To Trust Or Not To Trust: The Impact Of WebTrust On The Perceived Trustworthiness Of A Web Site

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Abstract

Despite the explosive growth of electronic commerce, many individuals are still reluctant to conduct business transactions on the Internet. Individuals may mistrust sending private information over the Internet or they may have concerns about the existence, performance, standing, and integrity of online businesses. In direct response to these concerns, the American Institute of Certified Public Accountants (AICPA) has developed an electronic commerce assurance service called WebTrust which is intended to improve the consumer's confidence in the process and the quality of information disclosed on vendor web sites. The purpose of this study is to shed light on the effectiveness of WebTrust by examining the influence of WebTrust on consumers' perceptions of a web site's trustworthiness. The question is investigated through a computer experiment. The results of this study are very encouraging for electronic commerce assurance services in general, and the WebTrust service in particular. Evidence is found that the presence of WebTrust on a web site has a positive impact on the perceived trustworthiness of the website. The results also show that knowledge of WebTrust plays a significant moderating role in the relationship between perceived trustworthiness and the presence of WebTrust. When subjects have prior knowledge of WebTrust they perceive a web site with WebTrust to be more trustworthy than a web site without whereas, the presence of WebTrust has no impact when subjects are uneducated about the WebTrust assurances. Also, when WebTrust is present, subjects with knowledge of WebTrust are more confident in the web site than those without knowledge of WebTrust. When WebTrust is not present, knowledge subjects are more unsure of a web site without WebTrust than those without knowledge.

Introduction

How many purchases have you made using the Internet in the past year? Did the factor of trust in the seller come into play? Was confidentiality an issue? Are you a risk-taker or not? Some estimates predict that over $300 billion dollars will be exchanged via the Internet by the year 2002 (Gray and Debreceny 1998). Interestingly, despite this explosive growth many consumers are still reluctant to conduct business transactions online. Many individuals mistrust sending private information over the Internet or they may have concerns about the existence, performance, standing, and integrity of online businesses. One study by CommerceNet[1] in 1997 identified the "barriers and inhibitions" to the adoption of electronic commerce (EC). All

respondent groups agreed that "lack of trust in transaction" is a primary barrier to the utilization of Electronic Commerce (EC) by consumers. Other buyer concerns include the authenticity of the company, credit card security, and performance (i.e. receiving goods that were ordered).

In direct response to these concerns, the American Institute of Certified Public Accountants (AICPA) has developed an EC assurance service called WEBTRUST™ (hereafter WebTrust). The purpose of WebTrust is to improve consumers' confidence in the process of buying online and the quality of information disclosed on vendor web sites. Although the overall intent of WebTrust is to increase consumer trust and reduce concerns about doing business online, the impact of WebTrust on consumer trust has yet to be empirically tested. Thus, the purpose of this study is to shed light on the effectiveness of WebTrust by investigating the influence of WebTrust on consumers' perceived trustworthiness of a web site and to examine how consumer knowledge of WebTrust may impact this relationship. Specifically, this study addresses two research questions: "Do consumers perceive web sites with the WebTrust seal to be more trustworthy?" and, "How does consumer knowledge of WebTrust influence consumers' trust perceptions?" These questions are investigated through a computer experiment

WebTrust attempts to build trust by developing and promoting standards for Internet commerce and ensuring that businesses adhere to those standards. Adding credibility to those who sell goods and services should reduce consumers' fears of Internet shopping, thus building trust in EC. WebTrust is currently in its infancy and its impact on consumers' trust is only presumed at this point. Thus, this study is an important first step in empirically supporting the expected benefits of WebTrust.

To examine the effect of WebTrust on consumers' trust perceptions, a model is developed that relates WebTrust, and the consumers' knowledge of WebTrust to the consumers' perceived trustworthiness of a web site. Hypotheses are tested using the responses of 388 undergraduates who participated in a computer experiment that required subjects to examine a web site for an online textbook company and to evaluate the trustworthiness of the site.

The results of this study are very encouraging for the WebTrust service Evidence is found that the presence of the WebTrust logo has a positive impact on the perceived trustworthiness of the web site. Furthermore, the findings indicate that when subjects have prior knowledge of WebTrust, they perceive a web site with WebTrust to be more trustworthy than subjects with no knowledge of WebTrust. This provides evidence that when WebTrust is present, knowledge of WebTrust makes a significant difference in how the logo is perceived. For subjects with no prior knowledge of WebTrust, web sites with WebTrust were perceived to be no more trustworthy than web sites without WebTrust. This finding suggests that WebTrust may only enhance consumers' trust perceptions when consumers understand the assurances of a WebTrust audit. Therefore, educating consumers about WebTrust may be a critical first step before WebTrust can effectively reduce consumers' fears about online shopping.

The remainder of this paper is organized as follows. The next sections explain the nature of the WebTrust service, discusses how logo assurances may influence consumers' trust in EC, and develops the hypotheses. Thereafter, the research method is described along with the specific measures employed to test the hypotheses. The next section presents the results, followed by a discussion of the implications for practice, conclusions and potential future research opportunities.

Background on WebTrust

In September of 1997 the American Institute of Certified Public Accountants (AICPA) initiated WebTrust, an attestation service for web sites (Elliot 1997). The purpose of WebTrust is to provide assurance by an independent and objective CPA that a company's web site discloses and follows its operating practices and that controls are in place so electronic transactions are

processed properly and any information sent via online is protected (Koreto 1997).

