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An investigation of significant factors affecting consumer trust in e-commerce

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AN INVESTIGATION OF SIGNIFICANT FACTORS AFFECTING
CONSUMER TRUST IN E-COMMERCE

by

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A dissertation submitted in partial fulfillment
of the requirements for the

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ABSTRACT

An Investigation Of Significant Factors Affecting
Consumer Trust In E-Commerce

by

Changfeng Chen

Dr. John T. Bowen, Examination Committee Chair
Professor of Hotel Administration
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The major research goal of this dissertation was to identify the important factors that significantly influence the formation of a consumer's overall trust in a website. By collecting empirical data and applying multivariate statistical analysis, this study achieved this goal.

The data for this study were collected through a web page-based survey. Principal component factor analysis was applied to obtain composite scores for some constructs measured with multiple items. Stepwise multiple linear regression analysis was employed to test the hypotheses. A total of five hypotheses with 20 factors were posited and tested in this study. Six factors were identified to have significant influence on the formation of a consumer's overall trust in a website. These significant factors were reputation, website characteristics, service quality, overall satisfaction, perceived risk, and education. This study also examined other relationships as suggested in the model of consumer trust in e-commerce and determined that trust indeed have strong impact on two major dimensions of customer loyalty, purchase intention and likelihood of recommendation.
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To my son

WALLACE CHEN GREEN

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CHAPTER 1

INTRODUCTION

The use of the Internet, by both business organizations and individual consumers, continues to grow. As estimated by a leading Internet source company in Ireland, Nua (2003), by the end of this year approximately 600 million people worldwide will have Internet access; this volume will nearly double annually over the next five years. The U.S. Census Bureau reports that consumers in the United States alone spent US$11 billion online in 2002. It is projected that more than half of all the Internet users will purchase online by the end of 2003 (Holby, 2001; Kolsaker & Payne, 2002) and this will lead e-commerce, the sale of products and services over the Internet, to a new era.

The range of transactions over the Internet is broad: from books and music records to food and wine, from computers and exercise equipment to automobiles and houses, from pay-to-view web casts and news alert subscriptions to online banking and computer training. In short, practically anything that can be bought and sold is available on the Internet in one form or another.

There is no doubt that the advent of the Internet has brought important implications to both business organizations and individual consumers. For consumers, the new medium provides enormous potential benefits, such as wider choice ranges, lower prices, rich information, shopping convenience, and even shopping enjoyment. For most business organizations the Internet is an excellent alternative distribution channel that not only is
cost-effective but also can reach consumers directly and extensively. Additionally, the Internet seems to provide an "equal" opportunity for all those who want to enter the business world; the low costs of entering and exiting consumer markets can reduce the advantage of scale of large or established companies (Watson, Akselsen, & Pitt, 1998).

However, despite the phenomenal growth and the tremendous potential for future growth in e-commerce, e-vendors have encountered problems and challenges in converting online visitors to real purchasers. Although the absolute figure of e-commerce revenue in the year 2002, as reported by the U.S. Census Bureau, looks large, it accounts for only 1.3 percent of all retail sales. It also represents a slow increase from that in 1999 and did not change much at all since 2001 (Woods, 2003). Briefly, e-commerce makes up less than two percent of all retail spending. Many online visitors are still reluctant to purchase from websites, which has resulted mainly from the fact that these online visitors have doubts and concerns about purchasing from websites. Their doubts and concerns have brought heightened attention from both industry practitioners and academics and resulted in numerous discussions. Consumers' major concerns can be summarized in four areas: 1) Legitimacy and authentication of a web site; 2) Product quality; 3) System security and information privacy; and 4) Post-purchase service.

To alleviate these concerns and doubts, e-vendors have made a great investment in marketing activities. However, it appears that many of these marketing activities are unable to function as effectively as expected. One important reason, as pointed out by Kolsaker, et al. (2002), is that many e-vendors embrace the Internet as just another channel of communication but lack clear strategic vision and have simply adopted a reactive approach. Another important reason is the misunderstanding of the needs of
online users. In the early days, many companies speculated that online visitors looked for low prices. This perception proved to be wrong. Well-known e-vendors, such as Amazon.com and Expedia.com, who did not offer the cheapest prices in their products, were among a few e-companies that first made profits. Many e-vendors regarded advertising as a solution to win business and thus bombarded online consumers with commercial emails and e-newsletters. This strategy was not very effective, as most of these e-commercials have been forwarded to email owners' “junk boxes.”

E-commerce is an extension of traditional commerce. In fact, this is not the first time that new technology has changed the way that business is done. Television, telephone, FAX, photocopiers, and direct marketing technologies are all examples of technology developments that triggered transformation of the business world. Each new development has framed particular challenges for businesses. Evidence suggests that to achieve success, companies should embrace technologies strategically and adopt proactive rather than reactive business practices; and that the traditional wisdom, such as winning consumer trust, is still applicable in the technology-enabled business environment.

Various studies demonstrate that in the Internet business-to-consumer environment, a lack of trust is a main reason that inhibits online visitors from purchasing from websites. As reported in a survey (Beauprez, 2002) released by Consumer WebWatch, only 29 percent of Internet users say they believed the information provided on websites that sell products or services. Most consumers decline to provide personal information to websites (Hoffman, Novak & Peralta, 1999). To convert more online visitors to real
purchasers, e-vendors must think hard and seriously on the issue of winning online
visitors' trust.

The issue of trust is not a new topic. Since the 1950s, trust has been the subject of
studies in social psychology, sociology, philosophy, political science, management,
marketing, communication, computer science, and information systems. Interest in this
concept of marketing arose in the 1980s and has become prevalent since the 1990s. It has
become coupled with the development of relationship marketing. The key role of trust in
any relationship is commonly recognized across disciplines. Specifically, in the
marketing discipline, consumer trust has been regarded as a critical factor in a
relationship in which the consumer does not have direct control over the actions of a
seller (e.g., Deutch, 1958; Mayer, Davis, & Schoorman, 1995) and in which marketers
seek long-term relations with their consumers.

The deployment of the Internet as a distribution channel in the business world has
added new dimensions to consumer trust and led to rethinking of this concept. This view
is reflected in the increasing number of publications in the past few years addressing
consumer trust in e-commerce. These studies have covered many aspects of consumer
trust and significantly increased our understanding of this concept and its effects on
customer behavior in the e-commerce marketplace. However, how to build consumer
trust is still an open issue for many e-vendors who are eager to harness the new
capabilities enabled by the new business means.

This dissertation is complementary to the existing studies on consumer trust in e-
commerce. Through reviewing the literature information in social psychology,
sociology, management, economics, marketing, information systems science, and e-
commerce, this study strives to identify major factors that significantly impact the formation of consumer trust in using websites (also called “online trust”) and achieve both theoretical and practical meanings. From a theoretical perspective, the study advances our current understanding of consumer trust in e-commerce by proposing a theoretical model and providing evidence for the major elements contributing to the formation of this construct. From a managerial perspective, the study provides e-vendors with practical insights on how to design Internet marketing strategies that will initiate, develop, and maintain consumer trust.

Research Question and Objectives

This dissertation proposes a conceptual model reflecting the formation of consumer trust and its effects. Through an empirical data collection, this study tests hypotheses to confirm causal relationships between consumer trust and its antecedents and consequences. The main research question is:

- What are the major factors affecting a consumer’s trust in a website?

To answer this question, four objectives must be reached. First, this study must examine the conceptualization and nature of consumer trust. Second, it must study the major sources from which consumer trust might emerge. Third, it must identify the important factors that might affect the formation of consumer trust. Fourth, it must measure the effects of each identified antecedent on consumer trust.
Hypotheses

The hypotheses tested in this dissertation are summarized as follows:

**Hypothesis 1:** Individual characteristics significantly influence a consumer’s overall trust in a website. Such individual characteristics include disposition to trust (faith in humanity and trusting stance), attitude towards online shopping, perceived risk associated with online shopping, past purchase behavior (i.e., frequency of purchasing or obtaining information from any website, previous experience with non-traditional shopping means), personal values, gender, age, and education.

**Hypothesis 2:** Website characteristics significantly influence a consumer’s overall trust in this website. Such website characteristics include functionality, usability, efficiency, reliability, and likeability.

**Hypothesis 3:** An e-vendor’s reputation significantly influences a consumer’s overall trust in a website.

**Hypothesis 4:** Trusting infrastructure implemented on a website significantly impacts a consumer’s overall trust in this website. Typical trusting infrastructure includes regulation cues (e.g., privacy and security policies) and guarantee cues (e.g., diploma and third-party seals).

