

INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

**Bell & Howell Information and Learning
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA
800-521-0600**

UMI[®]

PREVIEW

**THE EFFECT OF WEBTRUST ON THE PERCEIVED TRUSTWORTHINESS
OF A WEB SITE AND THE UTILIZATION
OF ELECTRONIC COMMERCE**

by

Kristin S. Portz

A DISSERTATION

Presented to the Faculty of

The Graduate College at the University of Nebraska

In Partial Fulfillment of Requirements

For the Degree of Doctor of Philosophy

Major: Interdepartmental Area of Business (Accountancy)

Under the Supervision of Professor James F. Brown

Lincoln, Nebraska

August 2000

UMI Number: 9977012

UMI[®]

UMI Microform 9977012

**Copyright 2000 by Bell & Howell Information and Learning Company.
All rights reserved. This microform edition is protected against
unauthorized copying under Title 17, United States Code.**

**Bell & Howell Information and Learning Company
300 North Zeeb Road
P.O. Box 1346
Ann Arbor, MI 48106-1346**

DISSERTATION TITLE

The Effect of WebTrust on the Perceived Trustworthiness of a Web Site
and the Utilization of Electronic Commerce

BY

Kristin S. Portz

SUPERVISORY COMMITTEE:

APPROVED

DATE

James F. Brown
Signature

7/31/00

Dr. James F. Brown

Typed Name

Janice Lawrence
Signature

7/31/00

Dr. Janice Lawrence

Typed Name

William Walstad
Signature

7/31/00

Dr. William Walstad

Typed Name

Keng Siau
Signature

7/31/00

Dr. Keng Siau

Typed Name

Signature

Typed Name

Signature

Typed Name



GRADUATE COLLEGE
UNIVERSITY OF NEBRASKA

**THE EFFECT OF WEBTRUST ON THE PERCEIVED TRUSTWORTHINESS
OF A WEB SITE AND THE UTILIZATION
OF ELECTRONIC COMMERCE**

Kristin S. Portz, Ph.D.

University of Nebraska, 2000

Advisor: James F. Brown

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. Although the intent of a WebTrust audit is to increase consumer trust and reduce concerns about doing business online, the effectiveness of WebTrust on utilization of electronic commerce has yet to be empirically tested. Thus 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 and to determine if higher perceptions of trustworthiness increases consumers' willingness to purchase a product online. These questions are 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 web site. 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. Finally, overall perceived trustworthiness of a web site is found to be a key determinant of intention to utilize electronic commerce.

ACKNOWLEDGEMENTS

This dissertation is dedicated to my husband, Jay, for his continual love, patience, support, encouragement and understanding; to my two children, Alexie and Nicholas who are my endless source of motivation and constantly remind me of what is truly most important in life; to my parents, Larry and Ruth Sundby, for their love and moral support throughout all of my life endeavors and for teaching me the importance of perseverance and self-motivation; to my sister, Julie and her husband Andy Martin, for their constant caring and encouragement; and to Jay's parents, Lyle and Mary Lynn Portz for all of their love and support. Without these special people standing behind me every step of the way, I would never be where I am today.

I would like to thank the individuals who directly contributed to the ultimate completion of this dissertation. First, I wish to acknowledge the efforts and insights of my committee members: Dr. James Brown (chairman), Dr. Janice Lawrence, Dr. William Walstad, and Dr. Keng Siau. Their timely comments and assistance were invaluable. I am also thankful to Dr. Linda Ruchala for providing me with a solid foundation in behavioral and managerial accounting research and to Dr. Arthur Allen for providing me with a solid foundation in financial accounting research.

Equally important to me is to thank those individuals who have assisted in my academic development. To my doctoral program counterparts, Karen Senecal, Kirsten Harrington, and Steve Ostlund. I would not have enjoyed the program nearly as much or

reached all of my accomplishments without your help. To Carol and Sue for all of their support and for making life during the program a little easier and much more enjoyable. To Dr. Balke for always thinking of the graduate students and doing everything possible to meet our needs and make life easier on us. To Joel and my Dad for their help in running the experiment and to my mom for her help with the data entry. Finally, to Dr. Joel Strong for sharing his knowledge with me and helping me countless times throughout the entire program.

Last, but certainly not least, I want to thank two special families for their sincere friendships that were developed during the program and will continue for a lifetime. First, an abundance of thanks to Dr. Joel Strong and his family Lisa, Landon, Cecilia, and Colin, for all of the wonderful times we shared in Lincoln. We look forward to many more memorable times in St. Cloud! Second, to Brian and Kristin McAllister for their friendship and kindness during our last year in Lincoln. You are so good to us! Both of these families gave us a life outside of school and made our years in Lincoln so much fun!

