MIT Sloan School of Management

Working Paper 4282-02
December 2002

Determinants and Role of Trust in
E-Business: A Large Scale Empirical Study

Fareena Sultan, Glen L. Urban, Venkatesh Shankar, Iakov Y. Bart

Determinants and Role of Trust in E-Business:
A Large Scale Empirical Study

Fareena Sultan
Associate Professor
College of Business Administration
202 Hayden Hall, Northeastern University
Boston, MA 02115
Phone: (617) 373-8555
Fax: (617) 373-8366
E-Mail: f.sultan@neu.edu
Internet: http://www.cba.neu.edu/~fsultan
(Visiting Scholar, E-Business Center, Sloan School of Management, MIT
On sabbatical, Fall 2002- March 2003)

Glen L. Urban
David Austin Professor of Marketing
Sloan School of Management
E56-332, MIT
Cambridge MA 02139
Phone: (617) 253-6615
E-Mail: glurban@mit.edu

Venkatesh Shankar
Ralph J. Tyser Fellow and Associate Professor of Marketing
Robert H. Smith School of Business
3307 Van Munching Hall, University of Maryland
College Park MD 20742
Phone: (301) 405-2175
E-mail: vshankar@rhsmith.umd.edu

Iakov Y. Bart
Doctoral Student
Haas School of Business
University of California at Berkeley
Berkeley, CA 94720-1900
Phone: (510) 643-1401
Email: bart@haas.berkeley.edu

December 13, 2002

Determinants and Role of Trust in E-Business:
A Large Scale Empirical Study

Abstract

This research investigates the determinants and role of consumer trust in e-business. It examines consumer perceptions of trust in a Web site and addresses the following key research questions: What factors influence consumer trust in a Web site and what specific Web site trust cues are associated with these factors? How does trust affect consumer behavioral intent on a Web site? To address these questions, we develop a conceptual model that links consumer perceptions of Web site characteristics, consumer characteristics and demographics to perceptions of trust in a Web site, and trust to behavioral intent related to a Web site. We also examine whether trust mediates the relationship between Web site and consumer characteristics and behavioral intent related to the Web site. We test our hypotheses in a large-scale empirical study that estimates this model from 6831 consumers across 25 Web sites and eight industry categories. We validate the model using a holdout sample. The results show that Web site, consumer, category and demographic variables can explain 76% of the variance in trust. *Web site characteristics* such as privacy and security, navigation, presentation, brand, and advice account for as much as 98% of this explained variance in Web site trust. Surprisingly, over 80% of the explained variance in Web trust is due to factors other than privacy and security—mainly navigation, brand, advice, absence of errors, and presentation. We also find that trust mediates the relationships between Web site and consumer characteristics and behavioral intent related to Web sites. The results offer important implications for Web site strategies that include the manipulation of factors influencing Web site trust to favorably impact consumer behavior at the Web site.

Key Words: E-Business, Trust, Internet marketing, Web site design, Online strategy

INTRODUCTION

The Internet has evolved into an important medium for marketing. The use of the Internet by business and consumers continues to grow in the US. The Computer Industry Almanac reports that there are 149 million Internet Users in the US (CyberAtlas, August 2002).[1] According to a US government study, US Internet usage is growing at the rate of 2 million new users each month (CyberAtlas, February 2002). 13% of airline tickets are sold on the web and totaled $7.8 billion in June -August 2002 (Travel Weekly, US Consumer Travel Survey, 2002). 60% of customers go to the web for auto information and 6% bought their auto through a buying service in 2001 (J. D. Powers, New Autoshoper.com study, 2001). Over 50% of USA adults go to the Internet for health information (Cyber dialogue, Cybercitizen, Health Data Q2 '99). Increased customer familiarity and use of the medium have resulted in continued growth in e-business activity. Online consumer sales (excluding auctions) were $17.5 billion in June – August 2002, representing an increase of 41% over the previous year (comScore Media Metrix, CyberAtlas, September 2002). EBay reports 52% increase in sales (Wall Street Journal, Friday October 18, 2002, p. B4) and sold $3.77 billion of goods in the June to August quarter 2002. These large sales growths occurred in a quarter when overall retail sales were flat. Total sales on the Internet in 2002 are likely to be over 75 billion dollars and it is clear the Internet is becoming a significant factor in marketing today.

Internet strategy is increasingly becoming a multi-channel strategy phenomenon. Under the current challenging economic conditions, managers need to allocate scarce marketing resources efficiently across the Internet and other marketing mediums or channels to build sustained relationships with customers. We believe that the establishment of customer trust is a pre-requisite for creating these long-term customer relationships. Customer trust is particularly important if we expect customers to use a new channel for information and buying. Companies need a deeper understanding of how trust works in the online context in order to make this medium a successful element in their marketing.

Internet site design is an important element in building trust. For example, look at Figure 1a, which shows the autochoiceadvisor.com Web site. This unbiased advisory Web site helps customers find

a car that matches their needs. It is sponsored by GM, J.D. Powers and AutoSite and can be found on Kelly's Blue Book Web site as a decision aid. This Web site uses these brand marks to build credibility and the Web site design uses considerable amount of white space. It carefully describes the purposes of the Web site and why GM would be interested in providing this service in a fair way. It provides alternative ways to get started in moving through the Web site. Several key managerial decisions are evident here in the use of brands, presentation (feel of the Web site), and navigation. Vince Barabba, General Manager of Corporate Strategy and Knowledge Development at General Motors says "We are trying to provide open and honest information and advice to auto customers in order to build a trusting relationship with customers. They get unbiased recommendations and we get design input to build better cars". Figure 1b is in sharp contrast to Figure 1a. Here Dell uses a crowded design with promotional specials on Dell PCs. How does trust and purchase intents relate to these Web site design characteristics and which approach is best? Figure 1c shows Orbitz's Web site, where an artificial intelligence advisor searches airline fares to find the lowest fares for the customer. Jeff Katz, CEO of Orbitz says they are trying to design a "customer friendly" Web site. Figure 1d shows Intel's download Web site and the use of a decision assistance box to help people navigate the complex process of identifying their needs and finding the correct download. Bryan Rhodes, manager of the Intel download Web site says "We want the Web site to be easy to use and the decision assistance boxes have helped – now we are testing a wizard with a persona picture in order to build increased customer confidence so they will be successful in electronically downloading their software".

We focus on these critical managerial Web site design issues. Although most managers agree and understand that factors such as privacy and security affect consumer perceptions of trust in a Web site, they need a better understanding of how these other aspects of the Web site affect trust and the consequences of onli‌ **Figure 1** ‌vigation on the site affect consumers'

Site Designs

‌s consumer an‌ ‌er.

perceptions of a site's trustworthiness? Is brand an important factor in trust perceptions? Do the artistic and creative aspects of the Web site influence attitudes and purchase intent? From consumers' point of view, while some continue to have privacy and security concerns, others may find the navigation confusing, and the amount of information available on a Web site overwhelming at times. While it is often relatively easy for consumers to get a list of alternatives in an online shopping situation, it is not that easy to make a choice between available alternatives, particularly choosing one that is most favorable to the consumer. Many Web sites do not provide a mechanism for facilitating consumer decision-making. Consumers seek advice. They are often unsure as to whether the information available can be trusted. In sum, managers need an understanding of the role of trust in e-business, the Web site drivers of trust, and how trust perceptions affect behavioral customer response to the Web site.

While previous academic studies have emphasized the significance of trust in Internet strategy (e.g., Hoffman, Novak and Peralta 1999; Urban, Sultan and Qualls, 2000) and suggested potential determinants and consequences of online trust (e.g., Shankar, Urban and Sultan 2002; Yoon 2002), there has not been a systematic large-scale empirical investigation of the role of trust in e-business across industries. A large-scale empirical investigation could lead to generalizable insights into the determinants and role of trust in e-business. The primary purpose of this study is to fill this void. We examine the following key research questions: What factors (Web site characteristics, consumer characteristics, category types and demographics) influence consumer trust in a Web site and what specific Web site trust cues are associated with these factors? How does trust affect consumer behavioral intent on a Web site? Does trust mediate the relationships between the factors influencing Web site trust and consumer behavioral intent on a Web site? To address these questions, we propose a conceptual framework and model of consumer trust in a Web site. We examine factors such as Web site and consumer characteristics, and articulate a set of propositions related to our key research questions. We test these propositions through an empirical analysis of responses from 6831 consumers relating to 25 Web sites across eight industries.

Our research makes important contributions in the following ways: First, it contributes to the growing literature on Internet trust by examining theoretically sound and managerially relevant variables that might affect online trust. Second, it investigates the mediating role of trust in the relationship between Web site and consumer characteristics and consumer behavioral intent related to the Web site. Third, to our knowledge, it is the first large-scale, generalizable, quantitative, empirical study linking consumer perceptions of Web site characteristics and consumer characteristics to trust, and trust to consumer behavioral intent in an e-business setting.

TRUST, ITS ANTECEDENTS AND CONSEQUENCES

The concept of trust has been investigated in many disciplines. It has been defined in a variety of ways in the management and marketing literatures and there is no universally acceptable definition. Differences in the conceptualization of trust are due to disciplinary traditions and assumptions used by researchers (Williamson 1993, Rotter 1967, Zucker 1986). Trust has been defined in various terms, ranging from "the willingness to be vulnerable to the actions of another party" (Mayer et al. 1995) to "the probability one attaches to cooperative behavior by other parties" (Hwang and Burgers 1977). Trust has also been defined as the belief by one party about another party that the latter will behave in a predictable manner (Luhmann 1979).

Despite divergent views, there are some consistent underlying themes regarding the conceptualization of trust. Many agree that trust entails a perception of risk (Coleman 1990, Lewis and Weigart 1985). In an exchange relationship, uncertainty regarding how the other party behaves leads to risk. However, the perception of uncertainty and risk as being elements of trust is not accepted by all studies. Some researchers have proposed that perceived risk is a moderator between trust and risk taking rather than being an inherent part of trust (Davis and Shoorman 1995).

In the marketing literature, trust has been primarily studied in the context of relationship marketing (Doney and Cannon 1997, Dwyer, Schurr and Oh 1987, Ganesan 1994, Morgan and Hunt 1994). Trust is believed to be a part of all relationships (Sheppard and Sherman 1998) requiring the

assumption of some risk for the relationship to evolve. Trust involves interdependence between two or more parties (Lewicki et. al. 1998). In exchange relationships, the interest of the parties involved requires reliance upon each other. Intrinsically, trust implies a willingness to accept vulnerability, but with an expectation or confidence that one can rely on the other party (Lewicki et. al. 1998, Moorman, Zaltman, and Deshpande 1993). There is an expectation that the other party will behave in goodwill (Rousseau et. al 1998, Whitener et. al 1998). Trust has been defined as the willingness to rely on an exchange partner in whom the buyer has confidence (Moorman, Zaltman, and Deshpande 1992, Morgan and Hunt 1994).