**Hypothesis 5:** A consumer’s repeated interactions with a website significantly influence a consumer’s overall trust in this website. Indicators of repeated interactions include frequency of purchases/obtaining information from the website, frequency of receiving marketing pieces, perceived service quality, and overall satisfaction.
Justification

Clearly, consumer trust has new implications that need to be re-addressed and thought about as they apply to e-commerce. In the past few years the increasing number of publications from both industry and academia mirrors this need. However, the literature information on consumer trust in e-commerce is still very limited compared to traditional literature on trust. The continuous growth of e-commerce demands more empirical and comprehensive studies of the issue of consumer trust.

This study adds to existing studies by providing empirical evidence. What differentiates this study from others resides in four main areas: 1) By taking a broader approach, this study reviews literature information on trust in multi-disciplines, including social psychology, sociology, economics, management, marketing, information systems, and e-commerce. 2) This study offers a hierarchical framework of trusting sources derived from the literature information. This framework provides researchers with a systematic approach when studying the formation of trust under any specific context and can be applied to multiple disciplines. 3) This study proposes a theoretical model and empirically tests hypotheses to confirm possible causal relationships. 4) The data used to test the model and hypotheses in this study were collected through a real commercial website, which increases the generalizability of the findings in this study.

The important contributions of this study can be summarized as follows. First, it offers a framework of trusting sources, which can be applied to any specific context. Second, it develops a conceptual model reflecting the formation of consumer trust in e-commerce. Third, it provides empirical evidence for the major elements contributing to the formation of consumer trust in e-commerce. Fourth, it proves how a consumer's trust
in a website can affect this consumer's behavioral intent in this website. Fifth, it presents a theoretically sound measurement. Sixth, it adds to our knowledge on how web page-based surveys can help with data collection. Finally, this study provides practical insights to e-vendors. The variables identified in this study are not only theoretical, but also managerial. They can be applied by e-vendors to their e-business strategies, such as web design and marketing activities, in winning consumer trust and building online loyalty.

Delimitations of the Study

This study contains delimitations. First, a vast set of factors might affect the formation of consumer trust in e-commerce. The literature review in this study is focused on social psychology, sociology, management, economics, marketing, information systems science, and e-commerce. Although this review is comprehensive, it is not exhaustive by all means. Second, the data in this study were collected through a web page-based survey. Some disadvantages inherited in web page-based surveys might generate un-detectable errors. For example, a respondent who is not eligible (e.g., under the age of 18) to answer all the questions in the survey might fill out the survey due to curiosity; a respondent might provide inaccurate data without reading all the questions clearly due to impatience. A study reported that information overload on the Internet causes users to feel frustrated and stressed, and their patience is very short (Nua, 2001). The third delimitation of this study is that it focuses on consumer market, i.e., business-to-consumer e-commerce. Therefore, when the findings are applied to industry market,
i.e., business-to-business, researchers might need to modify the findings in consideration of a specific relationship.

Definition of Terms

1. **Affect-based trust.** This term refers to that a person’s trust in another stems from affective bonds with them (McAllister, 1995).

2. **Calculus-based trust.** Trust stems from a calculation of costs and rewards. It is grounded not only in the fear of punishment for violating consistency but also in the rewards to be derived from preserving it (Lewicki & Bunker, 1995).

3. **Cognition-based trust.** A person uses evidence and analysis to form attributes of the trust components, representing the rationale part of human judgment (McAllister, 1995).

4. **Consumer trust in e-commerce.** It is a psychological state comprising a consumer’s intention to accept vulnerability based upon positive expectations of the intention, integrity, and competence of an e-vendor under conditions of risk and interdependence (Rousseau, et al, 1998).

5. **Deterrence-based trust.** It is based on consistency of behavior, i.e., people will do what they say they are going to do. Behavioral consistency is sustained by the threat of punishment if consistency is not maintained. Therefore, deterrence-based trust is grounded in punishment for inconsistency (Shapiro, Sheppard, & Cheraskin, 1992).
6. **Disposition to trust.** The extent to which an individual is willing to depend on others across a broad spectrum of situations (Rotter, 1967; Rotter, 1971; Rotter, 1980).

7. **E-commerce.** The sale of products and services over the Internet (Chen & Dhillon, 2003).

8. **E-vendors.** Companies that conduct the sale of products and services over the Internet.

9. **Identification-based trust.** It is based on a full internalization of the other party’s desires and intentions. At this level, trust exists because each party effectively understands, agrees with, empathizes with, and endorses what the other wants, and can act for the other. Identification-based trust thus permits one to act as an agent for the other, substituting for the other in interpersonal transactions (Shapiro, Sheppard, & Cheraskin, 1992; Lewicki & Bunker, 1995).

10. **Institution-based trust.** One believes the necessary impersonal structures are in place to enable one to act in anticipation of a successful future endeavor (Zucker, 1986; Shapiro, Sheppard, & Cheraskin, 1992).

11. **Knowledge-based trust.** It is grounded in behavioral predictability, i.e., a judgment of the probability of the other’s likely choice of behaviors. Knowledge-based trust occurs when one has enough information about others to understand them and to accurately predict their likely behavior (Shapiro, et al, 1992; Lewicki, et al, 1995).
12. **Privacy.** The issue of whether consumers believe that the collection and subsequent access, use, and disclosure of their private and personal information is consistent with their expectations (Luo, 2002).

13. **Risk.** It is also called perceived risk. It is an individual consumer's assessment of the relative probability of positive and negative outcomes of a given transaction (Kimery & McCord, 2002).

14. **Security.** It is also called system security. The issue of whether consumers believe that their personal information (private and monetary) will not be viewed, stored, and manipulated during transit and storage by inappropriate parties in a manner consistent with their confident expectations (Shanker, et al, 2002; Hoffman, et al, 1999; Mayazaki, et al, 2001).

15. **Situational normality.** The belief that success is likely because the situation is normal or customary, and that everything seems to be in proper order (Garfinkel, 1963; Baier, 1986; Lewis & Weigert, 1985; McKnight, Cummings, & Chervany, 1998).

16. **Trusting infrastructure.** It refers to tangible cues, or structural assurances, which are deliberately used in a website to entice a consumer's trust. The common tangible cues include regulations and policies (Sitkin, et al, 1995; McKnight, et al, 1998; Kimery, et al, 2002).

17. **Trustworthiness.** A person is trustworthy when he/she is worthy of the trust of others (Barney & Hansen, 1994).
Organization of the Dissertation

This dissertation has five chapters. Chapter 1 provides the rationale and a brief description of the focus of this study. Specifically, it includes research questions and objectives, hypotheses to be discussed and tested in the later chapters, justification, delimitations, and definitions of key terms used in this dissertation. Chapter 2 is an extensive literature review. It is divided into three sections. Section 1 reviews the literature information in traditional disciplines, including the conceptualization, dimensionality, life cycle, antecedents and consequences of trust, and the reciprocal relationships between trusting antecedents and consequences. Section 2 discusses the growing literature on consumer trust in e-commerce and explores some published empirical studies addressing antecedents and consequences of consumer trust in e-commerce. Section 3 presents the thesis of this study, a conceptual model, and hypotheses. Chapter 3 describes the methodology in this dissertation. It first describes the development of measures, outlines a survey instrument, and explains the decision on the sample size. Then, it elaborates the sampling procedure, data collection process, data handling, the concepts of reliability and validity, and the application of two multivariate statistical techniques, principle component factor analysis and multiple linear regression analysis. Chapter 4 describes the data collected for this study and reports the final data analysis. It gives the results of the hypotheses tested along with the statement on the validity and reliability of the measurement. Chapter 5 summarizes the major findings of the study, discusses the theoretical and practical implications of these findings, gives suggestions for e-vendors, states the limitations of the study, and offers an agenda for future research in e-commerce.
CHAPTER 2

LITERATURE REVIEW

Introduction

This chapter provides the theoretical background for the thesis of this study. It is divided into three sections. Section 1 reviews the literature of trust in traditional disciplines. This section includes the conceptualization of trust, its dimensionality, life cycle, sources and antecedents, consequences, and reciprocal effects between antecedents and consequences. Section 2 reviews the growing literature of consumer trust in e-commerce. Section 3 presents the thesis of this dissertation, including the conceptualization and nature of consumer trust in e-commerce, a conceptual framework and hypotheses to be further discussed and tested in the later chapters.

Trust In Traditional Disciplines

Any understanding of trust with respect to e-commerce should be grounded in an understanding of trust in the traditional literature, i.e., literature in disciplines that are not related to the usage of the Internet. Scholars in multiple disciplines have extensively examined the issue of trust over years. Psychologists assess trust in terms of the attributes of all the identities involved in a trusting relationship and focus on a host of internal cognitions that personal attributes yield (e.g., Rotter, 1967; Rotter, 1971). Sociologists examine trust in the socially embedded properties of relationships among
people (Granovetter, 1985; Lewicki & Bunker, 1995) or institutions (Zucker, 1986;
or institutional (Rousseau, Sitkin, Burt, & Camerer, 1998; North, 1990). Managerial
scholars tend to study sources from where trust can emerge. Marketers seem to be more
interested in the antecedents and consequences of trust (Rousseau, et al., 1998).

