

Reflections on the Dimensions of Trust and Trustworthiness among Online Consumers

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Abstract

Trust is emerging as a potentially central aspect leading to IT acceptance. It is especially needed in the case of gaining and later retaining consumers of online vendors. This has been shown by previous research using single dimensional constructs. But trust can also be viewed as a multi-dimensional construct combining specific beliefs (sometimes labeled as trustworthiness) that either directly or through an overall assessment of trust influence relevant behavioral intentions. To show the need to examine trust in a multi-dimensional perspective, this study proposes a three-dimensional scale of trustworthiness dealing with integrity, benevolence, and ability in the unique case of online consumer trust, and then shows the importance of examining the effects of each dimension individually. The data show that trustworthiness and trust should not be regarded as a single construct with a single effect. Rather, different beliefs influence different consumer activity intentions. Window-shopping intentions was affected by the ability-trustworthiness of the vendor, while overall trust in the vendor and its integrity-trustworthiness affected purchase intentions. The importance of differentiating among online customer activities and what dimensions of trustworthiness affect each is discussed.

ACM Categories: H.1.2, K.4.4

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Introduction

Trust is emerging as a potentially important antecedent of IT adoption. Previous research however regarded trust as a single conceptual construct, albeit possibly containing several statistical dimensions (Jarvenpaa & Tractinsky, 1999; Gefen & Straub, 2002; McKnight et al., 2000; McKnight & Chervany, 2001; Gefen & DeVine, 2001). The objective of this study is to show that there is merit to examining trust as a multi-dimensional construct at least in the case of e-commerce adoption, by showing that the different dimensions of trust are statistically distinct and have different effects on e-commerce adoption. In doing so the study proposes a multi-dimensional scale of trust in the context of e-commerce adoption and verifies this scale in two separate datasets. The study examines trust in the context of e-commerce because trust is crucial in this context.

One of the main inhibitors of consumer participation in e-commerce is the lack of online consumer trust in the online vendor with whom they are engaging in business (Cole, 1998; Jarvenpaa & Tractinsky, 1999; Reichheld & Scheffer, 2000; Rose et al., 1999). Low degrees of

online consumer trust prevent consumers from purchasing and even from just window-shopping (i.e., inquiring without purchasing) at websites (Gefen, 2000).¹ Low degrees of consumer trust also inhibit consumers from returning for additional purchases. Indeed, research suggests that if an online vendor wishes to succeed financially then establishing its consumers' trust is an imperative (Reichheld & Scheffer, 2000).

Online consumer trust is crucial for e-commerce, as the Better Business Bureau's testimony before the House of Representatives stated (Cole, 1998), because the online environment exposes consumers to the threat of possible inappropriate opportunistic behaviors by online vendors, such as masquerading, misuse and unauthorized distribution of personal information, and even credit card fraud. Online consumer trust is important also because it helps consumers build appropriate favorable expectations of what to expect of the vendor (Gefen, 2000). Understandably, consumers abstain from doing business with an online vendor they do not trust (Reichheld & Scheffer, 2000).

Empirical research indeed shows this significant role of online consumer trust. Across cultures, inexperienced online consumers' purchase intentions are affected by their trust in the online vendor (Jarvenpaa & Tractinsky, 1999). And, in the case of experienced consumers, consumer trust directly affects both their window-shopping intentions and their purchase intentions from an online vendor (Gefen, 2000). Indirect support for this claim can also be found in the popular press that has suggested that the recent failure of many dot-coms is related, at least in part, to their inability to build their consumers' trust (DiSabatino, 2000).

In general, previous research examining trust conceptualized it in one of two ways: (1) as a set of *specific beliefs* about the specific other party dealing with beliefs about relevant combinations of its integrity, benevolence, and ability (Ganesan, 1994; Giffin, 1967; Doney & Cannon, 1997; Larzelere & Huston, 1980; Gefen & Silver, 1999; Gefen, 2002), and (2) as a *general belief* that the specific other party can be trusted (Hosmer, 1995; Gefen, 2000; Zucker 1986; Moorman et al., 1992), sometimes with the specific beliefs in ability, integrity, and benevolence (labeled, in this case, as trustworthiness) serving as antecedents of this general belief in trust (Jarvenpaa & Tractinsky, 1999; Mayer et al., 1995; Mayer & Davis, 1999; Butler & Cantell, 1984). This study adopted the second option, naming the specific beliefs as dimensions of Trustworthiness, and naming the general belief as Overall Trust.² Within this

conceptualization the specific beliefs of ability, integrity, and benevolence that compose trustworthiness are seen as antecedents of overall trust. Accordingly, the terms trustworthiness beliefs and beliefs in ability, integrity, and benevolence are used interchangeably throughout this study.

Previous MIS research examining online consumer trust and trustworthiness used mostly a single dimensional scale that measured either a single dimension that combines many aspects of trustworthiness into one factor as in option 1 (Jarvenpaa & Tractinsky, 1999), or measured consumers' assessment of their overall trust in the online vendor, as in option 2 (Gefen 2000). As stated above, the objective of this study is to show that differentiating among these specific beliefs can provide a broader picture of the role of trust and trustworthiness in e-commerce. But, studying these trustworthiness beliefs in the context of e-commerce requires a verified and reliable scale that is adapted to the unique online environment where, unlike previous research that examined these trustworthiness beliefs (Mayer & Davis, 1999; Rempel et al., 1985), there is absolutely no interaction with another person and no physical environmental cues (such as the state of the store, the behavior of the attendants, the number of patrons, or its size) that can indicate whether the vendor is trustworthy.

The main objective of this study is to take the first step in building such a scale. Indeed, after building and revalidating a three-dimensional scale of online consumer trustworthiness dealing with beliefs in the ability, integrity, and benevolence of the online vendor, the data show that different trustworthiness-beliefs affect different online behavioral intentions, both directly and through overall trust.

The Meaning and Nature of Trust

Trust is a willingness to be vulnerable to the actions of another person or people (Mayer et al., 1995). This is based on optimistic expectations that the other person or persons will protect the rights of all involved (Hosmer, 1995). Stated otherwise, it is the expectation that commitments undertaken by another person or organization will be fulfilled (Rotter, 1971), especially in relationships where the trusting party lacks control over the trusted party but must still depend on it (Deutsch, 1958; Fukuyama, 1995; Hart et al., 1986; Hosmer, 1995).

Trust is an important component of many social and business relationships, determining the nature of the

¹ To avoid confusion, this study applies the term window-shopping to inquiring about items without purchasing.