A WebTrust audit is conducted as follows. A CPA firm, which has been licensed by the AICPA to perform WebTrust audits, examines the company and its web sites. Web sites that meet the established criteria earn the right to display a CPA WebTrust logo. See Figure 1. Thus, the intention of the WebTrust logo is to symbolize to potential customers that visit the web site that the business is legitimate, reliable and secure.

Figure 1
WebTrust Logo

In order to obtain the WebTrust seal of approval, the entity must meet a set of established criteria. Specifically, the AICPA has stipulated that WebTrust engagements must be conducted under the Statements on Standards for Attestation Engagements #1 (SSAE #1) of the *AICPA Professional Standards.* Reflecting the multifaceted aspects of EC assurance services, the established standards are divided into three major categories and serve as the foundation to a WebTrust audit. These categories are *business practice disclosures*, *transaction integrity*, and *information protection.* These standards provide practitioners with a consistent set of standards to use in testing and evaluating web sites.

Internet Trust Literature

According to Keen et al. (1999), trust is the foundation of EC and EC simply cannot exist without trust. Although EC is becoming more established, consumers still lack trust in EC for many reasons, including the lack of legal protection in many areas, especially in consumer transactions over the Internet, and also the lack of long-term history of relationships with no face-to-face contact.

Understanding trust in general is a necessary first step to comprehending how assurance services such as WebTrust can affect trust in the context of EC. While trust is a multi-faceted, commonsense concept, it is difficult to define even in vague terms. Trust is variously defined in both theory and practice. At one extreme are the views of trust as a personal and interior response. At the other extreme, trust is about rational judgments of reliability where individuals focus on collecting and processing information to predict likely outcomes of certain future events (Lewis and Weigert 1985). Keen et al. (1999) suggests that trust in the context of EC refers to "reliability" and that the key to trust is "collaboration and control."

Trust has been considered a central element to economic exchange transactions for some time. For instance, Hirsch (1978) states that trust is a "public good, necessary for the success of economic transactions." Similarly, Weber (Eisenstadt 1968) argues that "the exchange of goods is possible only on the basis of far-reaching personal confidence and trust."

There are numerous barriers in building trust for economic exchanges over the Internet, which pose some unique challenges for online businesses. EC is a highly impersonal market, lacking human contact found in most other markets. EC also lacks physicality. There are no tangible products to hold, no buildings to enter, and no salespersons to interact with the potential buyer. There is a certain amount of unfamiliarity with the purchasing process, including navigation around a site and following the "clicks" necessary to complete a transaction. Consumers fear divulging their personal information and no standard technologies exist for secure payment. Also, many of the Internet companies are unknown to consumers and consequently assessing a company's reputation is difficult, at least initially. Finally, the legal enforcement of acceptable business practices is developing slowly and is falling behind the rapidly changing Internet environment.

The combination of all of these elements create a feeling of uneasiness or "lack of trust" surrounding EC. Thus, the question remains, "How do Internet companies build trust?"

Two recent studies have considered the issue of trust in EC by developing frameworks that model trust determinants (Ambrose and Johnson 1998; Fung and Lee 1999). First, Ambrose and Johnson (1998) develop a trust-based model for EC retailing which considers the trust determinants for the both buyer and seller. The trust portion of their model consists of the buyer's propensity to trust and the seller's capability to be trustworthy. Trust propensity varies among buyers, differs over time, and can be influenced by the seller. The seller's trustworthiness image hinges on ability, benevolence, and integrity. These three factors are manipulable by the seller and can equally influence the buyer's perception of trust. Second, Fung and Lee (1999) attempt to develop a model that portrays the time-related stages of the development of trust in EC, including the growth of trust and the initial formation of trust. The authors argue that trust can be built on can only by built at the firm level. The three factors they find relevant for initial trust formation at the firm level are information quality, Web-interface design, and company reputation. Company reputation in turn depends on existing brand name and seals of approval.

Cheskin Research (1999) also investigated the issue of trust in EC by surveying consumers, interviewing experts, and analyzing web sites to identify a list of key factors that communicate trust. At first, extrinsic forms (i.e. professionalism of a web site) may suggest to the consumer that a business is worthy of trust. Over time intrinsic characteristics such as dependability, reliability, and honesty develop trust. This study identified six extrinsic forms on a web site that signal trust: seals of approval, brand, navigation, fulfillment, presentation, and technology[2].

Seals of approval were considered to be both the logos of assurance services and those of credit card companies. However, assurance service logos were found to convey trustworthiness more than credit card brands even though credit card brands are better known. For example, 25% of the respondents said that Verisign (assurance service logo) increased their trust as compared to 24% saying the that Visa logo increased their trust, even though only 36% were familiar with Verisign as compared to 83% having familiarity with Visa. The difference in trust-building capacity was more striking for those who were familiar with the different "seals of approval" - 53% of those familiar with Verisign felt that their logo increased trust as compared to 30% for Visa. Cheskin (1999) also concluded that even before these extrinsic forms affect trust, the first step in establishing trust is to satisfy buyers that the company has control over the security and privacy of their personal information. Once control has been established, the other extrinsic form areas may be addressed.