Research suggests that trust changes over time, evolving through stages of development, build-up, and decline (Fukuyama 1995, Rousseau, Sitkin, and Burt 1998). In studies of buyer-seller relationships, trust in a sales agent evolves over time and is based on a buyer's observation of a sales representative's honesty, reliability, consistency and trustworthiness (Anderson and Narus 1990, Biong and Selnes 1996, Donney and Cannon 1997, Ganesan 1994). For a detailed review of trust in different disciplines, see Yoon (2002) and Shankar, Urban, and Sultan (2002).

Despite the many definitions of trust it is widely agreed that trust is important in business relationships. It is essential in building a continuing relationship with a customer (Morgan and Hunt 1994). Trust is considered important because it is a good predictor of satisfaction (Driscoll 1978) and it reduces uncertainty (Mayer, Davis and Schoorman 1995). In the e-business context, trust is important because it has been shown to affect the adoption of new technologies including the Web (Fukuyama 1995). The importance of trust in the online environment is significant (Urban, Sultan and Qualls 2000), because implementation of a technology such as the Internet can impact trust (Zuboff 1982) and trust is relevant in virtual organizations (Handy 1995). Based on the above discussion, our premise is that trust is important and understanding how it works in the online environment is essential for firms to develop a long-term relationships with consumers in the e-business context.

Trust comprises many dimensions. Trust can be viewed both as a belief in the trustworthiness of a partner and a behavioral intention to rely on a partner in a situation of vulnerability. Credibility and

5

benevolence have been proposed as the underlying dimensions of trust (Doney and Cannon 1997; Ganesan 1994; Ganesan and Hess 1997). Credibility refers to the buyer's belief in the seller's expertise to do the job effectively, while benevolence is based on the buyer's belief in the positive intention of the seller (Ganesan 1994). Some authors propose that trust is multidimensional involving two distinct cognitions relating to provider competence and benevolence (Singh and Sirdeshmukh 2000).

Online trust has several possible antecedents and consequences (see Shankar, Urban and Sultan 2002 for a detailed review). Despite agreement on the significance of trust in business relationships, there is still a fair amount of disagreement on what factors constitute the antecedents, dimensions and consequences of trust. The antecedents of a buyer's trust in a seller include the seller's reputation for reliable, consistent and fair behavior (Ganesan 1994). Other antecedents include relationship-specific investments by the seller, the seller's size (Doney and Cannon 1997), the buyer's experience with the seller (Anderson and Weitz 1989; Ganesan 1994), and the incidence of opportunistic behavior by the seller (Morgan and Hunt 1994). In a meta analysis of studies on trust in marketing relationships, Geyskens, Steenkamp and Kumar (1999) show that environmental uncertainty, own dependence, partner's coercive power use, communication and economic outcomes are the primary antecedents of trust, while satisfaction and long-term orientation are the consequences of trust.

The establishment of trust between a firm and its customers leads to long-term relationships that prove beneficial to both parties. Some authors have proposed that the consequences of trust are a long-term exchange relationship (Ganesan 1994) and cooperation (Morgan and Hunt 1994). Satisfaction and long-term orientation have also been proposed as consequences of trust (Geyskens, Steenkamp and Kumar 1999).

In this paper, unlike some prior studies, we adopt an empirically derived approach to identify the dimensions and antecedents of trust as articulated by consumers. Rather than incorporate every single variable that may influence trust, we focus on those antecedents that are managerially relevant in the e-business context. We examine consequences of trust in terms of consumer response to Web site offerings.

We develop a set of propositions related to factors that influence trust in a Web site and examine the role of trust in influencing consumer behavioral intent in an e-business setting.

Our work is different from Shankar et al. (2002) in three important ways. First, we empirically investigate the antecedents and consequences of trust, whereas they focus on developing a conceptual model. Second, unlike their study, we empirically test whether trust mediates the effects of Web site and consumer characteristics on behavioral intent of consumers. Third, we focus on consumer trust while they focus on trust from the perspectives of all stakeholders.

Our research is also distinct from Yoon's (2002) research (which studied the antecedents and consequences of Web site trust) in the following ways. First, we develop a more comprehensive framework by including a broader set of antecedents. Second, ours is a large-scale empirical study of known Web sites across industries that examined US consumers' perceptions and response to Web sites. In contrast, Yoon's work is a study of college students' perceptions of Korean online shopping mall sites. Third, we test for the mediating role of trust in the relationships between Web site characteristics and behavioral intent and between consumer characteristics and behavioral intent.

Our research is different from Fogg et al. (2002) in that they examined the credibility of live Web sites by asking respondents which of two sites in a particular category was more credible. They also solicited qualitative comments from the respondents as to why a particular site was more credible than the other. Our approach is more analytical in that we are examining factors that influence trust perceptions in a quantitative model. Additionally, we examine the mediating role of trust in influencing action on a Web site, which is not investigated in Fogg et al. (2002).

CONCEPTUAL DEVELOPMENT AND PROPOSITIONS

We propose a conceptual framework linking Web site and consumer characteristics to Web site trust and trust to behavioral intent related to the Web site as shown in Figure 2. Characteristics of Web sites and characteristics of consumers affect perceptions of Web site trust (Shankar, Urban and Sultan 2002). In addition, we propose that trust acts as a mediating construct between Web site and consumer

characteristics and consumer behavior on the Web site. Based on this framework, we develop

propositions related to (1) Web site characteristics affecting trust, (2) consumer characteristics affecting

trust, and (3) the mediating role of trust in these relationships.

<div align="center">< Figure 2 about here ></div>

Web site Characteristics Affecting Trust

It is reasonable to expect that consumer trust will depend on the levels of security and privacy

provided by a Web site. Additionally, Web site characteristics such as navigation, depth of information

and advice, and brand may affect consumer perception of trust in a Web site. Consumers may prefer a

Web site with a good navigation scheme, or a site that offers correct advice in the choice of a product or

for consumer support, or one supported by a reputed brand name.

Privacy and Security

Security and privacy elements are key drivers of online trust (Hoffman, Novak and Peralta 1999).

Palmer et al. (2000) found that privacy statements and trusted third party utilization reduces consumer's

concerns and promotes trust. Consumers are generally wary of providing sensitive or confidential

information on a Web site. Typically, they prefer Web sites where their credit card information is safe.

Consumers also do not want their personal information to be misused. Seals of approval such as Better

Business Bureau, Verisign, and Truste are considered reliable by consumers and have been adopted by

many trustworthy Web sites. Companies can improve online trust by disclosing third-party certifications,

and making it easy to locate, read and enforce policies involving privacy and security (Shneiderman

2000). Seals of approval (logos of security firms) have a positive effect on trustworthiness

(Cheskin/Sapient Report 1999). Privacy may be an important determinant of online trust (Smith, Bailey

and Brynjolfsson 2000). State-of-art security, merchant legitimacy, and fulfillment are the core drivers of

online trust (Dayal, Landesberg, and Zeisser 1999). These arguments lead to the following proposition:

> P_{1a}: *Consumer perceptions of privacy policy, security and trust seals on a Web site influence consumer trust in the Web site.*

Other Web site Characteristics

Privacy and security are two of the many website characteristics that may also be important in influencing Web site trust. In this paper, we focus on managerially relevant variables such as the Web site's design and navigation, brand, and advice available to assist consumers on the site. In many of the prior empirical studies, characteristics of Web sites have been incorporated on a rather ad hoc basis. We examine an extensive array and variety of cues on the Internet Web site and their impact on consumer perceptions of site trust.

While privacy and security perceptions are intuitive drivers of Web site trust, not much is known about the role of other managerially important potential determinants on consumer trust such as navigation, advice and brand. An industry study of trust factors (Cheskin/Sapient Report 1999) concluded that besides seals of approval (logos of security firms), factors, such as, branding, fulfillment, navigation, presentation and technology drive trustworthiness. However, in that study, no formal model was proposed linking these characteristics to trust and trust to behavior or behavioral intent. Fogg et al. (2001) conducted an empirical study of people's perception of Web site credibility on 1400 students in the U.S. and Europe who evaluated 51 different Web site elements relating to trust. They found that real-world feel, ease of use, expertise, trustworthiness, and tailoring to be the most important factors affecting Web credibility, in that order. These factors were defined and the scale items designed *a priori* and were not empirically derived as we propose to do in our study.

Consider first, navigation. Navigation is important because it is directly related to the flow construct that has been proposed as important for understanding consumer behavior on the Internet (Hoffman and Novak 1996). Theoretically, a Web site can have several possible navigation schemes. The navigation paths could also be different for different types of consumers depending on their needs. Consumers of a product or service who are familiar with the product or service and who may be repeat users of the product or service and repeat visitors to its Web site may want a site design that is intuitive and easy to click on to get to their desired locations (Palmer et al. 2000). Such a Web site can enhance

trust and help ensure that consumers stick with that product or service. For example, Amazon.com offers "one click" ordering of books or videos or other products sold at its Web site for those who have registered and have bought from its Web site once or more. Similarly, many Web sites of service companies such as financial services and airlines allow frequent users to access their desired information with minimum number of clicks. Typically, they have shortcuts for frequent users and search engines for directly going to their desired pages. Consumer perceptions of navigation in Web sites are thus likely to significantly influence their trust in those Web sites.

Consider next, brand. A company's brand is a significant marketing variable. A brand is a trust mark that is the cue for all intangible trust generating activity and in the absence of human touch, it can be a symbol of quality and assurance that is capable of building trust. Brand is a surrogate for risk (Keller 1993). Brands are also important to the development of trust in Web based relationship marketing (Davis, Buchanan-Oliver and Brodie 1999). In the absence of all relevant information for comparison, brands can provide greater comfort online than offline in customer choice (Degeratu, Rangaswamy and Wu 2000). The greater the brand equity and comfort, the lower the risk or uncertainty in that brand. The lower the uncertainty, the higher the trust in the brand. Extending this logic to the online environment, we can expect that the higher the equity of the brand behind a Web site, the greater will be the consumer trust in that Web site. For example, Amazon enjoys a greater level of trust than rival book e-tailers, while having a high brand recognition at the same time (Pan, Ratchford and Shankar 2001). Reputation determines trust in an electronic store, which affects the attitude, risk perception, and in turn, the willingness to buy in an electronic store (Jarvenpaa, Tractinsky, and Vitale 2000).