² Trust and trustworthiness in this study, in accordance with

previous research (Gefen, 2000; Jarvenpaa et al., 1998; Mayer & Davis (1999), deals with beliefs that are directed at a specific organization or person (in this case Amazon.com), not as they relate to a technology or an industry in general (such as the online book industry).

interactions and people's expectations of it (Fukuyama, 1995; Hosmer, 1995; Lewis & Weigert, 1985; Luhmann, 1979). Trust is crucial in such relationships because it enables the parties to form appropriate favorable expectations about the party they are doing business with (Fukuyama, 1995; Luhmann, 1979; Williamson, 1985). As such, trust is essential in many commerce activities, especially those spanning time and those where the merchandise or service cannot be verified immediately (Fukuyama, 1995; Luhmann, 1979). The reason for this is that other people and organizations with whom one interacts are essentially free agents whose behavior cannot be entirely controlled or even predicted (Gefen, 2000). Because of this inherent uncertainty, the social environment is so potentially overwhelmingly complex that without somehow reducing its social complexity only simple short-term transactions would be possible. And so, explains Luhmann (1979), individuals are motivated to reduce this social complexity through understanding and controlling their social environment – that is, to predict the behavior of other people and organizations, and to understand how their own behavior affects it. In many cases, rules and regulations enable individuals to reduce this social complexity and so make complex and long-term transactions possible. When rules and regulations are not enough, however, individuals sometimes reduce the social complexity by assuming away undesirable, yet possible, behaviors of others. This favorable presumption about the acceptable future actions of others is the essence of trust (Luhmann, 1979).

In accordance with that observation, research has shown that trust indeed determines the nature of many buyer-seller and business relationships (Fukuyama, 1995; Ganesan, 1994; Kumar et al., 1995b). Research has shown that this applies also when trust is defined as a set of specific beliefs about integrity, benevolence, and ability – in what is labeled according to Mayer et al. (1995) and this study as trustworthiness. This latter set of studies conceptualized trust as a set of specific beliefs dealing with trust and integrity (Morgan & Hunt, 1994); with integrity, benevolence, and ability (Gefen & Silver, 1999); with credibility (dealing with a combination of integrity and ability) and benevolence (Ganesan, 1994); with honesty (integrity) and benevolence (Kumar, Scheer, and Steenkamp, 1995a; Kumar, Scheer, and Steenkamp, 1995b); with trustworthiness as an item in its own right combined with integrity and benevolence (Doney & Cannon, 1997); with trustworthiness combined with fairness, dependability, and openness (Schurr & Ozanne, 1985); and with ability, integrity, and benevolence (Giffin, 1967). Previous IS research adopted the same position, either studying trust as a single construct measuring overall trust in an e-commerce vendor (Gefen, 2000), a single construct measuring trustworthiness as an item in its own right combined with beliefs in the integrity and benevolence of

e-commerce vendors (Jarvenpaa & Tractinsky, 1999), or as a set of trustworthiness beliefs leading to trust in members of an online team (Jarvenpaa, Knoll, and Leidner, 1998).

The Meaning and Nature of Online Consumer Trust

Trust is arguably even more important in the case of e-commerce because of the less verifiable and less controllable business environment of the Web (Gefen, 2000; Reichheld & Scheffer, 2000). When online consumers provide credit card or personal information they are exposing themselves to the possible unethical use and distribution of the data. Even when online consumers only examine a website without purchasing from it, data may be automatically collected about their activities (Ohlson, 1999) and later misused or distributed without their consent or knowledge. One such case involving Amazon.com even reached the Federal Government and created a serious customer and business-partner backlash against Amazon.com (Rosencrance, 2000a; 2000b; 2000c). Such actions are not limited to online vendors, of course, but they are exacerbated in the case of an online vendor because of the lack of formal receipts with a legally binding signature, because of the ease with which information can be collected and used online, and because the location and questions of legal jurisdiction of the vendor are often unclear (Gefen, 2000). Indeed, industry and news reports suggest that the possibility of such fraudulent activities is a major concern of online consumers (BBC, 2000; Legard, 1999).

According to Mayer et al. (1995) and related empirical research (Jarvenpaa et al., 1998; Mayer & Davis, 1999) overall trust is the product of a set of trustworthiness beliefs. These beliefs are primarily beliefs about the ability, integrity, and benevolence of the trusted party. Integrity is the belief that the trusted party adheres to accepted rules of conduct, such as honesty and keeping promises. Ability is beliefs about the skills and competence of the trusted party. Benevolence is the belief that the trusted party, aside from wanting to make a legitimate profit, wants to do good to the customer (Mayer & Davis, 1999). As discussed above, many researchers treated these beliefs themselves as trust (Giffin, 1967), and accordingly demonstrated how these directly determined the value of outcome variables, while other researchers treated these beliefs as dimensions of trustworthiness that leads to trust and where the effect on the outcome variables is the product of trust, while yet other researchers built measures that combine some of these beliefs with overall trust.

Arguably, the three dimensions of trustworthiness identified by Mayer et al. (1995) should apply also to

online consumers. Many aspects of integrity, for example obeying the rules and fulfilling promises, are clearly important also in the case of e-commerce. Consumers, whether of online vendors or of bricks-and-mortar vendors, who have doubts about the vendor obeying the rules of commerce or keeping its word, can hardly be expected to interact with that vendor. Even when just inquiring (window-shopping), the value of the information is likely to be diminished when the online vendor is suspected of lying. Also in the case of beliefs in the vendor's benevolence, consumers who have doubts about the honorable intentions of an online vendor toward them can hardly be expected to rely on information provided by the vendor (window-shopping), nor can consumers be expected to pay in advance when it is not clear that the vendor has acceptable intentions with regard to any credit card or purchase information. And, in the case of beliefs in the vendor's ability, for example knowing its marketplace and being able to provide good service, consumers who have doubts about the online vendor's knowledge can hardly be expected to rely on the information that vendor provides (window-shopping), nor can they be expected to pay in advance when it is not clear that the vendor knows about the products and services it sells. While these issues apply to any vendor, they are even more pronounced with online vendors because consumers cannot rely on body language or other cues when assessing the integrity, benevolence, or ability of the vendor (Reichheld & Scheffer, 2000) and because the payment is made long before the service or merchandise is supplied.

Consumer Trust as an E-Commerce Enabler

The downstream effects of trust, in general, are a willingness to engage with the trusted party in situations where the trusting party may be vulnerable (Blau, 1964; Luhmann, 1979). This is true also in the case of business interactions where trust determines the nature of the business interaction and whether a business interaction will even occur (Fukuyama, 1995). It is also a significant factor leading to actual and to anticipated purchases (Doney & Cannon, 1997), and creates the kind of atmosphere where people are more willing to provide sensitive information (Ramaswani et al., 1997). And, trust increases the commitment of the involved companies to the business relationship between them, resulting in increased interaction between the companies and increased profits (Kumar, 1996).