Other researchers have considered the trust-related role of third parties to EC transactions. Salam et al. (1998) suggest that if consumers perceive that the risk of potential loss from a transaction exceeds the potential gain, the consumer is likely to forego the transaction until some form of "institutional mechanism is in place to reduce the associated risks." Salam et al. see institutional "intermediaries in trust" as crucial and find significant support for two factors which lower consumers' perceived risk of making online purchases and increase perceptions of trust: third-party trust intermediaries and economic incentives (i.e. lower prices).

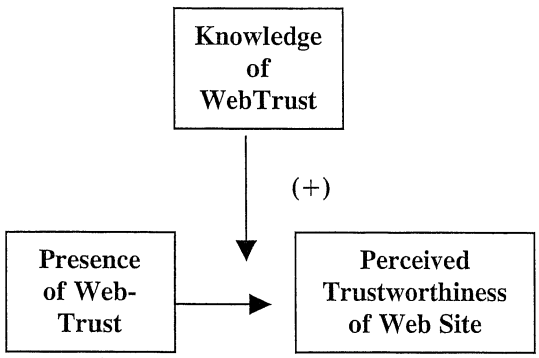
To conclude, there is evidence that assurance services increase consumers' trust. These assurance services appear to address the vulnerability and lack of control consumers feel about doing business online, in addition to providing some means of protection for and empowering of the consumer. This study attempts to investigate the role of WebTrust in increasing consumers' perceptions of trustworthiness.

Model Development

The literature reviewed above forms the basis for the research model tested in this study. The relationship between WebTrust and perceived trustworthiness is expected to be positive

such that the presence of WebTrust increases one's trust in a web site. Knowledge of WebTrust is measured and is expected to have a moderating effect on the relationship between these two variables. Figure 2 depicts the research model tested in this study.

Figure 2
Research Model of the Relationships between WebTrust And Perceived Trustworthiness



H1A - H1E

As is described in the preceding sections, many consumers lack trust in web-based transactions. Therefore, the continued growth of EC may to some extent depend on the ability of trust intermediaries to effectively address consumers trust concerns. CPAs have long been trust intermediaries in the capital markets as auditors of financial statements. Now, with WebTrust, the intent is that CPAs will become trust intermediaries in the EC market.

The model tested in this study predicts that the presence of a WebTrust audit will increase the perceived trustworthiness of the web site, which is a primary goal of WebTrust. The subject's knowledge of WebTrust is also included in this model to provide evidence that understanding WebTrust can increase consumers' confidence in a web site, more so than when consumers are not aware of the WebTrust assurances.

Hypotheses Development

The concept of trust and the perceived trustworthiness of a web site are crucial to EC because so much of the Internet operates based on trust. Establishing trust is critical in developing customer relationships. Maintaining and growing trust comes from ensuring that there is a consistent and reliable environment that continues to warrant this confidence. Providing evidence of a well-controlled and well-managed environment requires review of the processes and the creation of a customer perception that the organization maintains its control processes. As EC becomes a part of an organization's business process, the organization must provide evidence of the reliability and effectiveness of business processes related to EC that is commensurate with the value of trust. Independent reviews of business processes, such as a WebTrust audit, are a proactive way to inform consumers of a trustworthy operating environment (Keen et al. 1999). Organizations that provide audited financial statements afford similar evidence in that the reputation and objectivity of the auditor is as much of a factor of the company's reliability as are the controls. Security logos, such as WebTrust, communicate trustworthiness to consumers. WebTrust seeks to give web site visitors a sense of control and an assurance that the web site is trustworthy.

In order to examine the impact of WebTrust on the perceived trustworthiness of a web site, the following hypothesis is proposed:

Hypothesis 1A: There will be a positive relationship between WebTrust and the perceived trustworthiness of a web site.

In the trust study by Cheskin Research (1999), the authors found that, at this time, WebTrust and other security brand logos that relate specifically to the Internet are not well known to consumers. However, for those individuals who *are* aware of the logo, the symbols do enhance trustworthiness. Therefore, knowledge of WebTrust is an important variable in this relationship. Individuals who are educated about WebTrust are more likely to perceive a web site with the WebTrust logo to be trustworthy than individuals who see the WebTrust logo, but do not understand what the logo means or implies. In contrast, those individuals that are not aware of the meaning of

the WebTrust logo are not as likely to perceive a web site with the logo as more trustworthy.

In order to examine the moderating effects of knowledge on relationship between WebTrust and the perceived trustworthiness of a web site, the following hypotheses are proposed

Hypothesis 1B: Subjects with prior knowledge of WebTrust will perceive a web site with WebTrust to be more trustworthy than a web site without the WebTrust.

Hypothesis 1C: Subjects who have prior knowledge of WebTrust and view a web site with WebTrust will perceive the web site to be more trustworthy than subjects who also view a web site with WebTrust but have no prior knowledge of WebTrust.

Hypothesis 1D: Subjects with no prior knowledge of WebTrust will perceive no difference in trustworthiness of a web site when they view a web site with or without WebTrust.

Hypothesis 1E: Subjects who have prior knowledge of WebTrust will perceive the web site to be less trustworthy than subjects who have no prior knowledge of WebTrust when they view a web site without WebTrust.