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	iii
LIST OF TABLES	vii
LIST OF FIGURES	ix
CHAPTER	
1 INTRODUCTION	1
1.1 Purpose and Objective of the Research	1
1.2 Contribution of the Study	3
1.3 Research Methodology	5
1.4 Results of the Study	6
1.5 Organization of Remaining Chapters	7
2 REVIEW OF THE LITERATURE	8
2.1 Overview of Chapter	8
2.2 Background on WebTrust	8
2.2.1 Business Practice Disclosures	10
2.2.2 Transaction Integrity	11
2.2.3 Information Protection	12
2.2.4 WebTrust Engagement	13
2.3 Empirical Research on WebTrust	14
2.4 Empirical Research on the Impact of Accounting Information On User's Decisions	15

	2.5 Internet Trust Literature	19
	2.6 Triandis Theory on Attitude and Behavior	24
	2.7 Empirical Literature Using Triandis' Theory	28
	2.8 Chapter Summary	31
3	RESEARCH MODEL AND HYPOTHESES DEVELOPMENT	33
	3.1 Overview of Chapter	33
	3.2 Research Model	33
	3.3 Hypotheses Development	37
	3.4 Chapter Summary	42
4	RESEARCH METHODOLOGY	44
	4.1 Subjects	44
	4.2 Web Site	45
	4.3 Knowledge of WebTrust	46
	4.4 Experimental Procedure and Task	49
	4.5 Research Design	52
	4.6 Research Design to Test the Relationship Between WebTrust And Perceived Trustworthiness	52
	4.7 Research Design to Test the Relationship Between Perceived Trustworthiness and Intent to Utilize EC	55
	4.8 Chapter Summary	59
5	RESULTS	62
	5.1 Overview of Chapter	62
	5.2 Sample Data	62

5.3 Manipulation Checks	66
5.4 Descriptive Statistics	69
5.5 Test of Perceived Trustworthiness Hypotheses	71
5.6 Test of Intent to Utilize EC Hypothesis	77
5.7 Chapter Summary	81
6 CONCLUSIONS, DISCUSSION, LIMITATIONS, AND FUTURE RESEARCH	83
6.1 Overview of Chapter	83
6.2 Conclusions	83
6.3 Discussion	87
6.4 Limitations	88
6.5 Future Research	90
REFERENCES	93
APPENDIX A - LITERATURE REVIEW SUMMARIES	98
APPENDIX B - INSTITUTIONAL REVIEW BOARD HUMAN SUBJECTS MATERIALS	101
APPENDIX C - SAMPLE WEB PAGES	105
APPENDIX D - KNOWLEDGE MATERIALS	108
APPENDIX E - PRE-EXPERIMENTAL QUESTIONNAIRE	114
APPENDIX F - POST-EXPERIMENTAL QUESTIONNAIRE	118
APPENDIX G - WEBTRUST KNOWLEDGE TEST	125
APPENDIX H - SUMMARY OF RESULTS BY SCHOOL	128

LIST OF TABLES

Number	Title	Page
3.1	Predicted Effects of WebTrust and Knowledge of WebTrust On Perceived Trustworthiness of a Web Site	40
3.2	Table of Research Hypotheses	43
4.2	Sequence of Experimental Procedures	51
4.3	Analysis of Covariance Model	53
4.4	Regression Model	57
4.5	Operationalization of Constructs	61
5.1	Descriptive Statistics on Sample Demographics, Internet Purchase Data, and Security Information	64
5.2	Summary Statistics for Knowledge Manipulation	68
5.3	Summary Variables' Definitions and Descriptive Statistics	72
5.4	Effect of WebTrust and Knowledge of WebTrust On the Perceived Trustworthiness of the Web Site	73
5.5	Effect of Perceived Trustworthiness on Intent to Utilize EC	80
5.6	Summary of Results	82

LIST OF FIGURES

Number	Title	Page
2.1	CPA WebTrust Logo	9
2.2	User Understanding and Importance of Accountant Reports	16
2.3	Triandis' Theoretical Framework for Predicting Behavior	25
3.1	Research Model of the Relationship between WebTrust, Perceived Trustworthiness, and Intent to Utilize Electronic Commerce	34