Two outcomes of consumer trust that are suggested by research in the specific case of e-commerce, outcomes that resemble the same overall pattern, are: (1) a willingness to buy online from the vendor (Jarvenpaa & Tractinsky, 1999; Reichheld & Scheffer, 2000),

presumably including a willingness to provide credit card information in the process (Gefen, 2000), and (2) a willingness to window-shop at the online vendor (Gefen, 2000). The next sections describe the building, validating, and revalidating of such an exploratory scale and the relative importance of each of its dimensions with regard to these two behavioral intentions. The predictive validity of the scale was examined against the two conceptualizations of trust that were discussed in the introduction: (1) in Phase 1, as a set of specific beliefs about the ability, integrity, and benevolence of an online vendor – applying the three trustworthiness beliefs as dimensions of trust itself without the addition of Overall Trust, as done by some research (Ganesan, 1994; Gefen, 1997), and (2) in Phase 2, as a set of specific trustworthiness-beliefs that lead to trust – applying the conceptualization of Mayer et al. (1995).

Instrument Development

A central part in the development of any scale is establishing its reliability, content validity, and construct validity (Boudreau et al., 2001; Straub, 1989). Reliability is the extent of the consistency among the items that compose a scale (Hair, et al., 1998). This is typically assessed through established statistics such as Cronbach's α and, in the case of SEM, composite factor reliability (Gefen et al., 2000). Content validity is a qualitative assessment of whether the items in a scale capture the real nature of the construct as it is in the real world. Content validity is typically established through the literature and through expert judges (Cook & Campbell, 1979; Cronbach, 1971; Rogers, 1995). Construct validity is a set of quantitative measures that assess how accurately the scale measures the studied construct (Hair et al., 1998). The convergent, discriminant, and predictive validity of the scale are elements of construct validity (Bagozzi, 1980; Boudreau et al., 2001; Straub, 1989).

Content Validity

To establish the content validity of the scale, an initial set of items was adapted from existing research dealing with similar circumstances. The initial set of items was compiled from the marketing literature dealing with quantitative studies on trust in ability, integrity, and benevolence in *buyer-seller* and *service-providing* relationships (Crosby et al., 1990; Ganesan, 1994; Kumar et al., 1995a; Kumar et al., 1995b; Moorman et al., 1992; Morgan & Hunt, 1994). The entire set of items used in the above studies was examined and a subset of items that apply also to online consumers was then chosen and adapted to deal with an online bookstore. To this list, additional items were then added based on the themes reflecting these three beliefs in the qualitative literature on trust.

Integrity (Adheres to appropriate accepted rules of conduct)	Code
Promises made by Amazon.com are likely to be reliable	In1
I do not doubt the honesty of Amazon.com	In2
I expect that Amazon.com will keep promises they make	In3
I expect that the advice given by Amazon.com is their best judgment	In4**
I can count on Amazon.com to be sincere	In5**
Benevolence (Wants to do good to the customer)	
I expect that Amazon.com is ready and willing to assist and support me	Ben1*
I expect that Amazon.com have good intentions toward me	Ben2
I expect that Amazon.com intentions are benevolent	Ben3
I expect that Amazon.com puts customers' interests before their own	Ben4**
I expect that Amazon.com are well meaning	Ben5
Ability (Has appropriate skills and competence)	
Amazon.com are competent	Ab1**
Amazon.com understands the market they work in	Ab2
Amazon.com knows about books	Ab3
Amazon.com knows how to provide excellent service	Ab4

(*) Dropped in pretest (**) Dropped in the pilot testing

Table 1. The 14-Item Scale of Specific Online Consumer Beliefs (Trustworthiness)

These themes deal with the way individuals interact with each other in daily life and how these behaviors establish or ruin trust through indications of caring and integrity (Blau, 1964), and with how a trusting cooperation is established among companies by refraining from opportunism and by establishing a long-term and mutually caring attitude and its subsequent effect on the way business is carried out (Fukuyama, 1995). The objective was to capture as many different aspects of ability, integrity, and benevolence that might apply to online consumers, yet limit the scale to a manageable size by retaining only the most appropriate items. As in Mayer et al. (1995) and Mayer and Davis (1999), integrity was conceptualized as adherence to appropriate accepted rules of conduct, benevolence as a willingness "to do good" (Mayer & Davis, 1999, p. 124) for the customer, and ability as having appropriate skills, such as knowledge and competence.

Twenty-five items resulted from this process after similar items appearing in more than one study were dropped. The 25 items were then pilot tested by two experienced online shoppers who had extensive experience inquiring about and buying books with many online vendors. The objective of this testing was to examine the face validity of each item in the context of an online bookstore. Each online shopper was asked to read the 25 items and mark those items that were clearly appropriate, unambiguous, and dealt with desirable beliefs in the context of buying and inquiring about books online. The online shoppers worked individually and could not influence each other. Only items that were marked by both shoppers were included in the resulting scale. The 14-item scale is shown in Table 1.

Dataset 1 Pretest

The 14-item scale was then pretested in a free experiment with MBA students in the Mid-Atlantic region of the US. MBA students in the USA arguably represent one of the populations of interest in the case of online vendors who specialize in books (Gefen, 2000). This importance is also reflected in the recent proliferation of online USA vendors who specialize in college textbooks, such as www.campusbooks.com and www.textbooksatcost.com, and in the recent emphasis on selling college textbooks among the established leading vendors in this market, such as www.barnesandnoble.com. The free experiment was conducted in an Internet connected classroom.³ Each student had his/her own Internet connected PC with identical hardware and software configurations. As a matter of school policy, all the PCs also had exactly the same software installed and were connected to the Internet through the same network. Windows NT configuration guaranteed that the students could not possibly change these settings.

The students were asked to navigate to www.amazon.com, inquire about their current textbook, and go through the procedure of purchasing the textbook without actually submitting the purchase transaction. Amazon.com is among the most widely used e-commerce sites on the Web (NetValue, 2001; The Economist, 2000). Next, the participants were

³ A free experiment is a data collection method in which the subjects are allowed to behave "naturally" while conducting a pre-assigned task. There are no experimental treatment groups in a free experiment of this kind.

asked to complete the experimental instrument that requested the participants to assess the 14 items on a 7-point scale ranging from 1 (strongly agree) to 7 (strongly disagree) with the midpoint 4 being neutral. The purpose of the experiment was not revealed to the participants until after the data were collected. The objective of this procedure, as with free experiments in general (Fromkin & Streufert, 1976), was to elicit responses in natural settings. This procedure also made sure that all the students had the same idea of what precisely the nature of their interaction with Amazon.com is, and so reduced exogenous effects by providing a uniform and realshopping environment with identical interfaces, procedure, and response time.

In this manner, 217 complete instruments were collected from 239 students. About half the students were women (n=97) and half were men (n=96); twenty-four did not declare their gender. Most of the students were in the 21-25 age group (n=110), the 26-30 age group (n=54), or the 31-35 age group (n=21). Almost half (n=93) had previously bought online at the specific website. All the students knew how to inquire about and purchase books at the specific website.