Research Methodology

The hypotheses described above were tested using 388 subjects who completed a series of pre-experimental questions, performed a controlled experimental procedure, and completed a post-experimental questionnaire.

Subjects

A total of 388 subjects participated in the study. The subjects were from two large midwestern universities. All students were recruited from introductory accounting courses[3]. Students from both universities participated at the request of their instructors. The participants received both homework points towards their course grade and extra credit for their participation. The subjects selected are intended to represent the population of consumers who have the opportunity to utilize EC[4].

Web Site

A web site for a hypothetical online textbook company, offering textbooks for sale, was created for the purpose of this research. The experimental web site is closely modeled after the web site of an existing online textbook company to ensure that the web site appeared real and authentic. An online college textbook business was selected because of the natural interest college students would have in the product. Although students may not have purchased textbooks from a web site as of yet, students are likely to consider this in the future. Students are also likely to be concerned about the business practices, transaction integrity, and information protection policies of an online textbook company when ordering textbooks and would therefore be influenced by the presence or no presence of an assurance service. For example, students would want to be confident that their books will be shipped on time, know they will receive the books they order, and understand the return policy in the event they need to return a book. The investment in textbooks is also significant enough that students will take some care in purchasing their books online.

Subjects viewed one of two versions of the web site. Both versions were identical except for the presence or no presence of the WebTrust logo. Only the presence of the logo was manipulated, not the company or any information about the company. This design was chosen so that extraneous variables such as brand name, company name, or price would not influence the decision to purchase from the web site and the confounding effects of these variables were controlled between subjects. Of the 388 participants, 194 viewed the web site with the logo and 192 viewed the site without the logo.

On the site with the WebTrust logo, participants could drill down[5] on the logo to reach additional links that contained information about WebTrust. These links are identical to the links available when a WebTrust logo is displayed on a real web site that has undergone an authentic

WebTrust audit. The links, as prescribed by the AICPA, contain a WebTrust certificate to ensure authenticity, management assertions, independent auditor's report, business practice disclosures, details on the WebTrust principles and criteria, and general information on the WebTrust service. For those who viewed a site with the logo, 94% reported that they noticed the logo on the site and 83% reported they drilled down on the logo to access the additional WebTrust links[6].

Knowledge of WebTrust

A primary interest in this study is to explore what role knowledge and understanding of WebTrust may play in an individual's perception of the trustworthiness of a web site. In other words, does having knowledge of WebTrust impact how an individual perceives a web site with or without the WebTrust audit? To determine the impact of knowledge, subjects were assigned to a "knowledge" or "no knowledge group". Assigning students between the two groups was based on class sections. Sections were used in order to have more control over the education process.

To educate the knowledge group about WebTrust[7], students from five randomly selected sections were first given a reading assignment about WebTrust. The students were asked to read the article outside of class and to be prepared for an in-class discussion of the reading. A class discussion of the article led by the instructor was conducted, followed by a short presentation (using overheads) that highlighted the purpose of WebTrust and the primary assurances that WebTrust provides. Following the class discussion and presentation, students were given a short, out of class, Internet assignment that required them to access an actual online company, Alpine Bank, which currently has a WebTrust logo (http://www.aplinebank.com)[8]. The assignment consisted of five short-answer questions about WebTrust. All of the answers to the questions were available on the Alpine Bank web site and could be obtained by clicking on the WebTrust logo. Students received course homework points for completing the WebTrust assignment[9]. All of the WebTrust material was presented in the course three weeks prior to conducting the experiment with no reference to the upcoming experiment, the intent being that students were not aware they were learning about WebTrust for the purpose of an experiment.

The no knowledge group was selected from the remaining introductory accounting courses (sections not used for the knowledge group). Students in this group were not exposed to WebTrust in class prior to the experiment. Therefore, the actual computer exercise was the first time in which these students were involved with the experiment.

Experimental Procedure and Task

The experiment was conducted in a computer lab during twenty experimental sessions lasting approximately forty-five minutes each and was conducted in three parts: the pre-experimental phase, the experimental phase, and the post-experimental phase. The task and experimental procedures were tested prior to the experiment through a pilot study.

The pre-experimental phase consists of an informed consent form, a pre-experimental questionnaire, and an explanation of the task and experiment[10]. The pre-experimental questionnaire was used to gather demographic information and background data on Internet usage behaviors.

The experimental phase required subjects to evaluate a hypothetical web site. Subjects were randomly assigned to a web site; either the web site with WebTrust or the web site without WebTrust. The experimental task had subjects thoroughly review the web site and read through all of the information available on the site, including all of the pages and links. The subjects were instructed to spend an adequate amount of time reviewing the site so that they would be knowledgeable enough to answer questions pertaining to the company and its web site. Average time spent reviewing the web site was approximately ten minutes. When the subjects were finished looking at the web site, they were instructed to close out of the web site and notify the experiment administrator.

The post-experimental phase consisted of the post-experimental questionnaire and the WebTrust knowledge test. The administrator provided the students with the post-experimental questionnaire once the students had closed out of the web site. The questionnaire was designed to gather information on the subjects' perceptions of the web site. Perceived trustworthiness, in addition to the other control variables, was measured on the post-experimental questionnaire. The final task was to complete the WebTrust knowledge test. This test contained six multiple-choice questions on general WebTrust concepts and additional manipulation checks for the knowledge measure.