Information and advice to current and potential consumers is another managerially important factor that can potentially affect consumer trust in a Web site. Urban, Sultan and Qualls (2000) demonstrate that the presence of "virtual advisors" can enhance trust in a Web site for a pickup truck purchasing situation. There is a need to examine how the presence of advisors and other decision-making

aids can help in creating a feeling of trust in Web sites across a variety of industries and product

categories.

Consider now, information content. Depth of information at a Web site has the potential to lower

customer price sensitivity and increase customer value (Shankar, Rangaswamy and Pusateri 2001). If

consumers perceive greater value in a product or service online, they are likely to perceive higher trust

online as well. The quantity, quality and timeliness of information can enhance trust (Urban, Sultan and

Qualls 2000). Reduced uncertainty and right choices in turn lead to a higher degree of trust by

consumers. Based on the above discussion, we advance the following proposition.

> P_{1b}:   *Consumer perceptions of Web site characteristics other than privacy and security also influence Web site trust. These include the site's design, navigation and features such as brand and advice.*

Consumer Characteristics Affecting Web site Trust

In addition to Web site characteristics, consumer characteristics can also play an important part in

determining consumer trust in a Web site. These consumer characteristics include demographics,

psychographics and behavioral factors. While the effects of demographics and psychographic variables

on trust have been studied, the effects of some behavioral characteristics such as previous Web site

experience, type of usage, and the purpose of use, such as for entertainment, have not been studied in

detail.

We first consider the impact of past experience with a particular Web site or with the Internet in

general, on consumer trust in that Web site. Customer experience in online environment is important in

determining their behavior on a Web site (Novak, Hoffman and Yung 2000). Trust operates in different

ways depending on a consumer's state of knowledge about products and services. There are two

components of trust between two parties, cognitive and affective (Lewis and Wiegert 1985). The

cognitive component of trust comes from one party having some knowledge about the other party to

develop expectations about the response of the other party, but not enough knowledge to predict that

response with absolute certainty. The affective component of trust is partially determined by the lack of

knowledge, since uncertainty about the behavior of the other party generates fear, while higher levels of certainty induce comfort. Lewicki and Bunker (1995) suggest that knowledge based trust develops over time through experience and interaction. Past experience affects individual trust propensity, which has an important role in determining online trust (Lee and Turban 2001).

When consumers are knowledgeable about a purchase decision, they typically trust a salesperson if he/she reflects the consumer's level of knowledge in the sales process. A firm's Web site can be viewed as its electronic sales person (Jarvenpaa et al. 1999). If consumers are limited in their product knowledge, they are more likely to develop trust with a vendor based on *knowledge and comfort* gained from previous interactions so that there are no surprises once an agreement is reached (Butler and Cantrell 1984; Doney and Cannon 1997; Moorman, Deshpande, and Zaltman 1993). This reasoning applies to the online context where trust is likely driven by past experiences (Jarvenpaa et al. 1999). Yoon (2002) shows that Web site trust is influenced by consumer familiarity with e-commerce and prior satisfaction with e-commerce. Trust is driven by past experiences (Jarvenpaa et al. 1999). We incorporate the dynamic nature of trust formation by examining the impact of past consumer experience with the Web site on trust perceptions.

Many household consumers use the Internet for online entertainment or chat experience. It remains to be determined what effect online entertainment or chat experience on a Web site has on a consumer's perception of that Web site's trust. Consumers may surf a number of Web sites, including those that offer news, entertainment and the ability to converse with others. Consumers who frequently visit Web sites offering entertainment are likely to be more involved about their experience in those Web sites because they offer recreational value. Favorable experience may make them more confident about online browsing and buying. Consumers, who also chat on the Internet, share their experiences and get information from other consumers on products, services and related aspects. They may also be able to complain and punish those Web sites that fail to live up to the expectations or promises. This experience and information can also contribute to increased confidence with Web sites.

Greater confidence reduces uncertainty and builds trust (Ganesan 1997). Greater entertainment and chat experience may thus reduce uncertainty associated with Web sites. Additionally, such features can enhance the reviewed benefits of the site and make the site appear as one that caters to consumers needs for entertainment and community. Therefore, it is likely that greater entertainment and chat experience on the Internet will lead to greater trust in a Web site. Thus, consumer experience with a Web site is likely to affect trust in the Web site. In addition, consumer demographics may impact consumer perceptions of trust. For example, more educated consumers may rely more on their knowledge and may inherently trust Web sites less than other consumers. Based on these arguments, we propose the following:

P₂: *Consumer characteristics, such as past experience with a Web site, type of usage and consumer demographics influence Web site trust perceptions.*

In testing this proposition, we will focus on past consumer experience with the site (and with the Internet), type of usage (usage at home or for business), and use for entertainment or chat purposes. In terms of demographics we will focus on gender, age, education and income, to see whether these characteristics of a consumer influence trust perceptions.

The Mediating Role of Trust

Prior studies suggest that trust impacts behavior and behavioral intent. Singh and Sirdeshmukh (2000) have examined the role of trust in enhancing satisfaction in the context of exchange relationships. They examined the role of trust as a moderator or mediator (although not in the context of Web sites, as we propose to do in this study). They show that trust mediates the relationship between agency mechanisms and satisfaction and between satisfaction and loyalty. Trust can potentially mediate antecedents such as environment uncertainty and consequences such as satisfaction in a relationship-marketing context (Geyskens, Steenkamp and Kumar 1999).

Various studies have focused on different impacts of online trust. According to Shankar, Urban and Sultan (2002), consequences of online trust can be grouped into three broad categories: (1) intent to act, (2) stakeholder satisfaction and loyalty, and (3) firm performance. Trust affects the attitude and risk

perception, which, in turn, influences the willingness to buy in an electronic store (Jarvenpaa et al. 2000). Some studies have examined the effect of trust on prices and price dispersion on the Internet. In a study of price competition between pure play and bricks-and-clicks e-tailers across eight product categories, Pan, Shankar and Ratchford (2002) found that online trust had a positive impact on Web site traffic or visits to the Web site in two categories, gifts and flowers and computer hardware, but no significant effect in the six other categories. Trust may have a significant impact on online price dispersion over time (Ratchford, Pan and Shankar 2003). Our focus here will be on the impact of trust on consumer behavioral intentions in an online context.

According to Yoon (2002), Web site trust influences purchase intention. Behavioral intent may include willingness to click through further in a Web site, return to the Web site, send e-mail messages, download files from a Web site, order from a Web site, or decision to abandon a Web site, and so on. Although prior studies have examined some antecedents and consequences of trust in a Web site, they have not examined whether the relationships are such that *trust mediates* the relationships between Web site and consumer characteristics and behavioral intent related to Web site. Put differently, they have not established whether consumers first develop their trust about a Web site (due to various possible antecedents) before they are willing to act at a Web site.

The issue of mediation is important because if trust does mediate, then managers may want to focus first on improving trust by manipulating the drivers of trust before they can influence consumers' intention to act at the Web site. If, on the other hand, trust does not have a mediating role, then managers may want to focus directly on the Web site and consumer characteristics that may result in behavioral intent. Such direct initiatives could include focusing directly on loyalty programs and promotions.

Based on prior research in the offline environment (Geyskins, Steenkamp and Kumar 1999), we expect trust to play a mediating role between Web site characteristics and consumer characteristics at one end and behavioral intent at the other end. Proposition 3 reflects this expectation.

> *P₃:*   *Trust mediates the effects of (a) Web site characteristics on behavioral intent and (b) consumer characteristics on behavioral intent.*

VARIABLE OPERATIONALIZATION AND DATA

Our key dependent variables in our model are Web site trust and consumer behavioral intent ("action"). Our key independent variables are characteristics of Web site and characteristics of consumers. Characteristics of Web sites are those managerially relevant, identified in the literature, and empirically derived from our study. Characteristics of consumers that may affect trust perceptions include variables identified in the literature to impact trust perceptions and behavior. In this study, we identify multi-dimensional measures of trust and of behavioral intentions based on an initial exploratory study and a qualitative study. Measures of Web site characteristics were identified by respondents in our exploratory and qualitative studies (described below) as those affecting evaluations of Web sites.

Initial Exploratory Study and Qualitative Research

Before conducting an empirical examination of our proposed conceptual framework, we first performed an exploratory analysis followed by a qualitative study of trust dimensions. The primary objective was to identify the measures of the antecedents, dimensions and consequences of trust as perceived by consumers. The secondary objective of this initial research was to help in the design of a quantitative survey that would allow us to measure consumer perceptions of Web site characteristics, trust and their behavioral intent.

We conducted a pilot study of MBA students in Spring 2000, to help identify specific Web site trust cues that respondents thought would impact their perceptions of trust in a Web site. Based on this pilot study, we developed a questionnaire. The wording of the questionnaire was further tested and refined using feedback from respondents in a qualitative study.

The qualitative research was conducted with the assistance of a Boston based market research firm over three days in Fall 2000 at a focus group facility in Boston. This also allowed a pre-test of the data collection methodology to be used in our empirical study. Our self-administered questionnaire was also pre-tested to finalize the measures of constructs salient in our study. Each day consisted of eight one-on-one, in-depth, face-to-face interviews lasting 45 minutes and conducted by a trained qualitative

moderator. In total, 24 interviews were completed. Each interview was audio and video recorded. When the respondents were online, a picture-in-picture format was recorded, capturing their expressions and comments as well as the computer display as they navigated though the site in real time.

People whose immediate family worked in public relations, marketing, or Web site design/production were eliminated to avoid an expert bias and to ensure closer representation of an average consumer. Respondents were asked to examine a particular Web site. After the respondent had browsed the site, the moderator asked general questions about the experience – likes, dislikes, overall impressions, and meeting of expectations. The moderator asked more specific questions regarding the sites layout, navigation, and content. Other issues regarding security, privacy, guidance and trust were also explored at this point. Respondents were asked to comment on the questionnaire. Specifically, respondents were asked to circle words or phrases they found confusing, reword statements in their words, and make any other general comments about the statements.

Based on this qualitative research, the questionnaire was finalized and measures of the antecedents and dimensions of trust were identified. Thus, the scale generation and the selection of measures used in the model was an exhaustive process based on respondents' articulation of factors that influence their trust perceptions, as well as the specific site cues measuring these factors as indicated by them. Our study differs significantly from previous Internet trust studies in that measures of key constructs such as antecedents, dimensions and consequences of trust are based directly on consumer input.