The data, available on request from the authors, show that the subjects believed the online vendor was able, had integrity, and was benevolent. The standard deviations are all in the same range, between 1.13 and 1.22, and show that there was no large variability in the data.

A principal components factor analysis with a varimax rotation of the data revealed three factors with eigenvalues above 1 in which the items of integrity were one factor, of benevolence another, and of ability yet another. After dropping one item (Ben1) that loaded above .40 on more than one factor, the factor analysis showed a clean factor loading pattern where each item loaded highly only on the one factor where all the items of that construct loaded.

Confirmatory Factor Analysis Dataset 1

The trustworthiness scale was then examined in a LISREL Confirmatory Factor Analysis (CFA) to examine its reliabilities, and its convergent and discriminant validity. The multivariate-normal distribution assumption of the constructs was examined using the Kolmogorov-Smirnov test. The Kolmogorov-Smirnov test shows the significance of rejecting the null hypotheses that the distribution of a *continuous* random variable is not one of a given type, such as Normal, Uniform, and Poisson.⁴

⁴ The K-S test is seldom reported in LISREL studies, even in the top journals. The K-S Z is calculated by comparing the expected probability curve of the distribution with the observed one in the sample. As a rule, K-S Z is not applicable to random variables that contain interval data (NIST, 2001). Since the measurement items in

The K-S Z statistics were 1.374 (p=.05), 1.316 (p=.06), and 1.174 (p=.13), for Integrity, Benevolence, and Ability, respectively. A frequency distribution of each of the measurement items also showed that all the items had a bell-shaped distribution.

In the CFA, measurement items that shared a significant residual variance (the part of the variance that does not load on its assigned factor) with other measurement items were deleted one at a time and the CFA rerun after each item was deleted until good fit indexes were achieved, according to the method outlined by Gerbing and Anderson (1988). When each item was dropped, it was verified that in addition to sharing residual variance, it also shared meaning with the other items it shared residual variance with. Dropping the items was by no means only an exercise in statistics without regard to item wording.⁵ Deleting items with a high degree of shared residual variance is necessary in LISREL because, unlike principal components analysis, this method of analysis also examines the extent to which residual variance is shared among the items (Hair et al., 1998) and the unidimensionality of the scales (Gerbing & Anderson, 1988; Segars, 1997).⁶ The resulting scale was then retested with new data in Dataset 2, described next.

This procedure, based on the methodology of Gerbing and Anderson (1988) reduces the risk of researchers coming up with different items for the same construct depending on the data.

this study contained interval data, being an integer between 1 and 7, the K-S Z statistic was run on the constructs to provide a wider distribution of the "observed" values that would resemble a continuous random variable. The reason being that if these new random variables, created by adding several other random variables, have a normal distribution, so too do the random variables that compose it (Papoulis, 1984).

⁵ The items that were dropped were AB1, IN4, IN5, and BEN4. The significant residual variance reflects possible shared linguistic meaning these items have with other items. AB1, that the vendor is competent, had significant shared variance with IN4, that the advice the vendor gives will be its best judgment, and with AB4, that the vendor will give good service. In retrospect, it is not surprising that some variance relating to competence will be shared with best judgment and the ability to provide good service. IN4 also had significant shared variance with IN1, that vendor promises are reliable. Conceivably, in both cases the items also assess whether the information that the vendor is giving is reliable, whether directly regarding the information it is providing in the case of IN4 and whether regarding its promises in the case of IN1. IN5, that the vendor is sincere, had significant shared variance with IN3, that the vendor will keep its promises. In retrospect, this too is not surprising given that being sincere also means telling the truth about one's promises. Lastly, BEN4 had significant shared variance with BEN2 and BEN5. In retrospect this too is not surprising given that putting customer interests first reflects some of the same positive attitude as having good intentions, BEN2, and being well meaning, BEN5.

⁶ Unidimensionality is achieved when there is only one significant underlying factor among all the measurement items that reflect it.

Model	χ^2	Difference in χ^2 compared with the proposed model
Proposed three-dimensional model	$\chi^2_{24} = 53.92$	
All the items load on one factor	$\chi^2_{27} = 291.63$	$\Delta\chi^2_3 = 237.71$
Ability and Integrity as one factor and Benevolence as another	$\chi^2_{26} = 265.42$	$\Delta\chi^2_2 = 211.50$
Ability and Benevolence as one factor and Integrity as another	$\chi^2_{26} = 124.59$	$\Delta\chi^2_2 = 70.67$
Integrity and Benevolence as one factor and Ability as another	$\chi^2_{26} = 157.02$	$\Delta\chi^2_2 = 103.10$

Table 2. χ^2 of Alternative Models in Dataset 1

Intended Window-Shopping	Code
I would use Amazon.com to inquire what readers think of a book	Shop1
I would use Amazon.com to find out about the author of a book	Shop2
I would use Amazon.com to inquire about book ratings	Shop3
Intended Purchase	
I would use my credit card to purchase from Amazon.com	Purchase1
I am very likely to buy books from Amazon.com	Purchase2
Overall Trust in Vendor	
Even if not monitored, I'd trust Amazon.com to do the job right	Trust1
I trust Amazon.com	Trust2

Table 3. Adapted Window-Shopping and Purchase Intentions for Dataset 1

The resulting 9-item three-dimensional scale showed good fit indexes: RMR = .032, GFI = .95, AGFI = .91, NFI = .96, CFI = .97. The accepted thresholds for these statistics is below .05 for RMR, above .80 for AGFI, and .90 and above for the other statistics (see Gefen et al. (2000) for a detailed listing of these statistics and their accepted thresholds). The χ^2 was 53.92 with 24 degrees of freedom. All the items loaded significantly at the .01 level on their assigned latent variable (factor). The composite factor reliability, the SEM equivalent of Cronbach's α , was .88 for belief in ability, .91 for belief in integrity, and .83 for belief in benevolence.⁷ All the reliability coefficients are above the suggested .80 threshold (Hair et al., 1998; Nunnally & Bernstein, 1994).