Lewicki, et al (1995), in critiquing existing research on trust, state that each discipline
assumes its own frame of reference and perspective on the phenomenon without
effectively articulating the parameters of that frame; each is a blind man describing his
own small piece of the elephant. In an attempt to gain an integrated view the trust
concept, some scholars such as Bhattacharya, Devinney, & Pillutla (1998), Rousseau, et
al (1998) synthesize the key elements of trust as emphasized in various disciplines. They
suggest that, despite the difference in emphasis and approach, not much difference exists
at all in the study of trust in different disciplines. All the disciplines are seeking some
common elements underlying trust, which include its nature, antecedents, consequences,
life cycle, and levels. Researchers have provided an understanding of these diverse
aspects of trust from different lenses.

In the following text, this dissertation reviews the major issues of trust as addressed in
multiple traditional disciplines. This includes conceptualization of trust, its
dimensionality, life cycle, sources, antecedents, building mechanisms, consequences, and
reciprocal effects between antecedents and consequences.

**Conceptualization**

There are two reasons for the need to illustrate the definition of trust. The first reason
arises from the nature of trust as it is a contextual construct. Under certain contexts trust
is needed, while in other situations trust is not needed (Lewicki, et al, 1995). In an environment where everything is certain, there is no need for trust, since there is no risk involved (Lewicki, et al, 1995). Trust is most needed in an uncertain environment where interdependence exists (Rousseau, et al, 1998). This dissertation is designed to address the issue of trust in e-commerce, which is a new market environment. It is important to first know whether trust is needed in the e-commerce market environment. The second reason comes from the fact that the first step in developing good measures of a marketing construct is the conceptual specification of the construct itself, aimed to exactly delineate what is included and what is excluded from its domain (Raimondo, 2001).

Although scholars in multi-disciplines have generated a huge body of literature on the trust construct, there has been no universally accepted scholarly definition of trust (Rousseau, et al, 1998). Not only does each discipline have its own definition, but each author has his/her own interpretation about this concept. Since it is tedious, as well as unnecessary, to list all the definitions shown in the literature here, it is constructive to draw patterns and categorize these studies. The various definitions in the literature actually can be grouped into two schools. One school regards trust as a belief, confidence, attitude, or expectation about the other party's trustworthiness. Some representatives of this school include Blau (1964), Rotter (1967), Botter (1971), Rempel (1985), Dwyer & Lagace (1986), Andaleeb (1992), Morgan & Hunt (1994), Blomqvist (1997). The other school defines trust as a behavioral intention or behavior that reflects a reliance on a partner and involves vulnerability and uncertainty on the part of the person who trusts. Some representatives of this school include Deutsche (1962), Giffin (1967),
Zand (1972), Schlenker, Helm, & Tedeschi (1973), Larzerele & Huston (1980), Coleman (1990), and Moorman, Zaltman, & Deshpande (1992).

A recent definition of trust that has gained much support among scholars is by Rousseau, et al (1998). Drawing upon a comprehensive literature review in cross-disciplines, these authors conclude trust is a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another under conditions of risk and interdependence. The main reason for the popularity of this view among scholars is in its comprehensiveness. It basically synthesizes the two schools mentioned in the above paragraph. First, it states that trust is a psychological state that researchers in different disciplines interpret in terms of beliefs, confidence, positive expectations, or perceived probabilities. Second, it points out that trust is not a behavior (e.g., cooperation), or a choice (e.g., taking a risk), but an underlying psychological condition that can cause or result from such actions. Third, it emphasizes the positive outcomes brought by trust. Fourth and finally, it includes the necessary conditions under which trust is needed and can be developed. As elaborated by the authors, the first condition is risk where a person who trusts assesses the vulnerability and uncertainty as to whether the other party intends to and will act appropriately. Trust would not be needed if actions could be undertaken with complete certainty and no risk and the one who trusts is not in a vulnerable position. The second necessary condition of trust is interdependence, where the interests of one party cannot be achieved without reliance upon another.

Dimensionality and Overall Trust

Although Rousseau et al's (1998) conception of trust has been well received by many

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authors, there are others who have argued that this definition is too abstract to be useful for conceptual or empirical work (Bigley & Pearce 1998). They call for specifying the domain and connotative meaning of the trust construct in the context of a certain discipline. This inherent nature of most definitions of trust has resulted in two streams of insight into the dimensionality of the concept. One group of scholars contend that the trust construct be measured by one single dimension, such as reliability (Mohr & Spekman, 1994; Selnes, 1998) or motivation (Anderson & Waitz, 1989; Anderson & Narus, 1990; Crosby, Evans, & Cowles, 1990). The other group claims that the trust construct is multi-dimensional. For instance, Ganesan & Hess (1994) propose two dimensions of trust: credibility, the main partner’s intention and ability to keep promises; and benevolence: evidence of genuine concern for the partner through sacrifices that exceed a purely egocentric profit motive. These authors provide empirical support for the discriminant validity of these dimensions. Barber (1983) proposes that trust expectations likely include evaluations of two issues: 1) Technically competent role performance and 2) carrying out obligations and responsibilities by placing others’ interest before their own. Examples of other researchers supporting the multi-dimensional nature of trust include Morgan & Hunt (1994) who suggest that trust is composed of reliability and integrity and Zaheer & Venkatraman (1993) who consider trust as being formed through reliability, honesty, and predictability.

Two comprehensive reviews on related literature conducted by McKnight, Choudhury, & Kacmar (2002) and Chen & Dhillon (2003) reveal that competence, benevolence, and integrity are the most recurring themes in establishing trust dimensions (see Table 1). In the context of business-to-consumer exchange, the notion of
competence includes a company's ability to fulfill its promises communicated to consumers. Integrity refers to the fact that a company acts in a consistent, reliable, and honest manner when fulfilling its promises. Benevolence is the probability that a company holds consumers' interests ahead of its own self-interest and indicates sincere concern for the welfare of the customers.

Table 1

<table>
<thead>
<tr>
<th>Trust Dimensions</th>
<th>Relevant Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Trust</td>
<td>Swan, Trawick Jr., Rink, and Roberts (1988); Driscoll (1978); Scott (1980); Johnson-George and Swap (1982); Chen and Dhillon (2003)</td>
</tr>
<tr>
<td>Competence</td>
<td>Barber (1983); Baier (1986); Gabarro (1978); Kee and Knox (1970); Koller (1988); Thorslund (1976); Sitkin and Roth (1993); Mishra (1996); McLain and Hackman (1995); Anderson and Narus (1990)</td>
</tr>
<tr>
<td>Integrity</td>
<td>Morgan and Hunt (1994); Zaheer and Venkatraman (1993); Sato (1988); Rempel et al (1985); Koller (1988); Johnson-George and Swap (1982); Blakeney (1986); Cummings and Bromiley (1996); Gabarro (1978); Selnes (1998)</td>
</tr>
<tr>
<td>Benevolence</td>
<td>Ganesan and Hess (1994); Barber (1983); Bonoma (1976); Cummings and Bromiley (1996); Gaines (1980); Heimovics (1984); Holmes (1991); Johnson-George and Swap (1982); Kasperson et al (1992); Koller (1988); Lindskold (1978).</td>
</tr>
</tbody>
</table>

Researchers agree that in a relationship, one party tends to have overall trust toward the other (see Table 1). Overall trust refers to general trust, which is not related to a specific behavior of the other party, or any component of trust. The concept of overall trust was first developed by Johnson-George and Swap (1982) to measure the overall trust that a person has in another. The concept was later applied to different settings. For example, Swan, Trawick, Jr., Rink, and Roberts (1988) adopted it to an industrial setting and measure professional relationships. Chen and Dhillon (2003) suggest that a person's
conceptions of various dimensions of a specific other's trustworthiness interact to form a
composite or overall trust.

**Trust Life Cycle**

The construct of trust has a dynamic rather than static nature (Rousseau, et al, 1998). Trust changes over time and with the variations in risk and interdependence over the course of a relationship between parties. Theoretically, the process of trust development in a relationship, analogous to the marketing concept of product life cycle (Kotler, Bowen, & Makens, 2002), follows an intuitive four-step “life cycle” – initiation, growth, maturity, and decline. At each step, trust indicates a certain level. At the initiation stage, something triggers very little trust. Usually, a person’s initial trust in another is mainly based on rational inference. When two parties become more familiar with each other through increased positive interactions, trust becomes stronger. It peaks at the maturity stage when mutual trust (e.g., shared interests and values) and equilibrium is established between two parties. Finally, trust will decline and disappear if violation of trust occurs.

The difference between the traditional concept of “life cycle” and the concept of trust life cycle, as observed by Lewicki, et al (1995) and Sitkin, et al (1994), is that the trust life cycle is not a smooth and straight ladder, but spiral stairs; At each stage, trust can decline or disappear if violation of trust occurs. Another difference is that trust might never “die,” but become an unimportant issue if two parities trust each other more than ever or an environment becomes completely certain.