We operationalized the variables in our model based on the findings from these initial studies. Operationalization of key dependent variables is presented in Table 1. Sample operationalization of key independent variables is presented in Table 2.[2]

< Tables 1 and 2 about here >

To estimate our proposed model and test our propositions, we constructed a large sample of consumers from National Family Opinion's (NFO) online panel and administered a survey on this sample

during March 2001. From this survey, we obtained 6831 usable responses, of which 4554 were randomly selected for estimating the model and the remaining 2277 respondents were kept for prediction and validation of the model.

We investigated 25 Web sites, which were chosen from eight categories of industries, as shown in Table 3. These categories were chosen from the list of the most popular categories being used by household consumers as reported by industry statistics. Some of the sites were chosen to represent the most popular ones within the category while others were lesser known sites or chosen to test the effect of such characteristics as advisors and decision-making aids on the site.

< Table 3 about here >

Each respondent was assigned one Web site, which they evaluated using the questionnaire. For this evaluation we prescribed a browsing " tour " for each of the Web sites. Respondents examined the assigned Web site according to this tour and were given time to further examine the Web site as they chose. They then completed an online survey questionnaire that had been constructed based on our earlier exploratory research and qualitative research. The questionnaire included 127 questions, of these 126 were closed ended questions and there was one open-ended question. Unlike previous studies, we used a comprehensive set of scales to cover Web site and consumer characteristics and measures that were articulated by consumers.

Model Formulation and Estimation

Our analysis consist of two main parts: (I) Linking Web site and consumer characteristics and demographics to overall trust (to test P_{1a}, P_{1b}, P_2), and (II) Mediator analysis linking these characteristics to trust to consumer behavioral intentions (to test P_3). To estimate the relationships between Web site and consumer characteristics and trust (I), we performed the following analyses: (1) principal component analysis of Web site characteristics, (2) principal component analysis of consumer characteristics, (3) principal component analysis of trust variables, and (4) regression analysis linking Web site and consumer factors to trust (Regression 1). To test whether there are any category-specific or Web site-

---

[2] Details of the operationalization of all variables are available from the authors.

specific effects on trust perceptions and to control for them, we include a series of dummy variables for

categories and Web sites within each category in this regression.

For the mediator analysis (II), we examine whether trust mediates the relationship between

consumer perceptions and consumer behavioral intent. To this end, we performed the following steps: (a)

principal component analysis of consumer behavioral intent variables, (b) regression of consumer

behavioral intent on Web site and consumer characteristics and demographics along with category and

Web site dummies (Regression 2), (c) regression of consumer behavioral intent on trust, Web site and

consumer characteristics, demographics, category and Web site dummies (Regression 3), and (4)

mediation test performed as proposed by Baron and Kenny (1986).

The regression model for Trust can be written out as follows:

$$
\begin{aligned}
TRUST_{ij} = {}& \alpha_0 + \sum_{k=1}^{K} \alpha_k WDIM_{kij} + \sum_{m=1}^{M} \beta_m CDIM_{mij} + \gamma_1 AUTO_j + \gamma_2 COMM_j + \gamma_3 FIN_j + \gamma_4 COMP_j + \\
& \gamma_5 PORT_j + \gamma_6 ETAIL_j + \gamma_7 SPORT_j + \delta_1 CPT_j + \delta_2 GM_j + \delta_3 KBB_j + \delta_4 WEBMD_j + \delta_5 ANCS_j + \\
& \delta_6 ETRADE_j + \delta_7 MWCH_j + \delta_8 MSFT_j + \delta_9 AOL_j + \delta_{10} LYCOS_j + \delta_{11} MSMON_j + \\
& \delta_{12} CDNOW_j + \delta_{13} AMZN_j + \delta_{14} NBA_j + \delta_{15} SLINE_j + \delta_{16} AA_j + \delta_{17} TVCTY_j + \\
& \lambda_1 GEND_{ij} + \lambda_2 AGE_{ij} + \lambda_3 EDU_{ij} + \lambda_4 INC_{ij} + \varepsilon_{ij}
\end{aligned}
$$

(1)

where:
i is the consumer/respondent
j is the Web site
K is the number of Web site dimensions
M is the number of consumer characteristics dimensions
TRUST is the overall trust measure
WDIM are factors scores on Web site characteristics dimensions (obtained from principal components analysis)
CDIM are factors scores on consumer characteristics dimensions (obtained from principal components analysis)
AUTO is a dummy variable (=1 if the category to which the Web site belongs is automotive, 0 otherwise)
COMM is a dummy variable (=1 if the category is community, 0 otherwise)
FIN is a dummy variable (=1 if the category is financial services, 0 otherwise)
COMP is a dummy variable (=1 if the category is computers, 0 otherwise)
PORT is a dummy variable (=1 if the category is portals and others, 0 otherwise)
ETAIL is a dummy variable (=1 if the category is e-tailers, 0 otherwise)
SPORT is a dummy variable (=1 if the category is sports, 0 otherwise)
CPT is a dummy variable (=1 if the Web site is Carpoint, 0 otherwise)
GM is a dummy variable (=1 if the Web site is GMBuypower, 0 otherwise)
KBB is a dummy variable (=1 if the Web site is Kelly's Blue Book, 0 otherwise)

WEBMD is a dummy variable (=1 if the Web site is WebMD, 0 otherwise)
ANCS is a dummy variable (=1 if the Web site is Ancestry, 0 otherwise)
ETRADE is a dummy variable (=1 if the Web site is Etrade, 0 otherwise)
MWCH is a dummy variable (=1 if the Web site is Marketwatch, 0 otherwise)
MSFT is a dummy variable (=1 if the Web site is Microsoft, 0 otherwise)
AOL is a dummy variable (=1 if the Web site is AOL, 0 otherwise)
LYCOS is a dummy variable (=1 if the Web site is Lycos, 0 otherwise)
MSIMON is a dummy variable (=1 if the Web site is MySimon, 0 otherwise)
CDNOW is a dummy variable (=1 if the Web site is CDNow, 0 otherwise)
AMZN is a dummy variable (=1 if the Web site is Amazon, 0 otherwise)
NBA is a dummy variable (=1 if the Web site is NBA, 0 otherwise)
SLINE is a dummy variable (=1 if the Web site is Sportsline, 0 otherwise)
AA is a dummy variable (=1 if the Web site is American Airlines, 0 otherwise)
TVCTY is a dummy variable (=1 if the Web site is Travelocity, 0 otherwise).

GEND is gender (=1 if male, 0 if female)
AGE is the age of the respondent
EDU is education level of the respondent
INC is average annual household income of the respondent
ε is an error term assumed to be normally distributed.

The base category is Travel, and the base Web sites in each category are as follows:
Cheaptickets in Travel
Carsdirect in Auto
FoodTV in Community
Schwab in Financial services
Dell in Computers
Proflowers in E-tailer
Nike in Sports.

The use of dummy variables for categories and Web sites is consistent with the fixed effects

approach. By using one Web site within each category as the base case, we avoid linear dependency

between category and Web site dummies that might arise had we not used a base case Web site within

each category. Thus, the results are relative to the base category and to the base Web site within each

category.

The behavioral intent model is given by:

$$BEHINT_{ij} = \phi_0 + \sum_{k=1}^{K} \phi_k WDIM_{kij} + \sum_{m=1}^{M} \varphi_m CDIM_{mij} + \eta_1 AUTO_j + \eta_2 COMM_j + \eta_3 FIN_j + \eta_4 COMP_j +$$
$$\eta_5 PORT_j + \eta_6 ETAIL_j + \eta_7 SPORT_j + \pi_1 CPT_j + \pi_2 GM_j + \pi_3 KBB_j + \pi_4 WEBMD_j + \pi_5 ANCS_j +$$
$$\pi_6 ETRADE_j + \pi_7 MWCH_j + \pi_8 MSFT_j + \pi_9 AOL_j + \pi_{10} LYCOS_j + \pi_{11} MSMON_j +$$
$$\pi_{12} CDNOW_j + \pi_{13} AMZN_j + \pi_{14} NBA_j + \pi_{15} SLINE_j + \pi_{16} AA_j + \pi_{17} TVCTY_j +$$
$$\theta_1 GEND_{ij} + \theta_2 AGE_{ij} + \theta_3 EDU_{ij} + \theta_4 INC_{ij} + \psi TRUST_{ij} + \omega_{ij}$$

$$(2)$$

where BEHINT is behavioral intent, ω is an error term assumed to be normally distributed and

independent of ε, and the rest of the terms are as defined earlier. Equation (2) above describes Regression

(3). In the special case when ψ is zero, Equation (2) represents Regression (2).

We estimated the model using the ordinary least squares (OLS) method. As discussed later in the

robustness section, we subsequently checked to see if this estimation is appropriate. To estimate our

model, we used two-third of our sample of 4554 respondents. We used the rest of the sample as a holdout

sample for validating the results.

RESULTS AND DISCUSSION

Effects of Web site and Consumer Characteristics on Trust

Results of analyses (1), (2) and (3) are shown in Tables 4, 5 and 6, respectively. Table 4 shows

that nine factors emerge from Web site characteristics. We labeled these factors as navigation, advice, no

errors, order fulfillment, community, privacy and security, trust seals, brand and presentation. Table 5

shows that five factors comprise the underlying dimensions of consumer characteristics. We labeled these

factors as Internet savvy, past site experience, Internet shopping experience, use of Internet for

chat/entertainment and use of Internet for business/household related activities. Table 6 shows that three

factors describe trust. We labeled these factors as reliability/believability, visual feel/comfort and quality

of company. Our labels for the factors have face validity because they summarize the themes of the

questions that reflect these factors.

< Tables 4, 5, 6 about here >

Results from Regression 1 are shown in Table 7. The key dependent variable, Trust, is an arithmetic mean of the three trust factor scores. The independent variables are the factor scores from Web site and consumer characteristics, dummy variables representing categories and Web sites, and demographics. 13 out of the 14 factors underlying Web site and consumer characteristics are significant predictors of trust (11 are significant at $p < 0.001$, two are significant at $p < 0.05$). The adjusted R^2 of the model is 0.76. The order of relative influence or importance of the Web site characteristics is as follows: navigation, brand, advice, privacy and security, no errors, presentation, order fulfillment, community and trust seals. With regard to consumer characteristics, the order of relative influence or importance is as follows: Past site experience, Internet savvy, Entertainment experience and Internet shopping experience. Web use, measured as whether consumers used the Internet for business or household usage, is not a significant predictor of trust.