Having shown the reliability and the convergent validity of the scale, another set of LISREL CFA were run to examine the discriminant validity of the three dimensions of the proposed scale. This is done in LISREL by comparing the significance of the difference in χ^2 , given the difference in degrees of freedom, between the original model with three dimensions and alternative less restrictive models that combine some or all of these dimensions (Segars, 1997; Segars & Grover, 1993). Table 2 shows the χ^2 and degrees of freedom of the alternative models. Since the χ^2 of the three-dimensional model is significantly smaller, given the difference in degrees of freedom, than the χ^2 of any

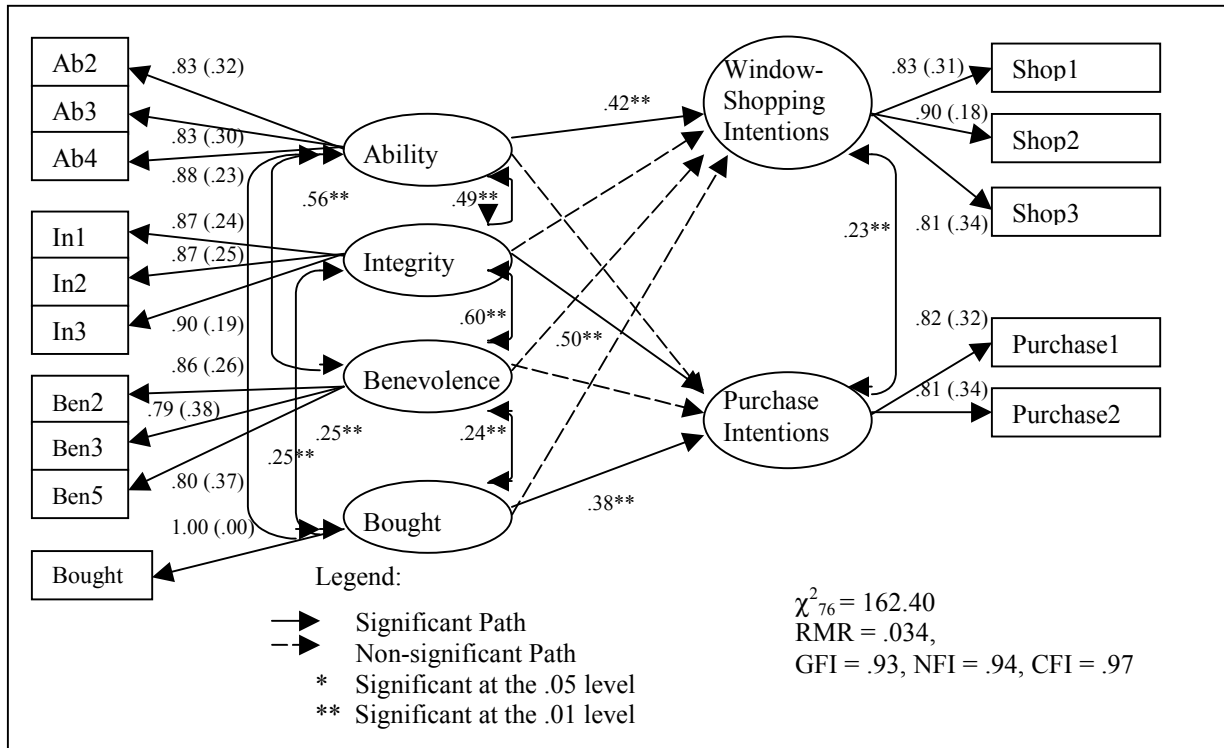
of the alternative models that combine any two or all three dimensions, the three-dimensional model is significantly better and its discriminant validity is significantly shown (Segars, 1997).

Instrument Validation: Dataset 2

Another important aspect of any new scale is its predictive validity, how well the scale is associated with its theoretical outcome constructs (Boudreau et al., 2001; Cook & Campbell, 1979). Since consumer trust should increase both purchase intentions (Gefen, 2000; Reichheld & Scheffer, 2000) and window-shopping intentions (Gefen, 2000), additional items dealing with window-shopping intentions, purchase intentions, and an overall assessment of trust in an online vendor were added to the experimental instrument. The scales for these outcome constructs were based on existing verified scales that applied the same data collection procedure (Gefen, 2000). These items are shown in Table 3.

The revised experimental instrument with the added items was administered to another group of 310 MBA students who went through the same data collection procedure as with the first dataset. This time, 289 complete responses were collected. The students were 46% men (n=132) and 41% women (n=118), 39 did not declare their gender. Here too, most of the students were in the 21-25 age group (n=122), the 26-30 age

⁷ Construct Reliability is calculated as: $\rho = (\sum\lambda_i)^2 / ((\sum\lambda_i)^2 + \sum\epsilon_i)$



group (n=89), or the 31-35 age group (n=32). Slightly more than half had previously bought at the website (n=150).⁸ All the students knew how to inquire about books at Amazon.com without assistance. Here too the subjects believed the online vendor was able, had integrity, and was benevolent. In addition, the data show that the students were inclined to purchase online and even more so to window-shop online, and trusted the online vendor. The standard deviations, with the exception of purchase intentions, are again within a small range. The somewhat greater standard deviations of the purchase intention items suggests that there is more variation when spending money is concerned than with beliefs about trustworthiness and trust.

The analysis on this dataset was done in three stages. First, the reliability, convergent validity, and discriminant validity of the three-dimensional scale alone was reassessed, repeating the statistical procedure applied to the first dataset. Next, the predictive validity of the scale was examined with window-shopping intentions and with purchase

intentions, examining the scale within the context of the conceptualization of trust as a multi-dimensional construct made up of the three beliefs themselves. And, last, the predictive validity of the scale was examined also with a measure of overall online consumer trust, examining the scale against the conceptualization of trust as the product of the three beliefs as trustworthiness-beliefs.

Reliability, Convergent and Discriminant Validity

The first stage in the analysis was to replicate the CFA analysis as done in dataset 1. The multivariate-normal distribution assumption was examined using the Kolmogorov-Smirnov test, showing that all the constructs had a normal distribution (K-S Z=1.250, 1.264, and 1.414 with p-values of .09, .08, and .04, for Integrity, Benevolence, and Ability respectively). The CFA of the three-dimensional scale showed good fit indexes: RMR = .029, GFI = .96, AGFI = .92, NFI = .97, CFI = .98. All these statistics are within their accepted thresholds (Gefen et al., 2000). The χ^2 was 58.29 with 24 degrees of freedom. All the items loaded significantly at the .01 level on their assigned latent variable. The composite factor reliability of the three dimensions were .88 for ability, .91 for integrity, and .86 for benevolence.

⁸ Amazon.com is among the most visited sites in the US with average weekly visits of over 5.5 million people, according to The Economist (2000). Given those numbers and given that the sample was taken from a computer literate population with easy access to the Internet this percentage is not surprising.

Next, another set of LISREL CFA were run to examine the discriminant validity of the three dimensions in the proposed scale, as done with the first dataset, and then to examine the discriminant validity of the scale against a scale of Overall Trust. Table 4 shows the χ^2 and degrees of freedom of the alternative models. Table 4 shows this first with regard to the original three-dimensional model, replicating the results of Table 2, and then with regard to a four-dimensional model which contains in addition to the original three dimensions also a measure of Overall Trust.

In all cases the χ^2 of the proposed multi-dimensional model is significantly smaller than the χ^2 of any of the less restrictive models, given the difference in degrees of freedom, demonstrating its significant discriminant validity (Segars, 1997) also in the second dataset.