The importance of understanding the dynamic nature of trust and its “life cycle” is the first step to the understanding of how trust is formed. Besides, an understanding of the
trust life cycle is vital to the development of relationships since a trust building process, under most circumstances, reflect a relationship building process (Lewicki, et al, 1995)

Sources. Antecedents, and Mechanisms

Sources of Trust

Having discussed the definition of trust and the conditions under which trust is needed and can change, now the study has to answer the question: How is trust formed? The literature information answers this question through examining three issues: the identification of sources, antecedents, and mechanisms. These three issues demonstrate a hierarchical relationship. Sources of trust form the highest level of constructs from which antecedents or major factors affecting the formation of trust can be derived. Mechanisms are specific items developed from antecedents in considering specific settings.

A significant body of knowledge from multi-disciplines sheds light on where trust can emerge. In psychology and sociology, personality is regarded as a major source affecting the formation of a person’s trust in others. Scholars believe that trust is shaped by the early relationship between the individual and the caregiver; the adequacy of this relationship dictates whether an individual develops a core orientation that others can or cannot be trusted, thus, affecting his or her overall “readiness to trust” or “propensity to trust” in interpersonal relationships (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1982; Erikson, 1968; Rotter, 1967). McKnight, et al (1998) distinguish between two types of dispositions to trust, each of which affects trusting intention to a certain degree. First is faith in humanity; this refers to one’s belief that others typically mean well and are reliable. Second is trusting stance; this refers to one’s belief that they will obtain better interpersonal outcomes by dealing with people as though they mean well.
Interpersonal trust has cognitive and affective foundations (Lewis & Wigert, 1985). McAllister (1995) states that cognition-based trust, which would involve a person's use of evidence and analysis to form attributes of the trust components, represents the rationale part of human judgment and distinguishes it from affect-based trust that stems from affective bonds among individuals. Shapiro, Sheppard, and Cheraskin (1992) suggest three types of sources in the development of a business relationship: deterrence-based trust, knowledge-based trust, and identification-based trust. Deterrence-based trust is based on consistency of behavior, i.e., people will do what they say they are going to do. Behavioral consistency is sustained by the threat of punishment if consistency is not maintained. Therefore, deterrence-based trust is grounded in punishment for inconsistency. Knowledge-based trust is grounded in behavioral predictability, i.e., a judgment of the probability of the other's likely choice of behaviors. Knowledge-based trust occurs when one has enough information about others to understand them and to accurately predict their likely behavior. Identification-based trust is based on a full internalization of the other party's desires and intentions. At this level, trust exists because each party effectively understands, agrees with, empathizes with, and endorses what the other wants, and can act for the other. Thus, identification-based trust permits one to act as an agent for the other, substituting for the other in interpersonal transactions. One can be confident that the other will not act harmfully, will protect and defend one's own interests, and that no surveillance of the other is required (Lewicki, et al, 1995). In identification-based trust, emotional involvement and interdependence become intertwined. Thus, it is similar to McAllister's (1995) affect-based trust.
By expanding and extending Shapiro, et al’s work, Lewicki, et al (1995) propose that these three trust sources are linked in a sequential iteration in which achievement of trust at one level enables the development of trust at the next level. In addition, these authors suggest that one take a broader view of deterrence-based trust by incorporating the other side of this source: trust is grounded not only in the fear of punishment for violating consistency but also in the rewards to be derived from preserving it. Thus, using calculus-based trust to replace deterrence-based trust seems better.

By analyzing a sociological and economic analysis of historical data in the United States from 1840 to 1920 (Luo, 2002; Zucker, 1986) presents three sources, which include characteristic-based trust, process-based trust, and institution-based trust. Characteristic-based trust refers to a person or group’s characteristics, such as ethnicity, family background, and personal values, and can affect this person or group’s trust toward others. Process-based trust refers to trust that can emerge or become stronger in repeated interactions between two parties. In other studies, as identified by Rousseau, et al (1998), process-based trust is the same as relational trust or identity-based trust (Coleman, 1990) and also overlapping with affect-based trust (e.g., emotional bonds partially result from repeated interactions). Institution-based trust means that one believes the necessary impersonal structures are in place to enable one to act in anticipation of a successful future endeavor. It is tied to formal mechanisms such as professionalism or third-party insurance, i.e., situational normality and structural assurances.

A close examination of these sources and their contents leads to five relatively exclusive sources of trust: characteristic-based trust, calculus-based trust, institution-
based trust, knowledge-based trust, and identification-based trust. There are three issues
that are noteworthy: 1) There are no fine lines among these five sources; 2) These
trusting sources are not necessarily sequentially linked, although knowledge-based trust
and identification-based trust are linked in some way; and 3) These sources have relative
importance, that is, under certain contexts, some sources are more important than the
others.

These five sources of trust appear to represent all the other theories and form the
highest level of constructs in the formation of trust. Researchers across disciplines have
greatly advanced and enriched our understanding of these sources and their effects
through applying them to different settings.

Antecedents

In examining the impact of an individual's characteristics on trust formation in the
consumer market, researchers have developed a comprehensive list of major antecedents
of trust such as disposition to trust, personal values, culture (nationality), prior
experience, attitude, subjective norm, gender, age, education, and income. In examining
an individual's characteristics (e.g., a salesperson) in industry market, researchers have
found that the salesperson's expertise, likeability, competence, dependability, and other
personal traits have positive impact on the formation of a buyer's trust. In organizational
studies, strings of key characteristics of an organization, an employee, and a manager
have been well addressed.

Antecedents of trust arising from calculus-based trust source can be found in the
study by Lewicki, et al (1995), who suggest that in any given transaction with another
trust may be derived by determining: 1) Benefits to be derived from staying in the
relationship; 2) Benefits to be derived from cheating on the relationship; 3) Costs of staying in the relationship; 4) Cost of breaking the relationship. Based on this view, calculus-based trust can be ensured through three ways: First, repeated interactions, which can lead to complex inter-dependence between two parities, Second, the degree of interdependence and alternative relationships – a higher degree of interdependence will make involved parties suffer higher costs of breaking the relationship, and Third, reputation as a hostage – if trust is violated, the reputation of the violator can be tarnished throughout networks of friends and associates.

Rousseau, et al (1998) find similar observations in the literature. Many authors regard that calculus-based trust is based on rational choice. Trust derives not only from the existence of deterrence but also because of credible information regarding the intentions or competence of another (Barber, 1983). The credible information about a trusted party may be provided by reputation or third-party assurances such as certification. The advanced studies indicate that calculus-based trust is major sources from which initial trust can be developed and factors such as reputation and brand recognition are important issues that help a consumer form initial trust in a company.

Institution-based trust is tied to formal mechanisms such as professionalism or third-party insurance, i.e., situational normality and structural assurances. Situational normality is defined as the belief that success is likely because the situation is normal or customary, or that everything seems to be in proper order (Garfinkel, 1963; Baier, 1986; Lewis & Weigert, 1985; McKnight, Cummings, & Chervany, 1998). For instance, a person enters a luxury hotel and expects a setting conducive to both customer service and fiduciary responsibility that is reflected in the workers’ professional appearance, the
prosperous and secure physical setting, and a friendly and a safe procedure. This individual then believes that this situation is normal and feels comfortable enough to quickly form some level of trust in the hotel.

The belief in structural assurances can lead to trust. Shapiro (1987) defines structural assurances as structural safeguards such as regulations, guarantees, and legal recourse. Regulations such as contracts, company policies regarding privacy and security enable people to feel assured about their expectations of the other party's future behavior (e.g., Sitki, 1995). Guarantees mitigate the perceived risk involved in forming trust in others. Legal recourse (i.e., regarding contracts and promises) functions as deterrence.

Information contributes to predictability of the other, which contributes to trust. This is named as knowledge-based trust by Shapiro, et al (1992), process-based trust by Zucker (1986), and relational-based trust by Rousseau, et al (1998). In consumer markets, these concepts all mean that familiarity between a buyer and a seller through positive repeated interactions can increase the buyer's trust in the seller. These repeated interactions include repeated purchases, regular communication and courtship (Shapiro, et al, 1992). Regular communication puts a party in constant contact with the other, which allows for exchanging information about wants, preferences, and approaches to problems. Regular communication enhances a seller's ability to understand its buyers. Courtship, as explained by Lewicki, et al (1995), is conducted by "interviewing" the other, watching the other perform in social situations, experiencing the other in a variety of emotional states, and learning how other people view the other's behavior. Courtship allows one party to gain enough information to determine whether the other can work
together well. In the practice of business relationships, courtship is employed to establish long-term relationship (Shapiro, et al, 1992).

Identification-based trust, according to Lewicki, et al (1995), can form very strong trust. It can be established on accumulated knowledge as well as on shared values and interests. Emotional involvement and interdependence in the trusting parties are strong.