< Table 7 about here >

Results of this regression analysis support propositions P_{1a}, P_{1b} and P_2. Privacy, security and trust seals positively and significantly ($p < 0.001$) affect trust, supporting P_{1a}. Additionally, Web site characteristics such as navigation, presentation, advice, brand, order fulfillment and community features also positively and significantly ($p < 0.001$) affect trust, consistent with P_{1b}. Finally, consumer characteristics such as past site experience are significant ($p < 0.001$) predictors of Web site trust perceptions, supporting P_2.

The fourth column in Table 7, the relative sum of squared standardized coefficient percentage (RSSCP), captures the relative influence of each variable in the model. Interestingly, Web site characteristics account for 98% of the explained variance (Adj. R^2 = .76) in perceptions of Web site trust. Among these, navigation accounts for about 27%, while brand (17%), advice (14%), no errors (11%) and privacy and security (11%) make up the bulk of the remaining explained variance. Thus, over 80% of the explained variance in trust is due to Web site factors other than privacy and security.

The results are consistent with the propositions of Hoffman et al. (1999), Shankar et al. (2002) and Yoon (2002) regarding antecedents of online trust. Prior empirical research has examined subsets of the antecedents of online trust that we have studied (e.g., Jarvenpaa et al. 1999). Our results based on a more comprehensive set of antecedents, extend the research stream by examining the relative importance of various sets of antecedents such as Web site characteristics, consumer characteristics, categories, and demographics. Because our analysis is based on a large-scale empirical study, our results can offer some empirical generalizations on the drivers of online trust. Web site characteristics are critical in driving trust in a Web site. While prior studies have mainly highlighted privacy and security as the key antecedent of trust, we show that privacy and security, although a significant driver of trust accounts for just 11% of the explained variance in a Web site's trust. One possible reason is that prior studies were mainly done during the early years of the Internet (e.g., Hoffman et al. 1999) when privacy and security was more important. As the Internet has matured, factors other than privacy and security have become more prominent drivers of online trust. From our results based on data collected during 2001, navigation, brand and advice at a Web site turn out to be much more important drivers of Web site trust than privacy and security. The result on navigation being a major driver of Web site trust is consistent with the importance of the flow construct in influencing consumer behavior on the Web (Hoffman and Novak 1996).

The Mediating Role of Trust

Results of the principal component analysis on consumer behavioral intent variables are shown in Table 8. We identified one factor, which we label as "Action" (Behavioral Intentions). Results of Regression 2 are shown in the third column of Table 9. The model fits well (Adjusted R^2 of 0.61). 13 out of the 14 independent factors (except Web use) are significant predictors of consumer behavioral intentions (12 are significant at $p < 0.001$ and 1 at $p < 0.01$).

< Tables 8 and 9 about here >

Results of Regression 3 are shown in Table 9, in Column 4. The independent variables now include a "Trust" variable (average of the scores on three trust factors in Table 6). Trust is a significant

predictor of "Action" and nine of the 15 factors related to Web site and consumer characteristics are significant. The adjusted R^2 for Regression 3 is 0.71.

The mediation test for trust holds. First, Web site and consumer characteristics are significant predictors of trust in Regression 1. Second, the effects of Web site and consumer characteristics in Regression 3 are less than those in Regression 2. Therefore, trust is a mediating construct between Web site characteristics and consumer characteristics and consumer behavioral intent. Thus, Proposition 3 is supported and trust indeed plays a mediating role in an e-business context. Trust is such a strong mediating construct that it accounts for 74% of the explained variance in Regression 3. This result extends the mediating role of trust from the offline environment (Geyskins, Steenkamp and Kumar 1999) to the online environment as well. More generally, our results are consistent with the role of trust explored by Ganesan (1994) and Ganesan and Hess (1997) in the offline environment.

Category- and Web site-specific Effects on Trust

There are interesting category and Web site-specific effects on trust. From Table 7, the results on intrinsic effects of categories (after explaining trust due to all other factors) on trust can be summarized as follows. Trust is higher for financial services and computers, which is in turn, higher than those for community and e-tailer categories, which is in turn, greater than those for travel, portals, sports and automotive categories.[3] The results on intrinsic effect of Web sites within each category can be summarized as follows. In the Automotive category, Kelly's Blue Book has higher intrinsic trust than GM, which in turn has a greater intrinsic trust than either Carpoint or Carsdirect. It is interesting to note that a company's (GM's) Web site has greater intrinsic trust than that at third party web sites such Carpoint and Carsdirect. In the Community category, WebMD has a higher intrinsic trust than that for either foodtv or ancestry. Turning to the financial services category, the intrinsic trust at Charles Schwab is greater than that at Marketwatch, which in turn, is higher than that at Etrade. Again, intrinsic trust at a

---

[3] The conclusions on the relative ordering of the intrinsic trust for categories and Web sites are based on comparisons of the coefficients of category and Web site dummies, respectively in Table 7. The comparisons are based on paired t-tests of the relevant coefficient estimates that take into account the covariances of those coefficient estimates.

service provider (Schwab) is higher than that at a third party's Web site (Marketwatch). Among the computers, Dell has a higher intrinsic trust than Microsoft. Since Dell sells primarily through the Internet compared to Microsoft, which sells through other channels as well, the intrinsic Web site trust levels for Dell could have become stronger over time. Within portals, auctions, search engines and shopbots, intrinsic trust at eBay or Lycos is greater than that at AOL or MySimon. The finding underscores the popularity of eBay as a trusted online auction site. In the e-tailer category, Amazon and Proflowers have a greater intrinsic trust than CDNow. With regard to the sports category, the intrinsic trust levels are not significantly different for NBA, Sportsline and Nike. Finally, among the travel sites, intrinsic trust at American Airlines, Travelocity and Cheaptickets are about the same. Again, the intrinsic trust at a company Web site (AA) is not less than third parties' (Travelocity and Cheaptickets) intrinsic Web site trust. The fact that some company Web sites (GM, AA, Schwab) have as much or more intrinsic trust than that at third party Web sites may be due to inherent trust built over time in these company Web sites (Fukuyama 1995, Rousseau, Sitkin, and Burt 1998).

The category-specific effects become relatively more important than Web site characteristics if the mediating effect of trust is considered. They account for about 15% of the explained variance in behavioral intent in Regression 3, next only to the contribution of trust to the behavioral intent. This is because, most Web site characteristics drive trust and so their effects are already captured in the impact of trust on behavioral intent. The finding suggests that trust levels are inherently different across industry categories and they matter in the behavioral intent related to a Web site.

Effects of Demographics on Trust and Behavioral Intent

Demographics have significant effects on trust and behavioral intent. With regard to trust, the higher the education, the lower the trust. Compared to other consumers, more educated consumers may rely more on their own knowledge than on a Web site. With regard to behavioral intent, the higher the income the greater the behavioral intent. This finding can be attributed to increased disposable income leading to greater potential desire for acquisition of information and products. Likewise, the higher the

age, the greater the behavioral intent. Evidently, older consumers tend to be closer to "taking action" at a Web site than younger consumers. Women have higher behavioral intent on a Web site than do men. Apparently, women have greater proclivity to interacting and transacting at a Web site than do men.

Robustness Checks

Model Validation

Recall that our model was calibrated on two-third of the total sample (N=4554). To validate our model, we used the estimates from the model to predict behavioral intent on the remaining one-third of the sample (N=2277). The correlation of the dependent variable behavioral intent and predicted behavioral intent from the model was 0.8449. The correlation between the computed trust and the predicted trust variables was 0.8731. We also checked the closeness of the predicted values to the actual on random sample of observations from the holdout sample. These values were very close (these additional robustness results are available from the authors). Thus, our model is validated and provides very good predictions of both Web site trust and of consumer behavioral intentions related to Web sites.

Other Analyses

We checked for multicollinearity among the independent variables in each model. The correlations and the variance inflation factors were low, suggesting multicollinearity is not a problem in our data. We tested for heteroscedasticity of errors in each model using the Glesjer (1969) test, but it was not an issue in our models. Thus, the OLS estimation is appropriate. Even a generalized method of moments (GMM) estimation produced estimates similar to OLS, suggesting that the OLS method is appropriate. We also estimated the models with different operationalizations of income, including the median and arithmetic mean for respondents who did not report income. The signs of the coefficients in the model remained the same. To test for the possibility that Nike may be a more of a product commerce Web site than a sports Web site, we estimated models with Nike as a separate category. The results were similar, suggesting this is not an issue. We explored some interaction effects among some independent

variables (such as brand and navigation, brand and privacy and security). These interaction effects were insignificant, so we decided not to include them in our final models.

To examine if the Web sites can be grouped together based on the trust perceptions that may transcend the industry categories, we performed a k-means cluster analysis of the Web sites based on the factor scores on the underlying dimensions of trust. The results indicated a four-cluster solution with the following cluster composition: Cluster 1 (Carpoint, Gmbuypower, Kelly's Blue Book, Carsdirect, American Airlines, Travelocity, Cheaptickets), Cluster 2 (WebMD, Ancestry, FoodTV), Cluster 3 (Marketwatch, Schwab), and Cluster 4 (Etrade, Microsoft, Dell, Amazon, Proflowers, CDNow, NBA, Sportsline, Nike). We can see that Cluster 1 is Transportation services (Auto and Travel), Cluster 2 is Community, Cluster 3 is Financial Services, and Cluster 4 is Other (primarily Computers, e-Tailer, and Sports). The use of these four clusters of categories rather than the eight categories in the regression models do not provide us with different or additional insights, so we use this cluster analysis as a check of the robustness of the results. We also estimated a system of similar structural equation models using LISREL. The results from the structural equation models were consistent with those from our models.

CONCLUSIONS

This study has empirically demonstrated that Web site characteristics indeed significantly affect perceptions of trust in a Web site. While it is no surprise that privacy, security and trust seals affect trust, what is surprising is that they account for only about 11% of the explained variance in Web site trust across a variety of industries and product categories. Characteristics of Web sites other than privacy and security significantly account for about 80% of the explained variance in Web site trust. These factors include the following Web site characteristics: navigation, brand, advice, no errors, presentation, order fulfillment, and community. While we expect that factors such as having no errors and good order fulfillment processes will affect trust in a Web site, it is an important finding that site design characteristics such as navigation and presentation, and advice and brand are also significant predictors of trust.