Predictive Validity Phase 1

The predictive validity of the scale was then examined by adding the Intended Window-Shopping and the Intended Purchase scales to the LISREL model to assess whether, in accordance with the conceptualization of trust as the three beliefs themselves, it directly increases behavioral intentions. The model allowed covariance between Intended Purchase and Intended Window-Shopping. The same covariance was also included in the study from where the scales and data collection procedure were adapted (Gefen, 2000). This covariance, shown as a double head arrow in Figure 1, reflects the observation that the two online activities are correlated but that there is no necessary causation between them. The six paths from the three dimensions of online consumer trust to the two intended online activities were also freed so that the predictive validity of each dimension of the three-dimensional scale could be assessed. A control variable with a true-false indicator of whether the person completing the questionnaire had previously bought from the site was also added reflecting the assumption that regardless of trust and trustworthiness people who bought in the past are more likely to buy again. The model is shown in Figure 1.

The model showed good fit indexes: RMR = .034, GFI = .93, AGFI = .89, NFI = .94, CFI = .97. The χ^2 was 162.40 with 76 degrees of freedom. The composite factor reliability was .88 for ability, .91 for integrity, .86 for benevolence, .80 for Intended Purchase, and .89 for Intended Window-Shopping. The model explained 40% of the variance of Intended Purchase and 29% of Intended Window-Shopping.

Additional LISREL statistics are presented in Figure 1. The numbers near the paths connecting a latent variable to its indicators contain the standardized loading with the error term specified in parentheses. The numbers near

the arrows (representing causation) and double headed arrows (representing covariance) connecting the latent constructs to each other contain the standardized path coefficient and its significance level. Non-significant paths at the .05 level are shown with a broken-line arrow. The data indicate that Purchase Intentions was affected by the belief in the vendor's integrity, while Window-Shopping Intentions was affected by the belief in the vendor's ability. The belief in the vendor's benevolence, while having a significant covariance with the belief in the vendor's ability and the belief in the vendor's integrity, did not directly affect either purchase or window-shopping intentions. There was a significant covariance between Window-Shopping Intentions and Purchase Intentions, and among the three dimensions of online consumer trust. The control variable, containing an indicator of whether the student had previously bought at the site, increased Purchase Intentions, but did not affect Window-Shopping Intentions. The control variable was significantly correlated with the three trustworthiness dimensions and increased purchase intentions.

Predictive Validity Phase 2

The predictive validity of the proposed scale was then revalidated with the same dataset but also including Overall Trust in the vendor. This was done to examine the predictive validity of the scale where overall trust is a distinct construct that is the product of three trustworthiness-beliefs. As in the model examined in Figure 1, the covariance between Intended Purchase and Intended Window-Shopping was included, as were all the paths from the three elements of online consumer trust to Intended Purchase and Intended Window-Shopping. Additionally, the paths from Overall Trust in the vendor to Intended Purchase and Intended Window-Shopping were freed, based on the model tested by Gefen (2000). The paths from the three trustworthiness-beliefs to Overall Trust in vendor were also freed as were the paths from Bought to Overall Trust and to Intended Purchase and to Intended Window-Shopping. The model is shown in Figure 2.

The model showed good fit indexes: RMR = .035, GFI = .92, AGFI = .87, NFI = .94, CFI = .96. The χ^2 was 221.75 with 99 degrees of freedom. The composite factor reliability was .88 for ability, .91 for integrity, .86 for benevolence, .81 for Intended Purchase, .89 for Intended Window-Shopping, and .91 for Overall Trust. The model explained 47% of the variance of Intended Purchase, 29% of Intended Window-Shopping, and 52% of Overall Trust. The increase in the explained variance of Intended Purchase compared with the extent of explained variance in the model in Figure 1, suggests that Overall Trust, influenced itself by beliefs in the integrity and benevolence of the vendor, captures aspects of consumer trust that affect Purchase

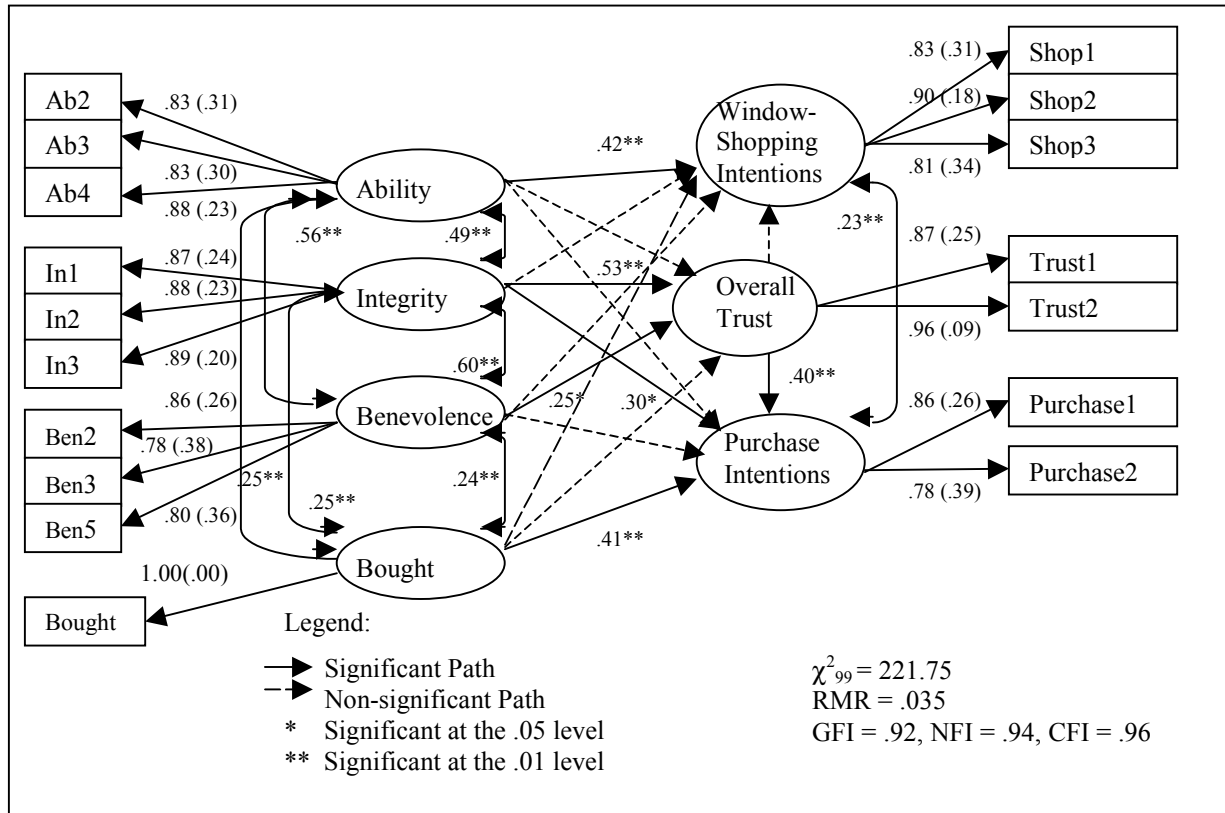


Figure 2. Instrument Validation Phase 2

Intentions beyond those captured by the belief in integrity alone.