Research Design

To address the research hypotheses pertaining to the relationship between WebTrust and perceived trustworthiness, a 2 x 2 between-subjects experiment was conducted with two factors and two levels of each factor. The two independent variables are presence of WebTrust (LOGO) measured categorically (logo or no log) and knowledge of WebTrust (KNOWLEDGE) also measured categorically (knowledge or no knowledge). The hypotheses are tested using ANCOVA.

The dependent variable of interest is perceived trustworthiness (TRUST). This variable is measured with nine Likert scale questions pertaining to various aspects of the trustworthiness of the web site. The Likert scale for each of the questions ranges from zero (not very trustworthy) to seven (very trustworthy). Four of the questions are adapted for this study from Salisbury et al. (1999) where perceived security of a web site is measured and five additional questions were created specifically for the study. The Cronbach alpha for this measure of perceived trustworthiness is .91, which indicates high internal consistency between the nine questions[11].

In addition, one variable with the potential to influence a subject's perceived trustworthiness independently of the effect of the presence of WebTrust and knowledge of WebTrust is propensity to trust. Thus, propensity to trust (PROPENSITY) is included in the ANCOVA as a covariate[12]. The measurement for this variable is based on four questions used in prior studies to measure general propensity to trust (Eckeli et al. 1999). This study makes no *a priori* predictions about how differences in propensity to trust may impact the relationship between WebTrust and perceived trustworthiness and is not of interest to the study, but is included to control for any possible confounding affects.

Results

Descriptive Information about Subjects

The total sample consists of 388 subjects. Mean age of the subjects is 20.86 years. Subjects spend an average of 6.07 hours on the Internet per week and 10.42 hours on the computer per week. In response to the question, "How comfortable are you with computers, the Internet, and technology in general?" subjects mean response was 5.58 (0=not comfortable, 7=very comfortable). Subjects, on average, have been using the Internet for 44.84 months (nearly 4 years).

Of the 388 subjects, 163 (42.4%) of the subjects have made at least one prior Internet purchase. Average number of purchases was 5.95 (range was 1 to 72). The types of purchases made include music online (38.0%), travel (30.7%), apparel (30.1%), books (23.9%), specialty gifts (20.2%), computer hardware (17.2%), computer software (17.2%), and grocery items (3%). Most of the prior purchases have been made within the past three months (74.2%).

For the sample, average concern about security of credit card information was 4.63 (0=not concerned, 7=very concerned) and average concern about security of personal information was 4.22 (0=not concerned, 7=very concerned). Considering only those who have made Internet purchases prior to this experiment, average willingness to provide credit card information over the Internet was 3.92 (0=not willing, 7=willing) and average willingness to provide personal information over the Internet was 3.98 (0=not willing, 7=willing). For all subjects, average re-

sponse to the question, "How comfortable are you that your credit card company protects you against fraud?" was 3.55 (0=not comfortable, 7=very comfortable).

Manipulation Checks

To verify the effectiveness of the knowledge manipulation, students were administered a six question multiple-choice knowledge test. This test was given following the computer experiment and once all other experimental materials had been completed and turned in to the experiment administrator. These questions were designed to test students on their general knowledge of WebTrust. The mean test score for the knowledge group was 3.62 compared to 1.86 for the no knowledge group. The mean difference in test scores between the two groups is significant (p = .001) and therefore indicates there is a sufficient distinction between knowledge level for the two groups. Furthermore, only 3% of the subjects in the no knowledge group (compared to 98% of the subjects in the knowledge group) had heard of WebTrust prior to the experiment indicating that the no knowledge subjects had no or very limited knowledge of WebTrust preceding the experiment[13]. These distinctions should be adequate to test for the hypothesized knowledge differences.

In addition to the knowledge test, subjects were asked various questions related to the class discussion and Internet assignment to verify that the knowledge subjects were aware they had been educated about WebTrust. These questions and the responses to these questions are summarized in Table 5. First, subjects were asked if they had heard of WebTrust prior to the experiment. Of the knowledge subjects, 98% of the subjects reported they had heard of WebTrust prior to the experiment whereas, only 3% of the no knowledge subjects had heard of WebTrust prior to the experiment. Subjects were also asked if they had learned about WebTrust in a class and whether they had completed a WebTrust computer assignment. For knowledge (no knowledge) subjects, 87% (1%) had learned about WebTrust in a class and 95% (2%) had completed a WebTrust computer assignment. Finally, 94% of the knowledge subjects recall seeing a WebTrust logo on a web site prior to the experiment compared to only 7% of the no knowledge subjects. Overall, the responses to these questions indicate that the knowledge subjects were aware that they had learned about WebTrust in class and they remember viewing the web site with WebTrust that was used to complete the computer assignment.

Descriptive Statistics for Perceived Trustworthiness

This section provides descriptive statistics for perceived trustworthiness and propensity to trust. "Perceived trustworthiness" is the dependent variable and "propensity to trust" is included as a covariate in the ANCOVA to test the hypotheses. The subjects had an overall mean (standard deviation) perceived trustworthiness of 4.10 (1.36) (0 = not trustworthy, 7 = extremely trustworthy). Average propensity (standard deviation) to trust was 3.77 (.87) indicating that subjects, in general, are moderately trustworthy.