We also find that consumer characteristics such as past experience with the Internet and with a particular Web site, do significantly affect trust perceptions, although they account for only a small fraction of the explained variance in Web site trust. A significant finding of this study is that trust is a mediating variable between Web site, consumer characteristics and consumer behavioral intent and it accounts for about 74% of the explained variance in behavioral intent. Some category- and Web site specific effects on trust are also significant. In particular, category-specific effects account for about 15% of the explained variance in behavioral intent. Some categories (such as Financial services) seem to have greater intrinsic trust than others. Web sites of some companies (such as GM, Schwab and American Airlines) seem to have greater intrinsic trust than third party Web sites.

This study also contributes to understanding the dimensions of trust. We find that some empirically derived dimensions of Web site trust are reliability/believability, visual feel/comfort and company quality.

MANAGERIAL IMPLICATIONS, LIMITATIONS AND FUTURE RESEARCH

Managerial Implications

One important implication of our results is that managers must remain diligent in making sure there are no errors on the site. This factor was important in building trust (see Table 7 – the coefficient on no errors is .29). Put in another way, errors reduce trust; they could be called "trust busters." It may sound simple to eliminate errors, but with today's complex designs and multiple paths of transit quality assurance (QA), it is not simple, especially since modern Internet services employ multiple load-shared servers and consumers use various versions of different browsers.

The well-established result that managers must be sure to have high levels of privacy and security for their sites is reinforced by this study (see Table 7 – privacy and security coefficient of .29). Interestingly, although we find that a presence of trust seals is a positive contributor to trust (see Table 7 – trust seals coefficient of .04), its effect is small. Although seals are a positive cue, basic privacy and security policies and practices are more important.

Our study shows that trust is driven by more factors than only privacy and security. As such, managers need to be cognizant of other factors that impact trust and the relative importance of these factors. For example, we find that navigation, brand and advice are as important (or more important) predictors of trust as are privacy and security (see Tables 7 and 9). This implies that GM's autochoice advisor Web site shown in Figure 1a is correctly using high brand salience and advice to gain success. Intel's Download Web site (Figure 1d) "decision assistance" tips have positive effects in building trust through better navigation. Orbitz's search to find and compare prices similarly is an example of an advisory trust builder.

Managers should think of site design to include navigation, advice and brand but extend this to the more creative presentation aspects of the site artistic design. We found presentation to be important and significant in differentiating trust between Web sites (see Table 7 – presentation coefficient of .28). This would suggest Orbitz's attempts to establish a "friendly" Web site are on the right track.

We need to add one caveat about our study. Note that order fulfillment is statistically significant, but not very important in Table 7 (coefficient of .13 versus .45 for navigation). We believe that order fulfillment quality is a necessary condition for trust building, but in our study the operationalization of order fulfillment was not based on actual experience (we did not require respondents to actually make a purchase on the Web site). The measure was a perception of fulfillment (order confirmation, delivery) so we probably have underestimated this factor.

Perhaps the most important finding of our work is that trust mediates between Web site characteristics and behavioral intent (see Table 9 – trust = .67). This means that managers should not think just of direct sales effects such as those from promotion in the Dell Web site (Figure 1b), but also of the relationship effects of trust building. These promotions may have a positive short term effect of increasing behavioral intent of buying, but the longer run effects of Web site and brand loyalty that result from trust may be more important. Managers should think of trust as an intervening state that consumers must move through, and design their Web sites to build consumer trust through all the elements cited

above. Our results on the mediating role of trust suggest that managers do need to focus first on improving trust by manipulating the drivers of trust before they can influence consumers' intention to act at the Web site. Incorporating Web site cues that enhance trust can result in a long-term favorable consumer relationship with the firm. Trust cues need to be explicitly incorporated in Web site design strategies.

A final implication is for multi-channel trust building. We examined the Internet, but many of the same factors are present in other channels like e-mail, phone, direct mail, ads and physical location. Navigation of the store is analogous to site navigation. Advice can be given by sales personnel or telemarketing operators. Branding can be reinforced across channels by advertising to help Internet brand salience. Privacy and security are important in store and on the phone as well as on the Internet. Presentation is evident in store design, telephone tone of voice, and ad copy. Managers should maintain a high level of coherence across the channels so that trust building efforts are reinforced throughout the consumer experience.

Limitations and Future Research

Whereas trust has an implicit dynamic nature and builds over time, our study only takes a static snapshot of consumers' perceptions of trust. This study presents a cross-sectional rather than a longitudinal view of Web site trust. Additionally, our study does not actually measure consumer action on the Web site in terms of actual purchase, rather we have incorporated consumers' behavioral intentions. Thus, in our study, the effects of order fulfillment are being understated. Despite this, we find that perceptions of the order fulfillment process are a significant determinant of perceived Web site trust.

We propose that the results and findings from this study can be used to build causal models that will further enhance our understanding of the variables at play in Internet trust issues. Another avenue for future research is to conduct behavioral experiments and market experimentation on trust cues. Given that many cues are important, there is a need for online market experimentation to find the best mix of characteristics on a Web site that enhance trust. Results from these future studies could be used to build

an "Internet Trust Generator." The notion here would be that by altering specific Web site trust cues, identified in our study, in a sequential manner, enhanced trust can be generated on a firm's Web site. Such an increase in trust would result in more favorable response to the firm's offerings and a long-term trusted relationship between consumers and firms.

References

Anderson, Erin and Barton Weitz (1989), "Determinants of Continuity in Conventional Industrial Channel Dyads," *Marketing Science*, 8, 310-323.

Anderson, James and James Narus (1990), "A Model of Distributor Firm and Manufacturer Firm Working Partnerships," *Journal of Marketing*, 54 (April) 42-58.

Baron, R. M. and D. A. Kenny (1986). "The Moderator Mediator Variable Distinction in Social Psychological-Research - Conceptual, Strategic, and Statistical Considerations," *Journal of Personality and Social Psychology*, 51(6): 1173-1182.

Biong, Harold and Fred Selnes (1996), *The Strategic Role of the Salesperson in Established Buyer Seller Relationships*, Cambridge, MA., *Marketing Science Institute*.

Butler, J.K., and R. S. Cantrell (1984), "A Behavioral Decision Theory Approach to Modeling Dyadic Trust in Superiors and Subordinates," *Psychological Reports*, 55, pp. 19-28.

Cheskin Research and Studio Archetype/Sapient (1999), "E-Commerce Trust Study," http://www.sapient.com/cheskin.

Coleman, J. S. (1990), *Foundations of Social Theory*, Cambridge, MA. Belknap press.

Davis, R., M. Buchanan-Oliver, R. Brodie (1999), "Relationship Marketing in Electronic Commerce Environments," *Journal of Information Technology*, 14, 319-331.

Dayal, Sandeep, Helene Landesberg, and Michael Zeisser (1999), "How to Build Trust Online," *Marketing Management*, 8, Fall, 64-69.

Degeratu, Alexandru, Arvind Rangaswamy, and Jianan Wu (2000), "Consumer Choice Behavior in Online and Traditional Supermarkets: The Effects of Brand Name, Price, and Other Search Attributes," *International Journal of Research in Marketing*, 17 (1), 55-78.

Doney, P.M. and J.P. Cannon (1997), "An Examination of the Nature of Trust in Buyer-Seller Relationships," *Journal of Marketing*, 61 (April), 35-51.

Driscoll, J. W. (1978), "Trust and Participation in Organizational Decision Making as Predictors of Satisfaction," *Academy of Management Journal*, 21 (1), 44-56.

Dwyer, Robert F., Paul H. Schurr, and Sejo Oh (1987), "Developing Buyer-Seller Relationships," *Journal of Marketing*, 51 (April), 11-27.

Fogg, B.J., C. Soohoo, D. Danielsen, L. Marable, J. Stanford, E. Tauber (2002) " How Do People Evaluate a Web Site's Credibility? Results from a Large Study," Working Paper Report, Persuasive Technology Lab, Stanford University

Fogg, B.J., J. Marshall, O. Laraki, A. Osipovich, C. Varma, N. Fang, J. Paul, A Rangnekar, J. Shon, P. Swani, M. Treinen (2001), "What Makes Web Sites Credible? A Report on a Large Quantitative Study," *ACM* SIGCHI, 3 (1), 61-67.

Fukuyama, F. (1995), *Trust: The Social Virtues and the Creation of Prosperity*, The Free Press, New York, NY.

Ganesan, S. (1994), "Determinants of Long-term Orientation in Buyer-Seller Relationships," *Journal of Marketing*, 58, 1-19.

Ganesan, S. and R. Hess (1997), "Dimensions and Levels of Trust: Implications for Commitment to a Relationship," *Marketing Letters*, 8(4), 439-448.

Geyskens, I., J. B. E. M. Steenkamp, et al. (1999), "A Meta-analysis of Satisfaction in Marketing Channel Relationships," *Journal of Marketing Research* 36(2): 223-238.

Glesjer, H. (1969), "A New Test for Heteroscedasticity," *Journal of the American Statistical Association*, 64, 316-23.

Handy, C. (1995), "Trust and Virtual Organization," *Harvard Business Review*, 73 (3), May-June, 40-50.

Hoffman, Donna L., Novak, Tom P. (1996), "Marketing in Hypermedia Computer-Mediated Environments: Conceptual Foundations," *Journal of Marketing*, 60 (July), 50-68.

_____, _____, and M. Peralta (1999), "Building Consumer Trust Online," *Communications of the ACM*, 42 (4), 80-85.

Hwang, P. and W. Burgers (1997), "Properties of Trust: An Analytical View," *Organizational Behavior and Human Decision Processes*, 69 (1), 67-73.

Jarvenpaa, Sirkka L., Joam Tractinsky, and L. Saarinen (1999), Consumer Trust in an Internet Store: A Cross-cultural Validation, *Journal of Computer Mediated Communication*, 5 (2), http://www.ascusc.org/jcmc/vol5/issue2.

Jarvenpaa, Srikka L., Joam Tractinsky, and Michael Vitale (2000), "Consumer Trust in an Internet Store," *Information Technology and Management*, 1 (1-2): 45-71.

Keller, Kevin (1993), "Conceptualizing, Measuring, and Managing Customer-Based Brand Equity," *Journal of Marketing*, 57 (January), 1-22.

Lee, Matthew K.O. and Efraim Turban (2001), "A Trust Model for Consumer Internet Shopping," *International Journal of Electronic Commerce*, 6 (1), 75-91.

Lewicki, R. J., and B. B. Bunker (1995) "Trust in Relationships: A Model of Development and Decline," In B. B. Bunnker, J. Z. Rubin, & Associates (Eds.), *Conflict, Cooperation, and Justice: Essay Inspired by the Work of Morton Deustch*, San Francisco: Josey Bass.