Antecedents represent the second level of constructs of trust from which mechanisms of trust building are derived. These mechanisms are contextual and usually treated as measures in empirical studies. They are the fundamental objectives that both researchers and practitioners are seeking in specific settings.

Consequences of Trust

The role of trust in a relationship has been universally recognized and extensively discussed. Rotter (1967) states that the efficiency, adjustment, and even survival of any social group depend on the presence or absence of interpersonal trust. In marketing, trust has been empirically tested to be a key factor in the initiation, development, and maintenance of any long-term relationship. It leads to customer loyalty and commitment (e.g., Morgan & Hunt, 1994; Bowen & Shoemaker, 1998; Garbarino & Johnson, 1999). It encourages cooperation, agreement, and also can increase the persuasive power of a company in a transaction since a trusting consumer is less price-sensitive (Schurr & Ozanne, 1985). On the other hand, trust can reduce perceived risk, uncertainty, conflict, and opportunistic activities. Hawes, Mast and Swan (1989) state: "No amount of detail in a formal written contract, no abundance of legal staff to fight for recompense, no form of recourse can provide the buyer with such a high expectation of a satisfying exchange relationship as a simple, basic trust of the salesperson and the company that he or she
represents.” Similarly, Williamson (1975) and Hill (1990) find that trust can decrease transaction costs such as the costs of negotiating, monitoring, and enforcing a contingent claims contract to ensure its possibility. In management, researchers find that trust in an organization, such as between employees and managers, can result in effective teamwork and positive organizational cultures (e.g., Jones, et al, 1998). Mishra (1998) finds that trust can make the downsizing of a company less stressful, because it can facilitate more constructive responses from employees.

Reciprocal Relationships

Undoubtedly, it is these positive effects of trust in a relationship that have inspired scholars and motivated practitioners. However, there are controversies over the positions of antecedents and consequences of trust. Many authors define antecedents of trust as consequences that are considered by other authors. For example, cooperation is considered as a consequence of trust by some authors, but others argue that cooperation can lead to trust, and thus it is an antecedent. The statement by Sitkin, et al (1994) seems to help ease this dilemma. They say:

“Developmentally, relationships among parties who have had no prior association are expected to emerge incrementally and to begin with small actions that initially require little reliance on trust. If the actions are reciprocated, trust tends to spiral upward. If the actions are not reciprocated, trust spirals downward.”

Since trust has a dynamic rather than static nature, it is not unusual to see that an effect on one stage in the trust life cycle becomes a cause at the next stage, because in a positive relationship, stages in the trust life cycle are sequentially linked; the achievement
of trust at one level enables the development of trust at the next level (Lewicki, et al, 1995).

Literature In Consumer Trust In E-Commerce

The literature body of consumer trust in e-commerce has grown quickly in recent years. However, it is still in its inception stage and is rather small compared with that in traditional disciplines. The study of consumer trust in e-commerce used to be a focus of information systems science. Most early publications appeared in journals and conference proceedings relating to information systems science. Only recently, more and more empirical studies can be seen in publications of marketing and consumer behavior, such as Industrial Marketing Management, Marketing Intelligence and Planning, the Journal of Interactive Marketing, and the Journal of Consumer Affairs. This shift shows an evolving process in the understanding of consumer trust in e-commerce. At the beginning of e-commerce, system security, the issue of whether consumers believe that their personal information (private and monetary) will not be viewed, stored, and manipulated during transit and storage by inappropriate parties in a manner consistent with confidence, and privacy, the issue of whether consumers believe that the collection and subsequent access, use, and disclosure of their private and personal information is consistent with their expectations, were considered the two most important factors that inhibited the formation of online trust (Shanker, et al, 2002; Hoffman, et al, 1999; Mayazaki, et al, 2001). With increased familiarity with e-commerce, online consumers have raised new concerns. Online trust is much more than the issues of
system security and information privacy, but a multi-disciplinary and multidimensional construct that has important antecedents and consequences (Shanker, et al, 2002).

Most publications in consumer trust in e-commerce find their origins in the traditional literature, especially in the disciplines of management and marketing, and are extended in the context of computer-mediated environments. However, the confusion and disagreement in the traditional literature has also been extended. These include the conceptualization of trust, its dimensions, sources and antecedents, and measurements. With respect to the conceptualization of online trust, some authors directly adopt the definition of trust from the traditional literature, while others leave it open. Most authors seem to believe that online trust is a multi-dimensional construct. However, consensus on the number of dimensions has not been reached. For instance, Chen & Dhillon (2003), Gefen (2002), and McKnight, Choudhury, & Kacmar (2002) suggest that online trust include three dimensions: competence, benevolence, and integrity. Other authors, however, such as Ba & Pavlou (2002), argue that online trust has two dimensions: benevolence and credibility. Notwithstanding, more and more scholars have turned their attention to investigate the antecedents and consequences of online trust. This research trend is consistent with the urgent call from the industry, where e-vendors strive to win consumer trust. Since the main goal of this dissertation is investigating the major factors that significantly impact the formation of online trust, it is necessary to look into similar studies. The following text outlines some recently published empirical studies that tested theoretical models of online trust.
Existing Empirical Studies

Two of the earliest studies testing the cause-and-effect of online trust were conducted by Jarvenpaa, Tractinsky, & Vitale (1999; 2000). In their first study, the authors tested a conceptual model in two industry domains: bookstore and travel. They found that consumers recognize differences in size and reputation among Internet stores, and these differences influence their assessment of store trustworthiness and their perception of risk as well as their willingness to patronize the store. In their second study, these authors validated their findings of the first study and examined the cross-cultural difference of online trust. However, the study did not find significant difference across different cultural groups on these two variables, size and reputation of an Internet store.

Cheung & Lee (2001) developed and validated a measurement instrument for a research model that describes factors that influence trust in Internet shopping and its impact on perceived risk. This model was partially tested by Lee & Turban (2001) who found that the perceived integrity of an Internet vendor is positively related to consumer trust in Internet shopping. That positive effect, however, is moderated by the trust propensity of the consumer (Koufaris & Hampton-Sosa, 2002).

The first study to address the effect of third-party assurance seals (e.g., WebTrust, TRUSTe) on online trust was published by Kimery & McCord (2002). These authors used five manipulations of a simulated retail website to test the relationships among the viewing of assurance seals, disposition to trust, consumer trust, perceived risk and intention to purchase from an e-vendor. The initial results indicated that a consumer’s disposition to trust has a positive effect on the consumer’s overall trust in an e-vendor; that a consumer’s overall trust reduces the consumer’s perceived risk associated with
purchasing from that e-vendor; and that a consumer's perceived risk negatively affects
the consumer's purchase intention from that e-vendor. Contrary to the propositions, the
study only found that one seal type, the privacy assurance, has a small, significant, and
positive impact on the consumer's overall trust in an unfamiliar e-vendor.

Ba, et al (2002) are among those authors who first empirically tested the importance
of online feedback mechanisms on online trust and the effect of online trust on price
premiums. Drawing from economic, sociological, and marketing theories, and using data
from both an online experiment and an online auction market, the authors demonstrated
that appropriate feedback mechanisms can induce calculus-based trust without repeated
interactions between two transaction parties; that trust can mitigate information
asymmetry by reducing transaction-specific risks, and, therefore, generating price
premiums (i.e., above-average price) for reputable sellers; and that for expensive
products, the relationship between trust and price premiums is stronger.

Using a non-random quota sampling approach, Kolsaker & Payne (2002) tested the
gender difference on overall trust in e-commerce. Their study detected only insignificant
gender-based variations over consumer trust in e-commerce. However, the authors
acknowledge the limitation of a convenient sampling method.

Koufaris, et al (2002) tested a model that includes the effect of consumers' experience
with, and beliefs regarding, a company's website on their trust in the company itself. The
authors found that a positive experience with a website that provides consumers with
enjoyment and perceived control (i.e., how much the consumer feels in control over
his/her actions while shopping at a company's website) leads to greater trust in the
company itself through the consumer's perceptions about the website's usefulness and
ease of use. These authors also confirmed a positive relationship between consumer trust in a website and consumer retention and intention to buy.

Yoon (2002) provided interesting findings through a simulation approach: 1) Website properties such as company awareness and reputation have significant impact on a consumer’s trust in a website; 2) Personal variables such as familiarity with e-commerce and prior satisfaction with e-commerce have high correlation with consumer trust; 3) A consumer’s trust in a website significantly influences the consumer’s purchase intention; and 4) A consumer’s trust in a website is highly correlated with the consumer’s satisfaction with this website.

