. V. 1976. Conflict, cooperation, and trust in three power systems. *Behavioral Sci.* **21**(6) 499–514.

Boudreau, M., D. Gefen, D. Straub, 2001. Validation in IS research: A state-of-the-art assessment. *MIS Quart.* **25**(1) 1–24.

Browne, M. W., R. Cudeck. 1992. Alternative ways of assessing model fit. K. A. Bollen and J. S. Long, eds. *Testing Structural Equation Models*. Sage, Beverly Hills, CA.

Burt, R. S., M. Knez. 1996. Trust and third-party gossip. R. M. Kramer and T. R. Tyler, eds. *Trust in Organizations: Frontiers of Theory and Research*. Sage, Thousand Oaks, CA, 68–89.

Butler, J. K. 1991. Toward understanding and measuring conditions of trust: Evolution of a conditions of trust inventory. *J. Management* **17**(3) 643–663.

Carlson, D., K. Kacmar, L. Williams. 2000. Construction and initial validation of a multidimensional measure of work-family conflict. *J. Vocational Behavior* **56**(2) 249–276.

Carnevale, D. G., B. Wechsler. 1992. Trust in the public sector: Individual and organizational determinants. *Admin. Soc.* **23**(4) 471–494.

Cheskin Research and Studio Archetype/Sapient. 1999. *eCommerce Trust Study*, monograph, ⟨http://www.gii.com/trust_study.html⟩, Accessed on May 12, 2000.

Churchill, G. A., Jr. 1979. A paradigm for developing better measures of marketing constructs. *J. Marketing Res.* **16**(1) 64–73.

Cook, T. D., D. T. Campbell. 1979. *Quasi-Experimentation: Design and Analysis Issues for Field Settings*. Houghton Mifflin, Boston, MA.

Cummings, L. L., P. Bromiley. 1996. The organizational trust inventory: OTI. R. Kramera and T. Tyler, eds. *Trust in Organizations: Frontiers of Theory and Research*. Sage, Thousand Oaks, CA, 302–330.

Currall, S. C., T. A. Judge. 1995. Measuring trust between organizational boundary role persons. *Organ. Behavior Human Decision Processes* **64**(2) 151–170.

Davis, F. D. 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quart.* **13**(3) 319–340.

——, R. P. Bagozzi, P. R. Warshaw. 1989. User acceptance of computer technology: A comparison of two theoretical models. *Management Sci.* **35**(8) 982–1003.

Deutsch, M. 1973. *The Resolution of Conflict: Constructive and Destructive Processes*. Yale University Press, New Haven, CT.

Dillon, W. R., M. Goldstein. 1984. *Multivariate Analysis: Methods and Applications*. John Wiley & Sons, New York.

Dobing, B. 1993. *Building Trust in User-Analyst Relationships*. Doctoral dissertation, Information and Decision Sciences Department, University of Minnesota, Minneapolis, MN.

Doney, P. M., J. P. Cannon, M. R. Mullen. 1998. Understanding the influence of national culture on the development of trust. *Acad. Management Rev.* **23**(3) 601–620.

Dunn, M. H. 1988. Trust and political agency. D. Gambetta, ed. *Trust: Making and Breaking Cooperative Relations*. Blackwell, New York, 73–93.

Erikson, E. H. 1968. *Identity: Youth and Crisis*. W. W. Norton, New York.

Fabrigar, L. R., D. T. Wegener, R. C. MacCallum, E. J. Strahan. 1999. Evaluating the use of exploratory factor analysis in psychological research. *Psych. Methods* **4**(3) 272–299.

Fazio, R. H., M. P. Zanna. 1981. Direct experience and attitude-behavior consistency. L. Berkowitz, ed. *Advances in Experimental Social Psychology*, vol. 14. Academic Press, New York, 162–202.

Fishbein, M., I. Ajzen. 1975. *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research*. Addison-Wesley, Reading, MA.

Fox, A. 1974. *Beyond Contract: Work, Power, and Trust Relations*. Faber, London, U.K.

Fox, S. 2000. *Trust and Privacy Online: Why Americans Want to Rewrite the Rules*. The Pew Internet & American Life Project, ⟨http://www.pewinternet.org⟩. Accessed on June 12, 2001.

Friedman, B., P. H. Kahn, Jr., D. C. Howe. 2000. Trust online. *Comm. ACM* **43**(12) 34–40.

Fung, R. K. K., M. K. O. Lee. 1999. EC-trust (trust in electronic commerce): Exploring the antecedent factors. W. D. Haseman and D. L. Nazareth, eds. *Proc. 5th Americas Conf. Inform. Systems*, August 13–15, pp. 517–519.