Test of Perceived Trustworthiness Hypotheses

Five hypotheses are formed regarding the impact of WebTrust on perceived trustworthiness and the moderating effects of knowledge of WebTrust on this relationship. To test hypotheses H1A - H1E, a 2 (WebTrust/no WebTrust) x 2 (knowledge/no knowledge) between-subjects ANCOVA was carried out with perceived trustworthiness as the dependent measure and propensity to trust as the covariate . Descriptive results and the ANCOVA are presented in Table 1, panel A and B, respectively.

Mean perceived trustworthiness for all subjects (n=388) was 4.10. Perceived trustworthiness for web sites with WebTrust was 4.48 (n=196) compared to 3.73 (n=192) for web sites without WebTrust. These results indicate a main effect for the presence of WebTrust, thus supporting H1A that predicts there is a positive relationship between WebTrust and the perceived trustworthiness of a web site (F=34.78, p=.001). Mean perceived trustworthiness for those with prior knowledge of WebTrust was 4.08 compared to 4.13 for those with no prior knowledge of WebTrust. This difference is not significant

Table 1
Effect of WebTrust and Knowledge of WebTrust
On the Perceived Trustworthiness of the Web Site

Panel A: Mean Perceived Trustworthiness (standard deviations are in parentheses)

	Presence of WebTrust		
Knowledge of WebTrust	WebTrust Logo	No WebTrust Logo	
Prior Knowledge of Web-Trust	1 4.74 (.132) n=90	2 3.41 (.129) n=91	4.08 (.086) n=181
No Prior Knowledge of WebTrust	3 4.21 (.120) n=106	4 4.06 (.123) n=101	4.13 (.092) n=207
	4.48 (. 089) n=196	3.73 (. 089) n=192	4.10 (.063) n=388

Panel B: ANCOVA: Dependent Variable is TRUST

Source	df	Sum of Squares	Mean Square	F	p
WebTrust	1	52.89	52.89	34.78	.000
Knowledge	1	.32	.32	.21	.647
WebTrust*Knowledge	1	33.35	33.35	21.93	.000
Propensity	1	52.06	52.06	34.23	.000
Error	383	577.88	1.52		

Panel C: Planned Comparisons: Dependent Variable is TRUST

Source	df	Mean Square	t	p	
WebTrust Logo (cell 1 v 3)					
Know vs. Don't Know	1	13.60	8.94	.003	H1C
No WebTrust Logo (cell 2 v 4)					
Know vs. Don"t Know	1	20.10	13.21	.000	H1E
Knowledge of WebTrust (cell 1 v 2)					
Logo vs. No Logo	1	79.36	52.18	.000	H1B
No Prior Knowledge of WebTrust (cell 3 v 4)					
Logo vs. No Logo	1	1.21	.79	.374	H1D

(F=.21, p=.647) indicating no main effect for knowledge. The interaction between WebTrust and prior knowledge of WebTrust was significant (F=21.93, p=.001). Since the interaction is significant, the slopes between treatments need to be investigated. These tests of differences in treatment means are performed in the tests of hypotheses 1B through 1E. Finally, there is a covariate effect for propensity to trust (F=34.23, p=.001). Propensity to trust is included only as a control variable and therefore, there were no *a priori* predictions made regarding propensity to trust

Panel C of Table 1 reports the results of the planned comparisons for purposes of testing H1B through H1E, after controlling for propensity to trust. H1B predicts that subjects with prior knowledge of WebTrust will perceive a web site with WebTrust to be more trustworthy than a web site without WebTrust (cell 1 vs. cell 2, Table 1, panel A). Mean perceived trustworthiness for subjects with prior knowledge and a WebTrust logo was 4.74 compared to 3.41 for knowledge subjects without a WebTrust logo. The planned comparison for testing H1B shows that the effect of WebTrust on the group with prior knowledge of WebTrust, after controlling for propensity to trust, is significant (t=52.18, p=.001). These results support H1B and indicate that, on average, the presence of WebTrust makes a significant difference in how subjects perceive the trustworthiness of a web site when the subjects have prior knowledge of WebTrust.

H1C predicts that when a WebTrust logo is present, subjects with prior knowledge of WebTrust will perceive the web site to be more trustworthy than subjects without prior knowledge of WebTrust (cell 1 vs. cell 3, Table 1, panel A). Mean perceived trustworthiness for subjects that viewed a site with a WebTrust logo and had prior knowledge of WebTrust was 4.74 compared to 4.21 for those who also viewed a site with a logo but had no prior knowledge about WebTrust. The planned comparison for testing H1C shows that the effect of knowledge of WebTrust on the group that viewed the web site with the logo, after controlling for propensity to trust, is significant (t=8.94, p=.003). These results support H1C and show that knowledge of WebTrust does make a significant difference in how WebTrust is perceived to increase the trustworthiness of a web site.

H1D predicts that when subjects have no knowledge of WebTrust, there will be no difference in trust perceptions of a web site with the logo and a web site without the logo (cell 3 vs. cell 4, Table 1, panel A). Mean perceived trustworthiness for subjects with no prior knowledge of WebTrust that viewed a site with WebTrust was 4.21 compared to 4.06 for no prior knowledge subjects that viewed a site without WebTrust. The planned comparison for testing H1D shows that the effect of WebTrust on the group with no knowledge of WebTrust, after controlling for propensity to trust, is not significant (t=.79, p=.374), thus supporting H1D. These results suggest that when subjects are not familiar with WebTrust, the presence of a logo makes no difference in how trustworthy the subjects perceive a web site to be.