Sultan, Urban, & Shankar (2002) conducted a large-scale study to investigate the determinants and role of consumer trust in e-commerce. By analyzing the data collected from 6,831 consumers across 25 websites and eight industry categories, the authors offered important findings. The first finding is that website characteristics, i.e., navigation, brand, advice, privacy and security, no errors, presentation, order fulfillment, community and trust seals, significantly affect online trust. It is interesting to note that more than 80% of the explained variance in online trust is contributable to factors other than privacy and security, which was considered the key influencer in the formation of trust at the beginning of e-commerce. This finding is consistent with the research trend appearing in e-commerce. The authors’ second finding is that consumer characteristics, such as previous site experiences, Internet savvy, entertainment experiences and Internet shopping experiences, significantly affect online trust. The third finding is that online trust is industry-specific. That is, some industry websites can entice a higher level of trust with the products they are selling or by their name recognition.
Another finding of this study is that a consumer's education level negatively affects the consumer's trust in an e-vendor. An interesting finding is that trust does mediate the relationships between website and consumer characteristics and consumer online behavioral intent.

In a similar manner, McKnight, Choudhury, & Kacmar (2002) proposed and validated measures of a multidisciplinary and multidimensional model of consumer trust in e-commerce. These authors found that consumer trust in a website is associated with specific dimensions; that a consumer's disposition to trust, general web experience, and personal innovativeness positively affect trusting beliefs (i.e., competence belief, benevolence belief, and integrity belief) which, in turn, affect trusting intentions (willingness to depend, willingness to follow advice, to make purchases, and to share personal information).

Overall, the above studies show two apparently different research streams: one stream focuses on testing partial models with one or two antecedents of online trust, while the other stream tends to be comprehensive and encompasses multiple antecedents of online trust. Although both streams have contributed to our understanding of the formation of online trust, the second stream is more theoretically sound.

Conceptual Framework and Hypotheses

Drawing on the above literature information, this dissertation proposed a theoretical framework, presenting the antecedents and consequences of a consumer's trust in a website (see Figure 1). The antecedents, marked with asterisks and shown at the left side, are under the trust sources discussed in Section 1 by incorporating the special dimensions
of the e-commerce context. These antecedents consist of eight factors in consumer characteristics, five factors in website characteristics, one factor in calculus-based trust, two factors in institution-based trust, and five factors in knowledge-based trust source. Identification-based trust was found not to be a productive source for a trusting relationship between a seller and an individual buyer (Lewichi, et al, 1995), and hence, it was not included in this study. Theoretically, the identified antecedents of online trust have possible inter-correlation with each other. The consequences, two aspects of online consumer behavioral intention, likelihood to purchase from a website in the future and likelihood to recommend a website to others, are shown on the right side. A consumer’s overall trust plays a mediating role between the antecedents and consequences. Trust might feedback to affect its antecedents. In addition, these antecedents might have direct effects on online consumer behavioral intention. However, this study does not formally investigate any feedback effects, inter-correlated relationships, nor examine the direct relationships between antecedents and consequences. Instead, this study focuses on identifying significant antecedents of consumer trust in e-commerce.

Straight lines from independent variables to dependent variable denote the effects that are hypothesized and tested. While dashed lines denote the effects that are not hypothesized, the line between trust and consumer behavioral intention was tested to assess the predictive validity of the survey instrument. Numerical values resulting from regressions of each arrow in the model indicate the relative strength of the influence (Loehlin, 1992). This dissertation has no intention to explore whether bi-directional relationships exist among the constructs — all relationships are presumed to be uni-directional.
In this dissertation, multiple linear regression analysis is employed to test the hypothesized relationships among trust and its antecedents and consequences (Pedhazur, 1982; Dillon & Goldstein, 1984; Tabachnick & Fidell 1996). The following text discusses each construct in the conceptual model as well as the development of hypotheses.

**Overall Trust**

This study adopts the definition of trust by Rousseau, et al (1998), but expands it to include the prevalent three dimensions. That is, consumer trust in e-commerce is a psychological state comprising a consumer’s intention to accept vulnerability based upon

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positive expectations of the intention, integrity, and competence of an e-vendor under conditions of risk and interdependence.

Consumer trust is not only needed in e-commerce but also critical to the continuous growth of e-commerce as a whole. The Internet demonstrates an unpredictable market environment where consumers are forced to guess how things work. One of the most important considerations in any consumer market is to ensure that the consumer is empowered to get what he or she expects when making a choice. Uncertainty and unpredictability of a market will inevitably drive consumers away. This inherent characteristic of the Internet market is not only a technological issue but also a political one. Although the Internet-related technology has advanced substantially in the past decade, technological errors and gaps still can emerge anytime during an e-commerce process; these are usually beyond the control of consumers. In the Internet environment, geo-political borders are essentially invisible and irrelevant to consumers and the borders are much more porous than in the world of bricks and mortar. As a result, inconsistent local, state, national, and regional-national regulations that rely on traditional boundaries make far less sense to both vendors and consumers on the Internet. This results in an anarchic market environment. This situation can be seen in frequent reports of credit card fraud, privacy invasion, misuse of personal information, and consumer disputes.

Another source of uncertainty arises from a transaction process. As stated by Warrington, Abgrab, & Caldwell (2002), the physical separation of the buyer and seller, the physical separation of the buyer and the merchandise, and the physical separation of the buyer and the physical environment make buyers' perceived risk much higher than that when purchasing offline. Traditional physical cues used by a buyer to infer an initial
judgment on the trustworthiness of a conventional business, such as a firm's size, location, physical appearance, and a salesperson's personality are not available in the online environment. The "faceless" or "impersonal" nature of a website gives rise to opportunistic behavior such as illegal practices of businesses, and misrepresentation of product authenticity and quality.

Consumer vulnerability is evident in e-commerce. Many consumers do not know how e-commerce functions and changes. For example, many consumers are not aware that their online activities might be monitored. Naivety of technology makes consumers easily fall victim to dishonest sellers and online criminals.

In summary, the Internet presents a market environment with high uncertainty, risk, inconsistency, and higher probability for opportunism. Consumer vulnerability in the Internet context is high, a result of the short history of the Internet as well as the consumer's own ability to catch up with a new technology. In such a market environment, consumer trust becomes essential in the initiation, building, and sustaining of an exchange relationship. In other words, to win business, e-vendors must first win consumer trust.

This study argues that consumer trust has three dimensions associated with benevolence, integrity, and competence. However, it uses overall trust as a dependent variable in order to reduce the complexity of the proposed model and increase the interpretation of the tested results.

**Antecedents**

The previous section has presented the conceptualization of online trust. In this section antecedents of online trust are evaluated. This study applies the hierarchical...
framework of trust sources as identified in the first section to derive major antecedents of online trust. It finds that a consumer’s trust in a website can reside in the individual characteristics of the consumer, the website, and the interaction of the consumer with the e-vendor through the website.

Characteristics-based Trust

Individual Characteristics

Major characteristics of an online consumer that might significantly impact the formation of this consumer’s trust in a website, as suggested in the traditional literature, might include disposition to trust, attitude toward online shopping, behavior control, past purchase behavior, personal values, gender, age, education, income, and culture.

Disposition to trust:

As described in Section 1, a person’s disposition to trust is formed in a person’s childhood and presents this person’s readiness or willingness to trust others. There are two types of dispositions to trust (McKnight, et al, 1998): faith in humanity and trusting stance. The more a person has faith in humanity, the more this person tends to trust others; the more a person has a trusting stance (i.e., belief that s/he will obtain better interpersonal outcomes by dealing with other people as though they mean well), the more this person tends to trust others. These beliefs have gained wide acceptance among scholars in traditional literature. This study proposes that these beliefs be applied in e-commerce.
Attitude and behavioral control:

The Theory of Planned Behavior (Fishbein & Ajzen, 1975) and its extensions (Shim, et al, 2001) suggest that an attitude towards a behavior is an immediate determinant of intention to perform a behavior. Attitude towards a behavior is recognized as a person’s positive or negative evaluation of a relevant behavior and is composed of a person’s salient beliefs regarding the perceived outcomes of performing a behavior. The Theory of Planned Behavior further proposes that intention to perform a behavior is the proximal cause of such a behavior. Intentions represent motivational components of a behavior, that is, the degree of conscious effort that a person will exert in order to perform a behavior. Perceived behavioral control refers to the perception of ease or difficulty in performing a behavior and risk involved in performing a task. The aspect of ease or difficulty specifically relates to whether or not a person perceives that s/he possesses requisite resources and opportunities necessary to perform the behavior in question.