Gabarro, J. J. 1978. The development of trust, influence, and expectations. A. G. Athos and J. J. Gabarro, eds. *Interpersonal Behavior: Communication and Understanding in Relationships*. Prentice-Hall, Englewood Cliffs, NJ.

Gaines, J. H. 1980. Upward communication in industry: An experiment. *Human Relations* **33**(12) 929–942.

Garfinkel, H. 1963. A conception of, and experiments with, "trust" as a condition of stable concerted actions. O. J. Harvey, ed. *Motivation and Social Interaction*. Ronald Press, New York, 187–238.

Gefen, D. 1997. Building users' trust in freeware providers and the effects of this trust on users' perceptions of usefulness, ease of use and intended use. Doctoral dissertation, Georgia State University, Atlanta, GA.

——. 2000. e-Commerce: The role of familiarity and trust. *Omega: Internat. J. Management Sci.* **28**(6) 725–737.

——, D. Straub. 2002. Managing user trust in B2C e-services. Forthcoming, *eService J.*

——, ——, M. Boudreau. 2000. Structural equation modeling and regression: Guidelines for research practice. *Comm. AIS* **7**(7) 1–78.

Giffin, K. 1967. The contribution of studies of source credibility to a theory of interpersonal trust in the communication process. *Psych. Bull.* **68**(2) 104–120.

Golembiewski, R. T., M. McConkie. 1975. The centrality of interpersonal trust in group processes. G. L. Cooper, ed. *Theories of Group Processes*. John Wiley & Sons, London, U.K., 131–185.

Gordon, M. E., L. A. Slade, N. Schmitt. 1986. The 'science of the sophomore' revisited: From conjecture to empiricism. *Acad. Management Rev.* **11**(1) 191–207.

Hair, J. F., Jr., R. E. Anderson, R. L. Tatham, W. C. Black. 1998. *Multivariate Data Analysis with Readings*, 5th ed. Prentice Hall, Englewood Cliffs, NJ.

Heimovics, R. D. 1984. Trust and influence in an ambiguous group setting. *Small Group Behavior* **15**(4) 545–552.

Hoffman, D. L., T. P. Novak, M. Peralta. 1999. Building consumer trust online. *Comm. ACM* **42**(4) 80–85.

Holmes, J. G. 1991. Trust and the appraisal process in close relationships. W. H. Jones and D. Perlman, eds. *Advances in Personal Relationships*, vol. 2. Jessica Kingsley, London, U.K., 57–104.

Husted, B. W. 1990. Trust in business relations: Directions for empirical research. *Bus. Professional Ethics J.* **8**(2) 23–40.

Jarvenpaa, S. L., N. Tractinsky. 1999. Consumer trust in an Internet store: A cross-cultural validation. *J. Comput.-Mediated Comm.* **5**(2) 1–33.

Jiang, J. J., G. Klein. 1999/2000. Supervisor support and career anchor impact on the career satisfaction of the entry-level information systems professional. *J. Management Inform. Systems* **16**(3) 219–240.

Johnson-George, C., W. C. Swap. 1982. Measurement of specific interpersonal trust: Construction and validation of a scale to assess trust in a specific other. *J. Personality Soc. Psych.* **43**(6) 1306–1317.

Kaplan, A. 1964. *The Conduct of Inquiry.* Chandler, New York.

Karahanna, E., D. W. Straub, N. L. Chervany. 1999. Information technology adoption across time: A cross-sectional comparison of preadoption and post-adoption beliefs. *MIS Quart.* **23**(2) 183–207.

Kasperson, R. E., D. Golding, S. Tuler. 1992. Social distrust as a factor in siting hazardous facilities and communicating risks. *J. Soc. Issues* **48**(4) 161–187.

Kee, H. W., R. E. Knox. 1970. Conceptual and methodological considerations in the study of trust and suspicion. *J. Conflict Resolution* **14**(3) 357–366.

Keen, P. G. W., C. Balance, S. Chan, S. Schrump. 1999. *Electronic Commerce Relationships: Trust by Design.* Prentice-Hall, Englewood Cliffs, NJ.

Kerlinger, F. N. 1986. *Foundations of Behavioral Research*, 3rd ed. Holt, Rinehart and Winston, New York.

Koller, M. 1988. Risk as a determinant of trust. *Basic Appl. Soc. Psych.* **9**(4) 265–276.

Krackhardt, D., R. N. Stern. 1988. Informal networks and organizational crises: An experimental simulation. *Soc. Psych. Quart.* **51**(2) 123–140.

Lewicki, R. J., B. B. Bunker. 1995. Trust in relationships: A model of trust development and decline. B. B. Bunker and J. Z. Rubin, eds. *Conflict, Cooperation, and Justice*. Jossey-Bass, San Francisco, CA, 133–173.