As in Figure 1, the numbers near the paths connecting a latent variable to its indicators contain the standardized loading with the error term specified in parentheses. The numbers near the arrows and double-head arrows connecting the latent constructs to each other contain the standardized path coefficient with its significance level. Non-significant paths are shown with a broken line arrow. The data show that Purchase Intentions was affected by the assessment of overall trust and by the belief in the vendor's integrity, that Window-Shopping Intentions was affected by the belief in the vendor's ability, and that Overall Trust was affected by both the belief in integrity and the belief in the vendor's benevolence. This is in accordance with Mayer et al.'s (1995) proposition and Mayer and Davis's (1999) empirical conclusions that, depending on the circumstances, only some of these three specific trustworthiness-beliefs increase trust. There was also a significant covariance between Window-Shopping Intentions and Purchase Intentions, and among the three dimensions of online consumer trust. As in Figure 1, previous buying increased Purchase Intentions and was significantly correlated with the three trustworthiness beliefs but did not increase Overall Trust. This too is in accordance with theory

(Mayer, et al., 1995) that suggests that Overall Trust is increased by the three trustworthiness beliefs but is not increased directly by previous activity, in this case whether the student had previously bought at the site.

Discussion

Relevance to MIS Research

The growing interest in the importance of creating user trust as an antecedent of IT acceptance requires a close examination of the conceptual and statistical dimensions of this trust. This study takes an initial step in that direction by presenting the multi-dimensionality of trust in the context of e-commerce adoption and showing the varying importance of each dimension depending on the type of intended usage. Although one study is clearly insufficient in this regard, the results do show that trust in this context is multi-dimensional in both its statistical dimensionality and in its ensuing effects on IT adoption intentions. These results raise the need to examine the dimensionality of trust as it is applied to each unique context rather than assuming a-priori that it is a single unified dimension – although as shown by previous research there are scenario-dependent reasons why these dimensions may occasionally overlap (Ganesan, 1994; Crosby et al., 1990; Gefen, 1997; and Gefen, 2002).

Relevance to e-Commerce Research

Consumer trust in an online vendor is crucial for the vendor's financial success because without it consumers will not use the vendor's website (Reichheld & Scheffer, 2000). In accordance with this observation, previous research has shown that consumer trust influences both purchase intentions and window-shopping intentions of online consumers (Gefen, 2000) and that consumers who lack trust in a specific online vendor tend to refrain from engaging in e-commerce with it (Reichheld & Scheffer, 2000). Studying the importance of online consumer trust and trustworthiness and differentiating among the beliefs that compose this trustworthiness requires a verified scale that captures these multi-dimensional beliefs in the unique circumstances of online activity that lack direct interaction with other people. This study takes the first step in this direction by proposing and verifying such an exploratory scale and showing its reliability, and its convergent validity and discriminant validity, although clearly additional research is needed to verify the applicability of the scale across scenarios. The study also shows the predictive validity of the scale with regard to overall trust in the vendor and two independent intended online activities, window-shopping and purchase. To date, this is the only three dimensional scale of trustworthiness as it applies to the unique circumstances of online activity. This three-dimensional scale supports the findings of previous research but puts these in a new context by showing that excluding an analysis of the dimensionality of trust may result in an oversight of the relative weight of each of the beliefs that compose it, although the extent of explained variance of intended e-commerce activity is in the same range as previous research that examined trust in this context (Jarvenpaa & Tractinsky, 1999; Gefen, 2000).

The relative importance of each of the three dimensions of online vendor trustworthiness as assessed by consumers and how each affects overall trust, window-shopping intentions, and purchase intentions is interesting, although caution is advised given that the study has not been replicated with other online vendors and with additional online industries. The results show that even though the three trustworthiness-beliefs form three distinct beliefs (as shown in the LISREL CFA and LISREL discriminant validity testing), the three beliefs are significantly and strongly correlated with each other. The results also corroborate the observation made by previous research (Gefen, 2000) that differentiates between consumers' window-shopping intentions and their purchasing intentions, showing the advantage of treating the two intentions as distinct constructs rather than regarding both as part of one monolith activity.

In this regard, the results show that the effects of each one of the three trustworthiness-beliefs on these two online behavioral intentions are different. Window-shopping intentions is affected directly by the belief in the vendor's ability, while purchase intentions is affected directly by the belief in the vendor's integrity. The belief in the vendor's benevolence, on the other hand, increases purchase intentions only indirectly through its effect on the overall trust that the consumers have in the online vendor. The belief in the vendor's integrity also contributes to the consumers' overall trust in the online vendor. This overall trust, however, only increases purchase intentions, not window-shopping intentions. Put together, the data suggest that the three trustworthiness-beliefs might actually form two separate units. On the one hand, there is a belief in the vendor's ability that affects consumers' window-shopping intentions. On the other hand, there are beliefs in the vendor's integrity and in benevolence that affect purchase intentions either directly, in the case of integrity, or through overall trust, in the case of integrity and benevolence.

As explained above, theory suggests that trust deals with a willingness to be vulnerable to the actions of another person or people. Expanding on this view suggests that different trustworthiness-beliefs affect different behavioral intentions because different beliefs affect different types of vulnerability. Accordingly, it may be that beliefs about ability are important when window-shopping intentions are concerned because the customer is interested in obtaining information from the vendor. In such a case, the competence, skills, and knowledge of the vendor, reflecting the ability of the vendor, contribute directly to the quality of what the customer gets from the interaction when window-shopping. On the other hand, integrity and benevolence are important in the case of online shopping intentions because once the customer has decided to buy the book the essence of the interaction with the vendor is primarily an economic one. In such an interaction the customer is vulnerable mainly concerning the online vendor not fulfilling its expected side of the contract and to a lesser degree not really caring about the customer, i.e., issues dealing with the integrity and benevolence. Whether the online vendor is competent about books and knows its market are somewhat minor issues once the customer has decided to buy the book.

Could this mean that increasing consumers' *window-shopping* intentions, and so presumably also the number and duration of hits on the website, requires building the consumers' belief in the ability of the vendor, while increasing *purchase* intentions, and presumably actual purchases too, requires building the consumers' belief in the vendor's integrity and benevolence? In other words, do online consumers

rely to a different extent on different aspects of their trust in the online vendor when making these decisions? The data suggest so, although more research is needed to verify the generalization of this tentative conclusion. If this proves to be the case, then some modification to existing online trust models might be needed based on making a distinction among the three dimensions of trustworthiness and how each of these affects different aspects of intended online behavior.