Finally, H1E predicts that when there is no logo present, subjects with knowledge of WebTrust will perceive the web site to be less trustworthy than those without prior knowledge of WebTrust (cell 2 vs. cell 4, Table 1, panel A). Mean perceived trustworthiness for subjects that viewed a web site without WebTrust that had prior knowledge of WebTrust was 3.41 compared to 4.06 for those subjects without prior knowledge. The planned comparison for testing H1E reveals that the effect of knowledge on the group that viewed the web site without WebTrust, after controlling for propensity to trust, was significant (t=13.21, p=.001). These results support H1E and suggest that subjects who are educated about WebTrust "expect" WebTrust to be present and when its not, perceive the web site to be less trustworthy than those who have no knowledge of WebTrust.

In sum, hypotheses 1A through 1E were all supported by the data. On the whole, the presence of WebTrust does appear to make a difference in how trustworthy a web site is perceived to be and knowledge plays a significant and important moderating role in the relationship between

the presence of WebTrust and perceived trustworthiness.

Discussion and Conclusion

This study investigated the effectiveness of WebTrust by examining the influence of WebTrust on consumers' perceptions of a web site's trustworthiness. The objective of WebTrust is to provide specific assurances to consumers relating to the business practices disclosures, transaction integrity, and information protection policies of the business. WebTrust attempts to build trust by developing and promoting standards for Internet commerce, and ensuring that businesses adhere to those practices. Adding credibility to those who sell products online should reduce consumers' fears of Internet shopping and increase consumers' willingness to participate in EC.

The results of this study are very encouraging for electronic commerce assurance services in general, and the WebTrust service in particular. Evidence is found, consistent with *a priori* expectations, that the presence of the WebTrust logo has a positive impact on the perceived trustworthiness of the web site. Specifically, the web site with the WebTrust logo was perceived to be more trustworthy than the web site without the logo.

Additionally, the findings indicate that when subjects have prior knowledge of WebTrust, they perceive a web site with WebTrust to be more trustworthy than a web site without WebTrust. Furthermore, for a web site with WebTrust, subjects with knowledge of WebTrust perceive the web site to be more trustworthy than those with no prior knowledge of WebTrust. This provides evidence that when there is a logo, having knowledge of WebTrust makes a significant difference in how the logo is perceived.

For subjects with no prior knowledge of WebTrust, the logo made no difference in the perceptions of trust. This suggests that the effectiveness of WebTrust in enhancing the consumers' trust perceptions is somewhat dependent upon the consumers' understanding of the WebTrust assurances. Without this understanding and knowledge of WebTrust, the presence of a WebTrust logo seems to be ineffective at increasing consumers' trust. Therefore, educating consumers about WebTrust may be an important first step before WebTrust will be able to effectively reduce consumers' fears about online shopping.

Interestingly, in comparing the knowledge and no knowledge groups when there was no logo on the web site, the knowledge group perceived the web site to be less trustworthy than the no knowledge group. Thus, once a subject is educated about the WebTrust service, they perhaps "expect" a web site to have undergone a third party assurance and if it has not, they tend not to trust it.

This study is important because the prosperity of WebTrust depends upon how Internet consumers perceive WebTrust and ultimately whether WebTrust can increase the number of EC purchases. Currently only a handful of companies display the WebTrust logo (less than 25) which is well below the projections by the AICPA. Despite this slow beginning, the accounting profession believes that the WebTrust product is superior to other logo services for several reasons. First, auditors believe they have established a reputation of trust and experience in attestation that is of incalculable value, more so than most of the other service providers entering this market. Second, they believe the WebTrust product is a more comprehensive package than other products because of its diverse focus on three key areas (business practices, information protection, and transaction integrity)[14]. Since consumers seem to be concerned with a variety of risks when conducting business online, accountants hope that the all-inconclusive product offered by WebTrust will meet consumer needs more effectively. The accounting profession has assumed that their reputation and expertise in financial auditing will carry over to the EC assurance market.

This study provides valuable information to the accounting profession. First, the accounting profession can use the results of this study to promote WebTrust to businesses considering a logo assurance on their web site. In addition, this research provides evidence in favor of the effectiveness of WebTrust and especially the effec-

tiveness of educating consumers about WebTrust. The accounting profession should begin to examine ways to promote WebTrust and educate consumers about its benefits. Namely, consumers should be informed about what a WebTrust audit involves, how the WebTrust product is superior to other products, why an assurance on a web site is necessary, and who auditors are and what their role is in this process.

The impact of WebTrust on EC is explored using a laboratory experiment with student subjects. As a result, this type of study has limitations. Some of the limitations in this study are inherent in the methodology, others are inherent in the choices and compromises of the researcher. Any conclusion drawn from this study must be relied on only with full knowledge of the limitations. Generalizability is the main concern in experiments (i.e. external validity). This study may not be generalizable beyond the (1) choice of subjects, (2) task used in the experiment, (3) formats used, and (4) the specific web site used. Additional limitations concern potential internal variation among assigned groups, the choices of the levels tested for the independent variables and the measurement instruments used to measure both the extraneous variables and the dependent variables.