Chapter 1

Introduction

1.1 Purpose and Objectives of the Research

An estimated \$300 billion dollars will be exchanged over the Internet by the year 2002 and continued growth in electronic commerce (EC) is expected (Gray and Debreceeny 1998). Despite this explosive growth, many individuals are 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. One study by CommerceNet¹ in 1997 identified the "barriers and inhibitions" to the adoption of EC. The "lack of trust in transaction" was identified by all potential parties as a primary barrier to the utilization of EC by consumers. Other buyer concerns included 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 (AICPA web site), which is intended to improve the consumer's confidence in the process and the quality of information disclosed on vendor web sites. Although the intent of a WebTrust audit is to increase consumer trust and reduce concerns about doing business online, the effectiveness of WebTrust on utilization of EC has yet to be empirically tested. Thus, the purpose of this study is to shed light on the effectiveness of WebTrust by addressing two

¹ See Research Report #97-05 available at <http://www.commerce.net/>

research questions. First, this study addresses the question, "Does WebTrust have a positive influence on consumers' perceptions of a web site's trustworthiness?" and, second, "If consumers perceive a web site to be more trustworthy, does that increase their willingness to purchase a product from that web site?" These questions are investigated through a computer experiment.

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 audits are provided by certified public accountants (CPAs) who are specifically licensed by the AICPA to perform the service. A CPA tests and evaluates the company's web site using procedures that are based on standards established by the profession. Merchants that demonstrate they have met all of the WebTrust Principles and Criteria are issued an unqualified CPA's report and awarded the WebTrust seal of assurance logo that is displayed on the web site. The logo on the web site contains links to the accountant's report and other relevant information about the WebTrust service.

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 and increase consumers' willingness to participate in EC. WebTrust is currently in its infancy and its impact on consumer's trust and utilization of EC is only presumed at this point. Thus, this study is an important first step in empirically supporting the expected benefits of WebTrust.

This study hypothesizes that WebTrust increases an individual's trust in a web site and that there is a positive link between trust and utilization of EC. The theoretical grounding for this research comes from the Internet trust literature and the work of Triandis (1971, 1980). First, the Internet trust literature is used to develop hypotheses about the impact of the WebTrust assurance service on perceived trustworthiness. Second, Triandis theory on attitude and behavior is used to develop arguments for the relationship between perceived trustworthiness and intent to utilize EC.

Despite the acceptance of Triandis' (1980) theory within the psychology literature, this theory has been used very little within the accounting context. Accordingly, one purpose of this study is to integrate Triandis' theory into accounting research. Recently, this theory has been adopted in the information systems (IS) literature to predict behavior relating to technology. For instance, the model has been used to predict the utilization of personal computers and the adoption of executive information systems (Thompson et al. 1991, Thompson et al. 1994, Bergeron et al. 1995). The utilization of EC is closely linked to IS and technology. Thus, Triandis' model provides a useful foundation for testing the determinants of EC behavior and most importantly, the effects of perceived trustworthiness on EC behavior.

1.2 Contribution of the Study

This research makes several contributions to the assurance services literature and also to the accounting profession, including both the public and private sectors of the profession. First, very little academic research has been done to date on WebTrust. Because web-based electronic commerce, electronic commerce assurance services, and

WebTrust are all relatively new, there is a strong need for research to better understand the needs of the marketplace, enhance services and technologies, and test the effectiveness of assurance services (Gray and Debreceeny 1998; Elliot 1997).

Second, this study is of interest to the public accounting firms that provide WebTrust. Currently the profession assumes that WebTrust will increase a consumer's trust in a web site which will in turn, increase the likelihood that the consumer will conduct business on that web site. While this is certainly an intuitive assumption, empirical evidence is necessary. Once the effects of WebTrust on trust and utilization of EC are measured, the accounting profession can use that information to assess the role of WebTrust as perceived by the users. Through such an assessment, the profession will be better able to understand if WebTrust is serving its purpose and will also be able to identify ways to improve the services provided by WebTrust.

Third, this study is of interest to private accountants working for companies that may be considering a WebTrust audit. With WebTrust, the AICPA is promoting itself as a new information trust intermediary. This information adds to EC transaction costs and companies must decide if the economic benefit of services like WebTrust outweigh the economic costs to obtaining the service. Awareness of the effects of WebTrust on consumers' participation in EC is an important factor when weighing the benefits and the costs.

1.3 Research Methodology

To examine the two primary research questions, a computer experiment is administered to 388 student subjects. The computer experiment requires subjects to examine a hypothetical web site for an online textbook company, evaluate the trustworthiness of the site, and determine how likely they are to make a purchase from the site.