Limitations and Future Research

The conclusions discussed in the preceding section are drawn from the LISREL analyses. It is important to note in this regard that the underlying assumption in LISREL is that all the relationships are linear. Such an assumption may be somewhat of an oversimplification in the case of online consumer trust. It is quite possible that trust, in general, has a stronger inhibiting effect on behavioral intentions when it is very low (Blau, 1964; Luhmann, 1979) and a stronger encouraging effect when it is very strong (Blau, 1964; Fukuyama, 1995). To address this, additional research should examine, with non-linear data analyses, also vendors who customers hold to have a questionable reputation and vendors who are regarded as very trustworthy. Amazon.com is in neither of these extremes as Appendices 1 and 2 show.

Additionally, the scale of Overall Trust, adapted from previous research, may be less than perfect given that it explicitly uses the keyword "trust". While including this keyword in such a scale is common (Moorman et al., 1992; Ramaswani et al., 1997); Morgan & Hunt 1994; Moorman et al., 1993; and Gefen (2000), supplementary research should examine whether this introduces a possible bias into the results. There is also some evidence that the relative importance and possibly also meaning of trust may be different across cultures. Trust is after all the building block of the social order and as such differs in its relative importance across cultures (Fukuyama, 1995). Thus, replicating the study with other populations and so examining possible cross-cultural effects could enhance the understanding of what consumer trust is and its effects. Indeed, research has suggested cross-cultural differences in the development of trust in general (Doney et al., 1998) and has also shown them with regard to online trust, in particular (Jarvenpaa & Tractinsky, 1999).

Related to this issue, the current study examined the textbook marketplace in an attempt to replicate previous research (Gefen, 2000) and so to allow for comparison with it. Yet, as the bricks-and-mortar marketplace shows, the population of book buyers is diverse and vendors tend to specialize on certain types

of books. Accordingly, examining other types of book buyers could broaden our understanding of trust and trustworthiness, especially as this study examined trust in a free experiment dealing with a well-known, large, and established online book-vendor. It is possible, however, that there might be a different effect with customers of lesser-known online vendors. Research is needed to examine this additional aspect.

Additionally, there may be some unique characteristics of the online bookstore market that may limit the generality of the results to other online markets and activities. Engaging with an online bookstore requires a relatively small investment in both time during window-shopping and credit in purchasing, and books in general are not a very risky type of merchandise.

Moreover, people who buy books online typically purchase them on a relatively frequent basis returning to the same vendor. In the case of Amazon.com, for example, recent reports claim that about two-thirds of its consumers are returning consumers (The Economist, 2000). Thus, another possible expansion of this study is to examine the proposed scale and its predictive validity in other online industries where the investment is larger, less frequent, and more risky, such as with online vendors who sell cars, furniture, and designer clothes. And so, generalizing these results to other online marketplaces, and to other types of interactions on the Internet, including business-to-business and consumer-to-consumer websites, requires additional research.

Additional research could also examine trust and trustworthiness as they relate to the technology itself and as they apply to an industry as a whole, such as online bookstores. Examining these issues was not the objective of this study because this study, like other studies about trust, dealt with a specific and identifiable human entity. Examining these issues could shed more light on the dimensions of trust and how these relate to behavioral intentions.

An additional topic worth looking into is how trustworthiness is built in an online environment and whether its antecedents are different from the antecedents in a bricks-and-mortar environment – and whether these differ between customers who choose to purchase online and those who choose not to. Previous research suggests that quality service (Reichheld & Scheffer, 2000) and previous activity (Fukuyama, 1995) may be key issues here. Assessments about safety, risk, and security, as well as access to an online environment and what prompts the customer to consider buying online in the first place might also be important aspects of online behavioral intentions. Also worth looking into is what other beliefs, concerns, fears, perceived risks, expectations, and evaluations influence the decisions to purchase and to

window-shop online – and whether these issues have a direct effect on these decisions or whether they influence the decisions through increased trust, and how these beliefs and assessments change after people shop online. These topics were beyond the scope of this study, but exploring them could contribute to our understanding of trust and trustworthiness in e-commerce. Related to the previous research, it is worth noting that previous purchase activity at the specific website had an equivalent effect on purchase intentions as the pertinent dimensions of trust did. This significant effect of previous purchase at the website on purchase intentions, provides further support to the model proposed by Gefen (2000) in which both trust and familiarity (in this case reflected through previous purchase activity) influence customers' intentions to engage in e-commerce. It does also warrant additional research because previous purchase may be a proxy for additional constructs that affect these intentions, such as previous successful experience with the vendor.

Another interesting avenue connecting this study to mainstream MIS research is recognizing that this study is in a category that Orlikowski and Iacono (2002) call the "nominal view of technology." This popular research stream emphasizes issues relating to IT but without delving into the IT Artifact itself. Orlikowski and Iacono suggest that such research should be expanded to address issues relating more directly to the IT Artifact. Pursuing this recommendation, research could tie the validated scales of trust into the "Proxy" view of the IT Artifact by incorporating it into technology perception models, such as TAM (Davis, 1989), or into the "Ensemble View" of the IT Artifact by incorporating it into models dealing with technology development (Dobing, 1993). Incorporating trust into any of these avenues requires, as with any other construct (Cook & Campbell, 1979), establishing the content and statistical validity of the construct. This study takes the first step in that direction.

Conclusion

Studying the effects that online consumer trust and trustworthiness-beliefs have on their intended online behavior requires a validated scale. Although, clearly, additional research is needed to show that the proposed scale applies to other cultures and to other online vendors, this study takes a first step in that direction by proposing such a scale and demonstrating its reliability and validity. The study also helps shed some light on the complex nature of trust and trustworthiness-beliefs and how each belief seems to have a unique role in determining various aspects of online consumers' intentions.

In the latter regard, the study suggests that it might be better to look upon online consumer trustworthiness-beliefs as a set of interrelated beliefs about the vendor rather than as one overall assessment. If consumer beliefs in the ability of the vendor affect window-shopping intentions, while beliefs about the vendor's integrity and benevolence affect purchase intentions, bundling the three beliefs into one category might be an oversimplification. Indeed, to the extent the results of this study can be generalized, they suggest that online vendors should adopt different strategy objectives depending on whether the objective is to increase consumer window-shopping, i.e., activity at the site, or to increase consumer purchase. This is an interesting addition to existing research on online trust that has mainly regarded it as one overall belief (Jarvenpaa & Tracktinsky, 1999; Reichheld & Scheffer, 2000; Gefen, 2000). If this is the case, such a multi-dimensional scale of online consumer trustworthiness-beliefs can help clarify its significant role in e-commerce activity and expand existing research.

Perhaps more importantly in the context of MIS research in general, the study highlights the need to establish the dimensionality of trust as it is applied to MIS topics and in doing so to recognize that although trust may occasionally be unidimensional as found by some research, it may also be multi-dimensional depending on the circumstances. Addressing it automatically as a unidimensional construct may oversimplify the analysis and hold back the researcher from revealing the whole story.

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