In the context of E-commerce (Shim, et al, 2001), a consumer’s attitude toward online shopping is mirrored by this consumer’s perceptions of shopping convenience that can be measured by the extent to which a consumer accepts the Internet as a new shopping medium and how useful it really is to her/him. Perceived behavioral control is the perception of ease-of-use of the Internet as a shopping means, and perceived control in interaction. An online consumer’s perceived control in an Internet interaction involves two issues: system security and information privacy. These two issues have gained extensive discussions and are considered negatively related to a consumer’s trust.
Past purchase behavior:

In Theory of Planned Behavior, Fishbein, et al (1975) did not include past behavior as a predictor. Other researchers, however, asserted that inclusion of past behavior in the model would significantly improve the prediction of behavior (Benthler & Speckart, 1979, 1981; Sutten & Hallent, 1989, 2001). This is based on the argument that behavior is influenced by learned predispositions to respond that are not readily encompassed by the concepts of attitude and intention (Benthler & Speckart, 1981; Shim, et al, 2001). Shim & Drake (1990) find that consumers with strong intentions to shop electronically have previous experience with other non-store shopping formats as well as prior experience with the use of personal computers. Similarly, Liang & Huang (1998) find that consumers’ prior experience had a moderating effect in predicting their acceptance of Internet shopping. Research related to the adoption of other technology-based shopping formats have also indicated that previous non-store experience may help predict intention to adopt interactive electronic formats (Eastlick, 1996) and that shoppers who use electronic shopping technologies have more experience with these or related technologies (Weber & Roehl, 1999). Thus, past non-store and online experiences may have a direct impact on a consumer’s trust in an e-firm, because knowledge or experience is related to increased assessment of trustworthiness of other people. Miyazaki & Fernandez (2001), find that more experience with the Internet and the use of other remote purchasing methods are related to lower levels of perceived risk toward online shopping, which in turn results in higher online purchase rates.

A consumer’s past purchase behavior is also stated in knowledge-based trust (see Section 1: Figure 1). Since here it measures a consumer’s overall experience with e-
commerce, rather than with a specific website, it is treated as an individual characteristic. A consumer’s past behavior with non-traditional shopping means can be examined through three aspects: the time length that a consumer has access to the Internet, the frequency that this consumer makes purchases/visits online, and this consumer’s previous shopping experience through other direct purchase methods such as paper catalogs.

**Personal values, gender, age, and education:**

A person’s values can greatly influence a consumer’s trust towards others (Jones & George, 1998). Typically, people incorporate their values into their value system and prioritize them in terms of their relative importance as guiding principles (Rokeach, 1973). Thus, a person’s value system guides behavior and the interpretation of experience by furnishing criteria that a person can use to evaluate and make sense of events and actions in the surrounding world. The particular value system determines types of behaviors, events, situations, or people that are desirable or undesirable. An individual whose value system emphasizes loyalty and honesty, for example, will strive to achieve loyalty and honesty in his or her relationships with others. Values contribute to the generalized experience of trust and can even create a propensity to trust (Mayer, et al, 1995) that surpasses specific situations and relationships. These assertions are consistent with the large body of literature on trust. For example, Barber (1983) suggests that trust serves to maintain and express the shared values that trust originates from and that shared values help create relationships characterized by trust. Another example, consistent with the research by Rotter (1980), comes from Good (1988) who suggests that people who are trustworthy (or endorse such values as honesty) tend to view others as trustworthy (or as endorsing similar values underlying trust). Clearly existing theory and
research suggest that trust can be based on enduring and relatively stable characteristics of individuals enshrouded in a person's value system.

Most consumer studies have incorporated sociodemographic variables as conventional consumer characteristics influencing consumer perceptions of companies, salespersons, and products. For example, the consumer behavior models of Fisk (1961-1961) and Sheth (1983) include the socio-demographic characteristics of consumers as antecedents to cognitive processes. Age, gender, and education appear to be major factors of consumer trust. Johnson-George & Swap (1982) studied the effects of gender on a person's trust in other people and found that male and female subjects look for different qualities in another person when assessing his or her trustworthiness. Many researchers find that males and females seem to use the Internet differently. For instance, Sheehan (1999), and Smith & Whitlark (2001) find that women and men use the Internet for different purposes and indicate different concerns about online shopping. These observations are consistent with those shown in the annual web surveys conducted by Georgia Institute of Technology (GVU, 1994-1998). The GVU's surveys also reveal identical patterns on Internet users' demographics over years. For instance, the average age of Internet users is approximately 35 years old; more than 50% of the respondents have a college degree; and there are more male users than female users.

Therefore, it is useful to examine these variables and see whether requirements for online trust are different between male and female, different age groups, and education levels. This leads to the first hypothesis of this dissertation:

Hypothesis 1: Individual characteristics significantly influence a consumer's overall trust in a website. Such individual characteristics include disposition to trust (faith in
humanity and trusting stance), attitude towards online shopping, behavioral control, past purchase behavior, personal values, gender, age, and education.

**Website Characteristics**

A major difference between online and offline commerce is the "impersonal" nature of the former. In e-commerce, the seller becomes "faceless." A firm and its salespersons are replaced by a single identity, a website. The website serves as a "non-human" salesperson "working" 24 hours a day and seven days a week, and mediating the relationship between the consumer and the firm. In other words, the relationship between a consumer and an e-vendor becomes a simple interaction between the consumer and a website.

The presence of a website undoubtedly can convey a sense of a firm's trustworthiness to consumers. A website has its own "personality" and its appearance and structure certainly can encourage or discourage consumer purchase intentions through consumer trust and acceptance. This view has support in the early Internet literature, where researchers found that some web features and layout such as appeal, graphics, readability, and ease-of-use had impact on consumers' clicking frequency and directions (e.g., Murphy, 1999).

Therefore, it is important to examine the perceived "characteristics" of a website and see how they impact the formation of a consumer's trust in this website. In traditional buyer-seller relationships, a salesperson's expertise in product and selling, likeability, honesty, consistency, customer-orientation, similarity with the customer, and prior experience all are considered important factors that contribute to consumer trust in both the salesperson and the firm (e.g., Frazier, Spekman, & O'Neal 1988; Czepiel, 1990;
Beatty, Mayer, et al, 1996; Webster Jr., 1968; Swan, Trawick, Jr., Rink, & Roberts, 1988). Some of these seem applicable to describe a website. In addition, this study finds that four of the five standards of software evaluation (IEC9126 – 1) published by ISO (2001) can be used to identify the important attributes that a quality website should possess. These attributes include functionality, usability, efficiency, and reliability. Incorporating these standards of software evaluation with requirements for a real salesperson, this study suggests that these five elements can represent a website’s “characteristics,” which are: functionality, usability, efficiency, reliability, and likeability. Table 2 provides definition for each variable.

Table 2
Characteristics of a Website (adopted from IEC9126-1, 2001)

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Usability</th>
<th>Efficiency</th>
<th>Reliability</th>
<th>Likeability</th>
</tr>
</thead>
<tbody>
<tr>
<td>What a website can really provide users with. A checklist of all the features and functions, which are grouped into must-to-haves and nice-to-haves.</td>
<td>The extent to which a website is convenient and practical to use.</td>
<td>Speed of use. How quickly the user can make an order or click through a website and whether all the features on a website can be fully utilized</td>
<td>A set of attributes that bear on the capability of software (system) to maintain its level of performance under stated conditions for a stated period time</td>
<td>The attractiveness of a website, e.g., graphics, color, layout, flash, and other hi-tech features</td>
</tr>
</tbody>
</table>

In the following, this study presents its second hypothesis:

Hypothesis 2: Website characteristics significantly influence a consumer’s overall trust in this website. Such website characteristics include functionality, usability, efficiency, reliability, and likeability.
Calculus-based Trust

Angeles (1992) says that expectation of receiving positive value from participation is the core driver for a consumer to engage in having a relationship with a firm. The consumer always looks for cues that can help him or her infer the possible outcome before engaging in an exchange relationship.

In channel management research, such factors as firm size, number of years that a firm has been in business, reputation, and brand recognition are considered important mental shortcuts for a consumer to calculate possible costs and benefits if the firm violates a promise (Doney & Cannon, 1997). Firm size refers to the firm's overall size (e.g., financial and personnel resources) and its market share position. Large size and market share indicate that the firm has a large number of consumers and has followed through with commitments made to its consumers. This is because it would not have been possible for the firm to maintain its position in the industry without such a perception by consumers. On the other hand, a less trustworthy and more opportunistic firm would be unable to build sales volume or large market share (Hill, 1990). Therefore, consumers would rationally (Lewichi, et al., 1995) determine that since larger firms would incur significant costs through untrustworthy behavior than smaller firms, there is merit in trusting larger firms. The number of years a firm remains in business also determines the level of trustworthiness of a company. A less trustworthy company will not be able to be in business for a long time.

Firm reputation is also an indicator of trust. In an exchange relationship, the professional reputation of a firm serves as a hostage. If the firm begins to violate the consumer's trust, the consumer quickly lets it be known, throughout the network of
friends, colleagues, and associates, that the firm is disreputable (Lewichi, et al, 1995). Since developing a favorable reputation involves significant investment and represents a valuable asset (Hill, 1990; Doney, et al, 1997), firms are reluctant to jeopardize their reputation by acting opportunistically (Telser, 1980). Empirical evidence supports the link between a good reputation and customer trust. Ganesan (1994) found that a retailer’s favorable perception of a vendor’s reputation leads to increased credibility, which is one dimension of the trust construct. Similarly, Anderson and Weitz (1989) found that a channel member’s trust in a manufacturer is positively related to the manufacturer’s reputation for fair dealings with channel members. Therefore, this study posits its third hypothesis:

Hypothesis 3: A website’s reputation significantly influences a consumer’s overall trust in this website.