——, D. J. McAllister, R. J. Bies. 1998. Trust and distrust: New relationships and realities. *Acad. Management Rev.* **23**(3) 438–458.

Lewis, J. D., A. J. Weigert. 1985. Trust as a social reality. *Soc. Forces* **63**(4) 967–985.

Lievens, F., E. Van Keer. 2001. The construct validity of a Belgian assessment centre: A comparison of different models. *J. Occup. Organ. Psych.* **74**(3) 373–378.

Lindskold, S. 1978. Trust development, the GRIT proposal, and the effects of conciliatory acts on conflict and cooperation. *Psych. Bull.* **85**(4) 772–793.

Luhmann, N. 1979. *Trust and Power*. Wiley, New York.

Lynch, J. G., Jr. 1999. Theory and external validity. *Acad. Market. Sci.* **27**(Summer) 367–376.

Mayer, R. C., J. H. Davis, F. D. Schoorman. 1995. An integrative model of organizational trust. *Acad. Management Rev.* **20**(3) 709–734.

McDonald, R. P. 1985. *Factor Analysis and Related Methods*. Lawrence Erlbaum, Hillsdale, NJ.

McGregor, D. 1967. *The Professional Manager*. McGraw-Hill, New York.

McKnight, D. H., N. L. Chervany. 2001. Trust and distrust definitions: One bite at a time. R. Falcone, M. Singh, and Y. H. Tan, eds. *Trust in Cyber-Societies: Integrating the Human and Artificial Perspectives*. Springer, Berlin, Germany, 27–54.

——, ——. 2001–2002. What trust means in e-commerce customer relationships: An interdisciplinary conceptual typology. *Internat. J. Electronic Commerce* **6**(2) 35–59.

——, L. L. Cummings, N. L. Chervany. 1998. Initial trust formation in new organizational relationships. *Acad. Management Rev.* **23**(3) 473–490.

McLain, D. L., Z. K. Hackman. 1999. Trust, risk, and decision-making in organizational change. *Public Admin. Quart.* **23**(2) 152–176.

Menon, N. M., P. Konana, G. J. Browne, S. Balasubramanian. 1999. Understanding trustworthiness beliefs in electronic brokerage usage. P. De and J. I. DeGross, eds. *Proc. 20th Internat. Conf. Inform. Systems*, December 13–15, Charlotte, NC, 552–555.

Meyerson, D., K. E. Weick, R. M. Kramer. 1996. Swift trust and temporary groups. R. M. Kramer and T. R. Tyler, eds. *Trust in Organizations: Frontiers of Theory and Research*. Sage, Thousand Oaks, CA, 166–195.

Mishra, A. K. 1996. Organizational responses to crisis: The centrality of trust. R. M. Kramer and T. R. Tyler, eds. *Trust in Organizations: Frontiers of Theory and Research*. Sage, Thousand Oaks, CA, 261–287.

Noteberg, A., E. Christiaanse, P. Wallage. 1999. The role of trust and assurance services in electronic channels: An exploratory study. P. De and J. I. DeGross, eds. *Proc. 20th Internat. Conf. Inform. Systems*, December 13–15, Charlotte, NC, 472–478.

Nunnally, J. C. 1978. *Psychometric Theory*, 2nd ed. McGraw-Hill, New York.

O'Brien, T. L. 2000. Aided by Internet, identity theft soars. *The New York Times*, April 3.

OECD. 1998. The economic and social impact of electronic commerce. Report available at: ⟨www.oecd.org/subject/e_commerce/summary.htm⟩.

Palmer, J. W., J. P. Bailey, S. Faraj. 2000. The role of intermediaries in the development of trust on the WWW: The use and prominence of trusted third parties and privacy statements. *J. Comput. Mediated Comm.* **5.** Available at ⟨www.ascusc.org/jcmc/vol5/issue3/palmer.html⟩.

Rempel, J. K., J. G. Holmes, M. P. Zanna. 1985. Trust in close relationships. *J. Personality Soc. Psych.* **49**(1) 95–112.

Riker, W. H. 1971. The nature of trust. J. T. Tedeschi, ed. *Perspectives on Social Power*. Aldine, Chicago, IL, 63–81.

Ring, P. S., A. H. Van de Ven. 1994. Developmental processes of cooperative interorganizational relationships. *Acad. Management Rev.* **19**(1) 90–118.

Rotter, J. B. 1971. Generalized expectancies for interpersonal trust. *Amer. Psychologist* **26**(5) 443–452.

Rousseau, D. M., S. B. Sitkin, R. S. Burt, C. Camerer. 1998. Not so different after all: A cross-discipline view of trust. *Acad. Management Rev.* **23**(3) 393–404.