Suggestions For Future Research

The results of the current study lead to the possibility of at least two future studies. First, future research could expand this study and examine the effect of perceived trustworthiness on EC utilization. The ultimate desire of EC websites is to increase the number of sales to consumers. Therefore, an important question is whether WebTrust leads to increased EC utilization.

A second possibility for future research would be to examine ways to inform and educate consumers about WebTrust. This question is important for many reasons. First, a key variable in this study is prior knowledge. This study found that WebTrust plays a key role in the trust perceptions of a web site and ultimately in the utilization of EC. These findings are enhanced if the subject has prior knowledge of WebTrust. Unfortunately, most consumers have very little knowledge about WebTrust at this time (i.e. only 3% of the no knowledge group had heard of WebTrust prior to the experiment). Therefore, increasing consumer knowledge about WebTrust will be important if WebTrust is going to prosper.

Also, it is important that consumers' knowledge of WebTrust is consistent with the auditors' intentions. For instance, WebTrust does not attest to the soundness of the business practices, only that the business practices are disclosed and operating as stated on the web site. Since many consumers may seek third party assurances on the soundness of business practices, misperceptions that WebTrust provides such assurances gives rise to a potential expectation gap. Thus, it is important that first, there is an education process on WebTrust, and that second, consumers are being educated appropriately on the intentions of the assurances.

On a final note, a recent study by Forrester Research found that of the 10,000 people surveyed, two-thirds said they did not buy online because of privacy concerns (Galvin 2000). That reluctance, according to Forrester, led to a $2.8 billion deficit in e-commerce last year. Perhaps services such as WebTrust can invoke enough confidence in consumers to turn this deficit into sizable profits for e-commerce businesses. 🕮

Endnotes

1. See Research Report #97-05 available at http://www.commerce.net/
2. Brand is the credibility of the company's promise to deliver specific attributes. Navigation stems from the ease of visitors finding what they seek. Fulfillment means a clear indication of how orders are processed and how problems (i.e. returns) are handled. Presentation is the sum of design attributes, which imply quality and professionalism. Professionalism is evoked by state of the art technology.
3. Students were enrolled in either Principles of Accounting I (financial accounting) or Principles of Accounting II (managerial accounting).

4. Since the participants are students, it is important to note that students attitudes toward Internet shopping are not to be affected by demographic characteristics such as age and income, two attributes on which students likely differ from the population of Internet users (Jarvenpaa and Todd 1996). In a recent study investigating college students and online habits (CyberAtlas 1999), results showed that 18 - 24 year olds represent over 18% of the total population of Internet users and 84% of college students have access to the Web from some location. Although only 25% of all college students surveyed have made purchases over the Internet, twice as many students are visiting shopping sites on the Internet compared to one year ago. More than half (62%) of these students say they have made an online purchase. The most popular item purchased by college students is CD's, with 84% of respondents planning to buy a CD online within a month. In another study, Greenfield Online (1999) found that 10% of the full-time students surveyed had made a purchase within the past 30 days, compared to only 8.5% of those surveyed who are employed full-time.
5. The term "drill down" refers to being able to click on the logo.
6. See Table 5 for a breakdown of these statistics between the knowledge and no knowledge group.
7. The materials for the classroom discussion and out of class assignment were designed by the research experimenter and then shared with the classroom instructors responsible for presenting the materials. Two instructors (neither of which was the research experimenter) were used to educate the students in the knowledge sections. Therefore, time and care was taken between all parties to coordinate the discussions conducted in class and to train each instructor on WebTrust in order to ensure that each section was receiving consistent information about WebTrust.
8. The out of class reading, in-class discussion, and Internet assignment were all conducted within a one-week timeframe.
9. Students received 20 homework points for the assignment, which was approximately 5% of their total course grade.
10. Subjects first read through and signed the informed consent form and then listened to verbal instructions on the experimental task. These instructions were read from an instruction sheet to ensure that the instructions given were consistent between each of the experimental sessions. Students were then given the pre-experimental questionnaire.
11. All variables for this study are measured by averaging the total responses. For example, perceived trustworthiness was measured using nine questions. The total response score for the nine questions was averaged and average scores were used in the data analysis.
12. Covariate variables should be observed before the study and should not be influenced by the treatments. Also, covariates should be correlated with the response variable and ideally, not with the independent variables. Propensity to trust is correlated with perceived trustworthiness (Pearson correlation = .27) and is highly significant (p=.001) and is not significantly correlated with either of the independent variables.
13. When testing the effects of prior knowledge (H1B-H1E), the subjects in the "no prior knowledge" group who indicated they had heard of WebTrust prior to the experiment were excluded from the analysis under the assumption that these subjects really could be considered knowledgeable. This made no difference in the results. Thus, these subjects were kept in the analysis and were considered to be part of the "no knowledge" group.
14. The AICPA is in the process moving to a new modularized approach to WebTrust. The modular approach will allow clients to pick the WebTrust product they want by choosing from a group of WebTrust principles. They may select the WebTrust principle(s) most relevant to their Web site business and request that the CPA report only on these. At this time the modular

approach has not been implemented.

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