The first objective of this research is to investigate the relationship between perceived trustworthiness and WebTrust. This study hypothesizes that WebTrust has a positive influence on the perceptions of trustworthiness. A two-factor ANCOVA is used to empirically test this question where perceived trustworthiness is the dependent variable. The first factor manipulated between subjects is the "presence" or "no presence" of the WebTrust logo. That is, subjects are randomly assigned to view a web site with or without the WebTrust logo². Another factor, knowledge of WebTrust, is also manipulated between subjects. To manipulate the knowledge factor, participants are randomly assigned to a "knowledge" or "no knowledge" group. The subjects in the knowledge group are educated prior to the experiment about the WebTrust service, including its purpose and objectives. In contrast, the "no knowledge" group has no prior knowledge of WebTrust before the experiment. The interactions between the presence of the logo and knowledge of WebTrust are evaluated and used to draw conclusions on how these two factors interact with one another to affect perceived trustworthiness.

² The web site is identical except for the presence or no presence of the WebTrust logo and relevant WebTrust information.

The second research question examines the link between perceived trustworthiness and intent to utilize EC. It is hypothesized that when consumers perceive a web site to be more trustworthy, they will be more likely to purchase from that web site. This question is evaluated through ordinary least squares (OLS) regression where perceived trustworthiness is the independent variable of interest and intent to utilize EC is the dependent variable. Perceived complexity of EC, perceived usefulness of EC, affect towards using EC, social factors, prior Internet habits, access to the Internet, and risk propensity are included as control variables.

1.4 Results of the Study

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.

The interaction between the presence of the logo and knowledge of WebTrust was also significant. The findings indicate that when subjects have prior knowledge of WebTrust and see the WebTrust logo on the web site, they perceive the web site to be more trustworthy than when the logo is not present. Furthermore, when the logo is present, those 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.

Whether or not the logo was displayed on the web site made no difference in the perceptions of trust for subjects with no prior knowledge of WebTrust. Interestingly however, in comparing the knowledge and no knowledge group 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. This result implies that once a subject is educated about the WebTrust service, they perhaps "expect" a web site to display a logo or their perceptions of trustworthiness decrease. Finally, overall perceived trustworthiness of a web site is found to be a key determinant of intention to utilize EC.

1.5 Organization of Remaining Chapters

The remainder of this dissertation proceeds as follows. The next chapter provides a background of WebTrust, a review of the prior literature on the impact of accounting information on decisions, a review of the Internet trust literature, an introduction to Triandis' theory on attitude and behavior, and a review of the empirical literature in IS that uses Triandis' theory. Chapter 3 presents the research model and develops the research hypotheses. Chapter 4 discusses the research methodology used to test the hypotheses. Chapter 5 summarizes the results of the study, while Chapter 6 provides some limitations, additional discussion, and suggestions for future research directions.

Chapter 2

Review of the Literature

2.1 Overview of Chapter

The purpose of this section is to review the literature that is relevant to this study. Section 2.2 provides a detailed background on WebTrust including the purpose of WebTrust, the WebTrust principles, and the WebTrust engagement. Section 2.3 describes the limited empirical research on WebTrust that has been done to date. Section 2.4 discusses how accounting information influences users' decisions and relates prior studies in this area to the objectives of the current study. Next, section 2.5 examines the Internet trust literature. The final two sections discuss Triandis' theory on attitude and behavior and examines the prior uses of this theory within the IS context. Section 2.8 summarizes the chapter.

2.2 Background on WebTrust

Due to technological advances and the declining usefulness of historical-based financial statements, the market for audits has been flat for a number of years with no clear prospect of a turnaround. Thus, to revitalize the future of assurance services and the accounting profession, CPA firms are exploring new ways to extend the traditional audit

service. 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 will be used for business purposes only (Koreto 1997). WebTrust was developed to allay consumer fears and concerns about the risks, both real and perceived, of doing business electronically. Although electronic commerce has undergone explosive growth, many consumers mistrust shopping online because they are unsure if an online store is real, trustworthy, or safe (Yankelovich, 1997). WebTrust is designed to increase consumers' trust and to inform consumers that a web site is safe and reliable.

The WebTrust program is implemented 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 2.1. 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 2.1 CPA 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. Companies that are in compliance with the three WebTrust principles, as determined through testing and verification, can display the WebTrust logo. Following is a brief overview of the three principles (AICPA web site).

2.2.1 Business Practice Disclosures

Most agree that to enhance consumer confidence in electronic commerce, the consumer must be well informed about the entity's business practices. Therefore, this principle requires an entity to disclose, directly on the web site, its business practices followed for EC transactions and to execute those practices as stated in the disclosures. Examples of business practices that need to be disclosed on the web site include the time required to fulfill an order, normal method of delivery, the company's refund policy, and who to contact with any questions. For instance, if the company's policy is to ship the