Lewicki, R. J., D. J. McAllister, and R. J. Bies (1998), "Trust and Distrust: New Relationships and Realities," *The Academy of Management Review*, 23, 3 (July), 438-458.

Lewis, J. D. and A. Weigart (1985), "Trust as a Social Reality" *Social Forces*, 63, 4, 967-985

Luhmann, N. (1979), *Trust and Power*, John Wiley and Sons, London.

Mayer, R. C., Davis, J. H., and Schoorman, F. D. (1995), "An Integrative Model of Organizational Trust," *The Academy of Management Review*, 20, 709-34.

Moorman, Christine, Gerald Zaltman, and Rohit Deshpande (1992) " Relationships Between Providers and Users of Market Research: the Dynamics of Trust Within and Between Organizations," *Journal of Marketing Research*, v. 29, (August), 314-29.

Moorman, C. R. Deshpande, and G. Zaltman (1993), "Factors Affecting Trust in Market Research Relationships," *Journal of Marketing*, 57 (1), 81-101.

Morgan, R.M., and S.D. Hunt (1994), "The Commitment-Trust Theory of Relationship Marketing," *Journal of Marketing*, 58 (July), 20-38.

Novak, Thomas P., Donna L. Hoffman and Yiu-Fai Yung (2000), "Measuring the Customer Experience in Online Environments: A Structural Modeling Approach," *Marketing Science*, 19 (1), 22-42.

Palmer, J. W., J. P. Bailey, et al. (2000). "The Role of Intermediaries in the Development of Trust on the WWW: the Use and Prominence of Trusted Third Parties and Privacy Statements." *Journal of Computer-Mediated Communication*, 5(3).

Pan, Xing, Brian T. Ratchford, and Venkatesh Shankar (2001), "Why Aren't the Prices of the Same Item the Same at Me.com and You.com?: Drivers of Price Dispersion Among E-Tailers," *Working Paper*, University of Maryland, College Park, MD 20742.

Pan, Xing, Brian T. Ratchford, and Venkatesh Shankar (2002), "Can Differences in e-Tailer Prices be Explained by Service Quality?," *Journal of Academy of Management Science*, 30 (4), 433-446.

Pan, Xing, Venkatesh Shankar, and Brian T. Ratchford (2002) "Price Competition Between Pure Play vs. Bricks-and-Clicks E-Tailers: Analytical Model and Empirical Analysis," *Advances in Microeconomics, Vol. 11, E-Commerce Economics*, 29-61.

Ratchford, Brian T., Xing Pan, and Venkatesh Shankar (2003), "On the Efficiency of Internet Markets," *Journal of Public Policy and Marketing*, forthcoming.

Rotter, J.B., "A New Scale for the Measurement of Interpersonal Trust," *Journal of Personality*, 35, (1967), 615-665.

Rousseau, Denise M. Sitkin, Sim B. Burt, Ronald S (1998), "Not so Different After all: A Cross-Discipline View of Trust," *Academy of Management Review*. 23(3), 393-404.

Shneiderman, Ben (2000), "Designing Trust into Online Experiences," *Communications of the ACM*, 43 (12), 57-59.

Shankar, Venkatesh, Arvind Rangaswamy, and Michael Pusateri (2001), "The Online Medium and Customer Price Sensitivity," *Working Paper*, University of Maryland, College Park, MD 20742.

Shankar, Venkatesh, Fareena Sultan, Glen L. Urban, and Iakov Bart (2002), "The Role of Trust in Online Customer Support," *Working Paper*, Sloan School of Management, MIT, Cambridge, MA 02142.

Shankar, Venkatesh, Glen L. Urban and Fareena Sultan (2002), "Online Trust: A Stakeholder Perspective, Concepts, Implications and Future Directions," *Journal of Strategic Information Systems*, 11, (3-4), December, 325- 344.

Sheppard Blake H. and D. Sherman (1998), "The Grammars of Trust: A model and General Implications," *Academy of Management Review*, 23 (3), 422-437.

Singh, Jagdip and Deepak Sirdeshmukh (2000), "Agency and Trust Mechanisms in Consumer Satisfaction and Loyalty Judgments," *Journal of the Academy of Marketing Science*, 28 (1), 150-167.

Smith, M. D., J. Bailey and E. Brynjolfsson (2000), "Understanding Digital Markets: Review and Assessment," in *Understanding the Digital Economy*, E. Brynjolfsson and B. Kahin (eds.), Cambridge, MA, MIT Press.

Urban, G. L., Fareena Sultan and William Qualls (2000), "Placing Trust at the Center of Your Internet Strategy," *Sloan Management Review*, Fall (1), 39–48.

Williamson, O.E. (1993), " Calculativeness, Trust and Economic Organization," *Journal of Law and Economics*, 30, 131-145.

Whitener, E.M., S.E. Brodt, M.A. Korsgaard, and J.M. Werner (1998), "Managers as Initiators of Trust: An Exchange Relationship Framework for Understanding Managerial Trustworthy Behavior," *Academy of Management Review*, 23 (3), 513-530.

Yoon, Sung-Joon (2002), "The Antecedents and Consequences of Trust in Online Purchase Decisions," *Journal of Interactive Marketing*, 16 (2), 47-63.

Zuboff, S. (1982), "New Worlds of Computer Mediated Work," *Harvard Business Review*, 60 (5), 142- 152.

Zucker, L. G. (1986), "Production of Trust: Institutional Sources of Economic Structure 1840-1920," In B. M. Staw and L.L. Cummings (eds) *Research in Organizational Behavior*, vol. 8, Greenwich CT. JAI Press, 53-111.

Figure 2

A Conceptual Model of Consumer Trust in a Web site
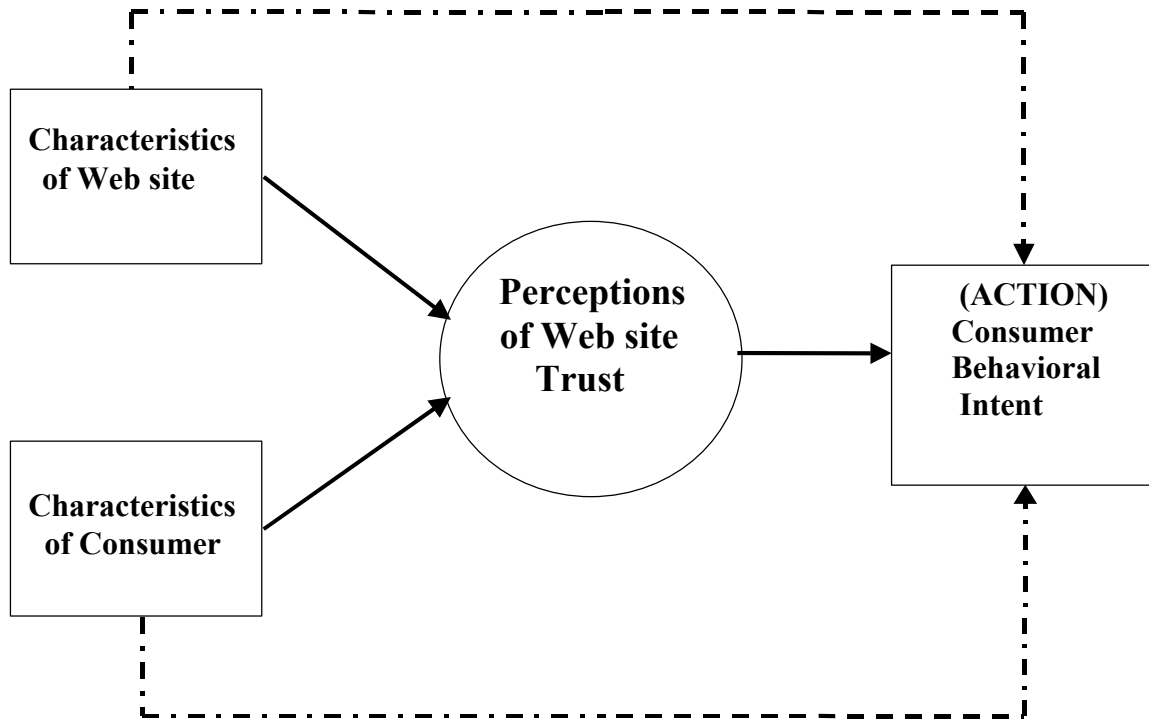
<div align="center">**Table 1**</div>

<div align="center">**Measures of Dependent Variables: TRUST & Consumer Behavioral Intentions ("ACTION")**</div>

Measures of Trust: 11 Items

(1= Strongly Disagree, 7=Strongly Agree)

- The site visually conveys a sense of honesty.
- The site feels warm and comforting.
- The site represents a quality company or organization.
- The site enhanced how I feel about the company whose site this is.
- I believe the company sponsoring this site will not use cookies to invade my privacy in any way.
- I enjoyed the overall experience of the site.
- This site appears to be trustworthier than other sites I have visited.
- The site represents a company or organization that will deliver on promises made.
- My overall trust in this site (1= Extremely Untrustworthy, 7= Extremely Trustworthy).
- My overall believability of the information on this site (1=Extremely Unbelievable, 7 = Extremely Believable).
- My overall confidence in the recommendations on this site (1=Not Confident At All, 7 = Extremely Confident)

Measures of Consumer Behavioral Intentions ("Action"): 7 Items

(1= Strongly Disagree, 7= Strongly Agree)

- I would be comfortable giving personal information on this site.
- I would be comfortable shopping at this site.
- I would purchase an item at this site.
- I would recommend this site to a friend.
- I am comfortable providing financial and personal information on this site.
- I would book mark this site.
- I would register at this site

Table 2

Examples of Operationalization of Independent Variables

Consumer Characteristics 16 Measures

Some items measured on 1-7 Agree-Disagree scales, others binary
Examples:

- I use the Internet as an information tool
- I use Internet for e-mail
- I use Internet for shopping
- I use Internet for banking/investing
- I use the Internet primarily for household relates activities
- I am confident in my abilities to assess trustworthiness of Web site
- Before today, approximately how many time had you visited this site

Etc.

Web site Characteristics 81 Measures

Some items measured on 1-7 Agree-Disagree scales, others binary
Examples:

- The process for browsing is clear
- The site displays a high level of artistic sophistication/creativity
- Good shopping tips are provided
- The site clearly explains how user information is used
- The text of the privacy policy is easy to understand
- There were trust seals present (e.g. TRUSTe)
- There were no busy server messages
- Order confirmation is given via e-mail
- The site is engaging and captures attention
- A chat room is available
- The site is consistent with my image of the company
- The site carries products and services with reputable brand names

Etc.