Sato, K. 1988. Trust and group size in a social dilemma. *Japanese Psych. Res.* **30**(2) 88–93.

Schwab, D. P. 1980. Construct validity in organizational behavior. B. M. Staw and L. L. Cummings, eds. *Research in Organizational Behavior*, vol. 2. JAI Press, Greenwich, CT, 3–43.

Shapiro, D. L., B. H. Sheppard, L. Cheraskin. 1992. Business on a handshake. *Negotiation J.* **3**(4) 365–377.

Shapiro, S. P. 1987. The social control of impersonal trust. *Amer. J. Sociology* **93**(3) 623–658.

Sharma, S. 2000. Managerial interpretations and organizational context as predictors of corporate choice of environmental strategy. *Acad. Management J.* **43**(4) 681–697.

Sheppard, B. H., J. Hartwick, P. R. Warshaw. 1988. The theory of reasoned action: A meta analysis of past research with recommendations for modifications in future research. *J. Consumer Res.* **15**(3) 325–343.

Shneiderman, B. 2000. Designing trust into online experiences. *Comm. ACM* **43**(12) 57–59.

Sitkin, S. B., N. L. Roth. 1993. Explaining the limited effectiveness of legalistic "remedies" for trust/distrust. *Organ. Sci.* **4**(3) 367–392.

Solomon, L. 1960. The influence of some types of power relationships and game strategies upon the development of interpersonal trust. *J. Abnormal Soc. Psych.* **61**(2) 223–230.

Steiger, J. H., J. Lind. 1980. Statistically based tests for the number of common factors. Paper presented at the annual meeting of the Psychometric Society, Iowa City, IA, May.

Stewart, K. J. 1999. Transference as a means of building trust in World Wide Web sites. P. De and J. I. DeGross, eds. *Proc. 20th Internat. Conf. Inform. Systems*, December, Charlotte, NC, 459–464.

Straub, D. W. 1989. Validating instruments in MIS research. *MIS Quart.* **13**(2) 147–165.

Thorslund, C. 1976. Interpersonal trust: A review and examination of the concept. *Goteborg Psych. Rep.* **6**(6) 1–21.

Tiryakian, E. A. 1968. Typologies. D. L. Sills, ed. *International Encyclopedia of the Social Sciences*, vol. 16. The Macmillan Company & The Free Press, 177–186.

Uslaner, E. M. 2000. Social capital and the net. *Comm. ACM* **43**(12) 60–64.

Venkatesh, V. 1999. Creation of favorable user perceptions: Exploring the role of intrinsic motivation. *MIS Quart.* **23**(2) 239–260.

——. 2000. Determinants of perceived ease of use: Integrating perceived behavioral control, computer anxiety, and enjoyment into the technology acceptance model. *Inform. Systems Res.* **11**(4) 342–365.

——, F. D. Davis. 2000. A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Sci.* **46**(2) 186–204.

Wang, H., M. K. O. Lee, C. Wang. 1998. Consumer privacy concerns about Internet marketing. *Comm. ACM* **41**(3) 63–70.

Wayne, S., R. Liden. 1995. Effects of impression management on performance ratings: A longitudinal study. *Acad. Management J.* **38**(1) 232–260.

Webster, J., J. J. Martocchio. 1992. Microcomputer playfulness: Development of a measure with workplace implications. *MIS Quart.* **16**(2) 201–226.

Worchel, P. 1979. Trust and distrust. W. G. Austin and S. Worchel, eds. *The Social Psychology of Intergroup Relations.* Wadsworth, Belmont, CA, 174–187.

Wrightsman, L. S. 1991. Interpersonal trust and attitudes toward human nature. J. P. Robinson, P. R. Shaver, and L. S. Wrightsman, eds. *Measures of Personality and Social Psychological Attitudes: Volume 1—Measures of Social Psychological Attitudes.* Academic Press, San Diego, CA, 373–412.

Yamagishi, T., M. Yamagishi. 1994. Trust and commitment in the United States and Japan. *Motivation and Emotion* **18**(2) 129–166.

Zaheer, A., N. Venkatraman. 1993. Relational governance as an interorganizational strategy: An empirical test of the role of trust in economic exchange. Unpublished working paper, Carlson School of Management, University of Minnesota, Minneapolis, MN.

Zaltman, G., C. Moorman. 1988. The importance of personal trust in the use of research. *J. Advertising Res.* **28**(5) 16–24.

Zand, D. E. 1972. Trust and managerial problem solving. *Admin. Sci. Quart.* **17**(2) 229–239.

Zucker, L. G. 1986. Production of trust: Institutional sources of economic structure, 1840–1920. B. M. Staw and L. L. Cummings, eds. *Research in Organizational Behavior*, vol. 8. JAI Press, Greenwich, CT, 53–111.

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