Table 3

List of Web sites Examined

Auto

- Carpoint.com
- gmbuypower.com
- kbb.com
- carsdirect.com

Finance

- etrade.com
- marketwatch.com
- schwab.com

Computers

- dell.com
- microsoft.com

Sport

- nba.com
- sportsline.com
- nike.com

Travel

- aa.com
- travelocity.com
- cheaptickets.com

E-tailers

- amazon.com
- cdnow.com
- proflowers.com

Community

- ancestry.com
- foodtv.com
- Webmd.com

Portals, Search Engines, Auctions and Shopbots

- aol.com
- lycos.com
- ebay.com
- mysimon.com

Table 4

Principal Component Analysis of Web site Characteristics

(9 FACTORS)

Factor	Characteristics	Examples of Heavy Loaders (Loadings)
1	Navigation	Clarity in site layout (0.79) Clarity in browsing (0.78)
2	Advice	Useful recommendations (0.77) Questions asked for preferences (0.76)
3	No Errors	No busy server messages (0.79) No errors or crashing (0.77)
4	Order Fulfillment	Order confirmation via e-mail (0.73) Delivery options available (0.69)
5	Community	Chat room available (0.69) Bulletin boards available(0.67)
6	Privacy/Security	Easy to understand policy (0.75) Use of consumer info. Explained (0.74)
7	Trust Seals	Trust seals present (0.77) Third party ratings (0.74)
8	Brand	Quality of advertised brands consistent with company quality(0.64) Carries reputable brand names (0.60)
9	Presentation	Artistic/creative site (0.61) Engaging site (0.56)

Table 5

Principal Component Analysis of Consumer Characteristics

(5 FACTORS)

Factor	Characteristics	Examples of Heavy Loaders (Loadings)
1	Internet Savvy/Ability to assess sites	Confidence in assessing trustworthiness (0.87) Confidence in assessing site quality (0.86) Knowledgeable about Internet (0.81)
2	Past Site Experience	Site familiarity (0.78) Purchased on site (0.78) etc.
3	Internet Shopping Experience	Use Internet for shopping (0.78) Completed purchase transactions online (0.76)
4	Entertainment/ Chat	Use Internet chat rooms (0.69) Use Internet for entertainment (0.61)
5	Web Use (Business/ household)	Use Internet for business work (0.78) Use Internet for household (-0.75)

Table 6

Principal Component Analyses of Web site Trust

(3 FACTORS)

Factors	Characteristics	Examples of Heavy Loaders (Loadings)
1	Reliability/ Believability	Believability of information (0.83) Trustworthiness of the site (0.82) Confidence in recommendations (0.80) Site represents company that delivers on promises (0.74)
2	Visual Feel/ Comfort	Sense of warmth and comfort (0.86) Sense of honesty (0.75) Enhanced feeling about the company (0.70)
3	Quality Company	Quality company or organization (0.70) No use of cookies (0.76)

Table 7: Results of Regression 1 (Trust on Web site factors, Consumer characteristics, Category/Web site dummies and Demographics)

	Variable	Estimate (t-stat)	RSSSCP
Site Characteristics	Navigation	0.45 (60.03) ***	26.8
	Advice	0.33 (41.95) ***	14.4
	No Errors	0.29 (38.78) ***	11.1
	Order Fulfillment	0.13 (16.64) ***	2.2
	Community	0.10 (12.58) ***	1.3
	Privacy and Security	0.29 (39.92) ***	11.1
	Trust Seals	0.04 (5.12) ***	0.2
	Brand	0.36 (44.02) ***	17.2
	Presentation	0.28 (36.47) ***	10.4
Consumer Characteristics	Internet Savvy	0.03 (4.15) ***	0.1
	Past Site Experience	0.07 (8.25) ***	0.6
	Internet Shopping Experience	0.02 (2.24) *	0.1
	Entertainment Experience	0.01 (1.96) *	0
	Web Use	0.00 (0.66)	0
Categories	AUTO	-0.03 (-1.46)	0.1
	COMMUNITY	0.04 (2.28)*	0.2
	FINANCE	0.08 (4.70)***	0.8
	COMPUTERS	0.06 (4.22)***	0.5
	PORTALS	0.03 (1.67)	0.1
	E-TAILERS	0.04 (2.32)*	0.2
	SPORT	-0.02 (-0.90)	0.1
Web sites	CARPOINT	0.01 (1.06)	0
	GMBUYPOWER	0.03 (2.82)**	0.1
	KBB	0.06 (5.75)***	0.5
	WEBMD	0.02 (2.30)**	0.1
	ANCESTRY	0.00 (0.12)	0
	ETRADE	-0.05 (-4.85)***	0.4
	MARKETWATCH	-0.03 (-2.88)**	0.1
	MICROSOFT	-0.04 (-3.81)***	0.2
	AOL	-0.04 (-3.58)***	0.2
	LYCOS	-0.02 (-1.54)	0.1
	MYSIMON	-0.03 (-3.20)**	0.1
	CDNOW	-0.05 (-4.77)***	0.4
	AMAZON	-0.01 (-1.03)	0
	NBA	0.01 (0.56)	0
	SPORTSLINE	0.01 (1.17)	0
	AA	0.01 (1.10)	0
	TRAVELOCITY	0.00 (0.30)	0
Demographics	Gender	-0.01 (-0.74)	0
	Age	0.00 (0.13)	0
	Education	-0.03 (-3.50)***	0.1
	Income	0.00 (-0.02)	0

Adj. R^2= .76; * Significant at .05 level; ** Significant at .01 level; *** Significant at .001 level. RSSSCP – Relative Sum of Squared Standardized Coefficient Percentage. Trust is measured by the arithmetic mean of 3 trust factor scores.

Principal Component Analysis of Action (Consumer Behavioral Intent) Variables

Factor 1: Action	Factor Loadings
	Would recommend site to friend (0.84) Would purchase on site (0.83) Would register at site (0.83) Give financial info on site (0.82) Comfortable shopping on site (0.81) Would bookmark site (0.76)

Table 9: Mediation Test - Regressions 2 and 3, Dependent variable: Consumer Behavioral Intent ("Action")

	Variable	Estimate (t-stat) Regression (2)	Estimate (t-stat) Regression (3)	RSSSCP (Reg. 2)	RSSSCP (Reg. 3)
Mediating Variable	Trust	---	0.67 (39.71)***	---	74.1
Web site Characteristics	Navigation	0.31 (32.21) ***	0.02 (1.43)	16.4	0.1
	Advice	0.30 (29.33) ***	0.08 (7.86)***	15.3	1.1
	No Errors	0.26 (26.33) ***	0.06 (6.63)***	11.5	0.6
	Order Fulfillment	0.16 (15.07) ***	0.07 (7.44)***	4.4	0.8
	Community	0.07 (6.81) ***	0.00 (0.47)	0.8	0
	Privacy and Security	0.25 (26.09) ***	0.06 (5.76)***	10.7	0.6
	Trust Seals	0.03 (3.16) **	0.01 (0.64)	0.2	0
	Brand	0.24 (22.97) ***	0.01 (0.55)	9.8	0
	Presentation	0.21 (21.25) ***	0.03 (2.75)**	7.5	0.1
Consumer Characteristics	Internet Savvy	0.07 (7.18) ***	0.05 (5.87)***	0.8	0
	Past Site Experience	0.20 (18.84) ***	0.16 (16.88)***	7	4.2
	Internet Shopping Experience	0.13 (13.63) ***	0.12 (14.50)***	2.9	2.4
	Entertainment Experience	0.04 (4.34) ***	0.03 (3.87)***	0.3	0.1
	Web Use	-0.01 (-1.22)	-0.02 (-1.81)	0	0.1
Categories	AUTO	-0.15 (-6.06)***	-0.13 (-6.17)***	3.8	2.8
	COMMUNITY	-0.04 (-2.05)*	-0.07 (-3.73)***	0.3	0.8
	FINANCE	-0.07 (-3.43)***	-0.13 (-6.74)***	0.8	2.8
	COMPUTERS	-0.06 (-3.05)**	-0.10 (-6.02)***	0.6	1.7
	PORTALS	-0.09 (-3.39)***	-0.11 (-4.92)***	1.4	2
	E-TAILERS	-0.06 (-2.57)*	-0.08 (-4.36)***	0.6	1.1
	SPORT	-0.14 (-5.94)***	-0.13 (-6.37)***	3.3	2.8
Web sites	CARPOINT	0.01 (0.72)	0.00 (0.21)	0	0
	GMBUYPOWER	-0.02 (-1.71)	-0.04 (-3.64)***	0.1	0.3
	KBB	0.03 (2.44)*	-0.01 (-0.56)	0.2	0
	WEBMD	0.00 (0.22)	-0.01 (-1.11)	0	0
	ANCESTRY	0.00 (0.02)	-0.00 (-0.05)	0	0
	ETRADE	-0.02 (-1.48)	0.01 (1.14)	0.1	0
	MARKETWATCH	-0.02 (-1.73)	-0.00 (-0.31)	0.1	0
	MICROSOFT	-0.01 (-0.58)	0.02 (1.58)	0	0.1
	AOL	-0.04 (-3.21)**	-0.02 (-1.61)	0.3	0.1
	LYCOS	0.00 (-0.06)	0.01 (0.98)	0	0
	MYSIMON	-0.00 (-0.20)	0.02 (1.66)	0	0.1
	CDNOW	-0.03 (-2.19)*	0.00 (0.27)	0.2	0
	AMAZON	0.01 (0.48)	0.01 (1.16)	0	0
	NBA	0.00 (0.36)	0.00 (0.09)	0	0
	SPORTSLINE	0.02 (1.66)	0.01 (1.24)	0.1	0
	AA	-0.05 (-3.92)***	-0.06 (-5.20)***	0.4	.0.6
	TRAVELOCITY	-0.02 (-1.42)	-0.02 (-1.83)	0.1	0.1
Demographics	Gender	-0.02 (-1.91)	-0.01 (-1.77)	0.1	0
	Age	0.02 (1.66)	0.02 (1.85)	0.1	0.1
	Education	-0.00 (-0.42)	0.01 (1.58)	0	0
	Income	0.03 (2.45)*	0.03 (2.86)**	0.2	0.1

* Significant at .05 level; ** Significant at .01 level; *** Significant at .001 level. RSSSCP – Relative Sum of Squared Standardized Coefficient Percentage. Trust is measured by arithmetic mean of 3 trust factors.
Adj. R^2 is .61 (Reg. 2) and .71 (Reg. 3).