Institution-based Trust

Although “inhuman,” a website is the major “interface property” that a consumer can see about, and interact with, an e-vendor and hence it is an important means for an e-vendor to present its trustworthiness to consumers. Theory of institution-based trust suggests that formal mechanisms such as professionalism or third-party insurance, i.e., situational normality and structural assurances, can initiate a sense of trust in a company. In the context of e-commerce, a “professional” look of a website will provide consumers with a sense of normality. While it is hard to define whether a website is “professional,” consumers can gain a feeling of normality through a set of tangible cues. Such tangible cues are structural assurances, which are deliberately used in a website to entice a consumer’s trust. These tangible cues are also defined as trusting infrastructure by many
e-commerce researchers. The common tangible cues used as trusting infrastructure in e-commerce can be observed as: 1) Regulation cues, including product return policy, service guarantee policy, information privacy and security policy, availability of mailing address and telephone number, and display of company history; and 2) Guarantee cues, including feedbacks and testimonials of existing consumers, credible information (e.g., a diploma and licenses), and third-party seals. The popular seals used in many websites include TRUSTe for privacy assurance, WebTrust indicating that the firm’s compliance with standards of internal business processes or order fulfillment, and ThAWTe assuring that the firm has employed specific technologies to enable secure and reliable order and payment handling and legal recourse indicating that the firm will make every effort to fulfill its promises to consumers, or risk reaping sanctions, through social disapproval or legal action (Sitkin, et al, 1995; McKnight, et al, 1998; Kimery, et al, 2002). Therefore, this study forms its fourth hypothesis:

Hypothesis 4: Trusting infrastructure implemented on a website significantly impacts a consumer’s overall trust in this website. Typical trusting infrastructure includes regulation cues (e.g., privacy and security policies) and guarantee cues (e.g., diploma, third-party seals).

Knowledge-based Trust

A consumer’s increased knowledge and familiarity about a website can improve this consumer’s predictions on this e-vendor’s future actions. If the accumulated experience and information about the e-vendor is positive, the consumer will predict the e-vendor’s future behavior in rather positive way. That is, the consumer’s trust in this e-vendor will be strengthened.
As stated in Section 1, familiarity is built through repeated interactions between two parties, which include repeated purchases or information uses, regular communication, and courtship. Repeated purchases or information uses through a website provide a consumer with first-hand information about the e-vendor’s trustworthiness. Regular communication refers to marketing activities initiated by an e-vendor to inform a consumer of its new products and services or to remind a consumer of its existence. Many e-vendors send consumers e-newsletters and e-mail advertising on a regular basis. Courtship is a means to facilitate a long-term relationship. In e-commerce, it can be interpreted as free benefits such as comps or discounted offers.

Increased familiarity in itself cannot increase a consumer’s trust in an e-vendor. Negative experience can only drive a consumer away from a website. Therefore, it is important to measure the impact of positive interactions on a consumer’s trust in a website. In marketing, two major factors, perceived service quality of and satisfaction with a company are popularly used to evaluate a consumer’s post-purchase evaluations. As stated by Warrington, Abgrab, & Caldwell (2002), tangible evidence can only initiate a low-level of trust that can lead to the first transaction; but once initiated, it gives marketers a chance to build a higher-level of trust that will lead to repeated transactions through quality service and customer satisfaction. Therefore, this study posits its fifth hypothesis:

Hypothesis 5: A consumer’s repeated interactions with a website significantly influence a consumer’s overall trust in this website. Indicators of repeated interactions include frequency of purchases/obtaining information from the website, frequency of receiving marketing pieces, perceived service quality, and overall satisfaction.
In this section this study has discussed the major trust sources in e-commerce and antecedents of consumer trust that can be derived from these sources. A number of hypotheses to be empirically tested in Chapter 4 are also presented.

**Consumer Online Behavioral Intention**

Both academic and industry researchers agree that theories of consequences of trust in traditional literature can be directly applied to e-commerce since, after all, e-commerce is about nothing else but selling products and services in a computer mediated market environment and the main identities involved in an exchange relationship are still consumers and sellers. To prove the accuracy of this view, Sultan, et al (2002) empirically tested the mediating role of trust in their large-scale study and found that trust does mediate the relationship between website and consumer characteristics and consumer behavioral intent.

This study measures the effect of online trust on consumer behavioral intent rather than actual behavior. The reason is that trust is an enabler but there are many other variables that can influence a consumer’s actual actions. In e-commerce, a trusting consumer usually intends to: 1) Go back to visit the same website again; 2) Make purchases from the same website again; 3) Follow advice given by that website; 4) Share his/her personal information with the e-vendor; and 5) Recommend this website to other people (Sultan, et al, 2002; McKnight, et al, 2002; Koufaris, et al, 2002).

In this study, two issues, likelihood of making a purchase again and recommending a website to other people, are used. These two issues are two established dimensions measuring consumer behavioral intent in the studies relating to service quality (e.g., Zeithaml, 1988), customer loyalty (e.g., Bowen, et al, 1998), and customer satisfaction...
(e.g., Oh, 2000). In this study, the relationships between trust and likelihood to purchase and to recommend are not hypothesized, but examined to assess the predictive validity of the proposed model.

Summary

This chapter reviews the literature information on trust in traditional disciplines as well as that in e-commerce. Additionally, this chapter presents a conceptual framework and hypotheses highlighting the casual relationships between the construct of online trust and its antecedents. The next chapter will discuss methodology for developing measures, designing a survey instrument, collecting data, and utilizing related statistical analysis to test the proposed hypotheses.
CHAPTER 3

METHODOLOGY

Introduction

This chapter presents the research design used. First, it discusses measurement development. Second, it describes the organization of the survey instrument. Third, it outlines the sample procedures, including population and sample size. Fourth, it presents how the data was collected. Fifth, it describes how the data should be handled before a formal data analysis, including the accuracy of the data file, missing data analysis, outliers, and assumptions.

Measurement Development

There is no global measurement that can be directly borrowed to operationalize the constructs of consumer trust in e-commerce proposed in this study. There are several reasons for this phenomenon. First, there is disagreement on the definition and dimensionality of trust in cross-disciplines. This has resulted in different scales, even in the same discipline, and the disagreement has been extended to the study of e-commerce. Second, a marketing measurement is usually influenced by the particular nature of a marketing phenomenon. A universally applicable marketing measurement does not exist. Third, e-commerce is a new discipline, emerging with the advent and growth of the Internet. The study of consumer trust in e-commerce is still at its inception and a well-
developed and validated measurement measuring consumer trust in e-commerce is not yet available.

Therefore, a set of measurements were developed by following the five-step procedure for developing measures suggested by Churchill, Jr. (1979): 1) Specify domain of the construct; 2) Generate sample of items; 3) Collect data; 4) Purify measures; and 5) Assess validity.

The measures used in this study came from a number of sources. Some were well-established items borrowed directly from the literature, whereas some were new items derived from definitions applicable to e-commerce only. Since the data was collected through a specific website, MDotCom, which was introduced in Section 4 of this chapter, some questions had the website’s name. The following illustrates all the constructs, as illustrated in Figure 1 of Chapter 2 (page 35), to be measured and specific items used to measure them.

**Overall Trust**

Consumer trust in an e-vendor in this study was measured by overall trust, which refers to a consumer’s general impression of an e-vendor’s trustworthiness and is not associated with any specific dimension of trust (Chapter 2, Section 1). This study adopted reliable measures of overall trust tested by Swan, et al. (1988). The four items used in the study by Swan, et al. (1988) were designed to measure an industrial buyer’s trust in a supplier’s salesperson, but appeared likely to fit an exchange relationship in e-commerce, where a website serves as a “non-human” salesperson “working” 24 hours a day and seven days a week, and mediating the relationship between the consumer and the firm. The alpha reliability of the overall trust measure in the study of Swan, et al. was
0.88. However, since the Internet market demonstrates a different research environment, the reliability of these measures must be re-tested. A 7-point Likert scale was used in the study of Swan, et al. (1988), which was used in this study also, with “1 = strongly disagree” and “7 = strongly agree.” The items used to measure overall trust are as shown as follows:

1) I am not sure that trusting MDotCom would be a good idea.
2) I have good reason to trust MDotCom.
3) I have doubts about trusting MDotCom.
4) I feel that I can completely trust MdotCom.

**Consumer Characteristics**

Eight constructs in the block of consumer characteristics have been identified from previous studies to have possible significant impact on a consumer’s overall trust in an e-vendor. These eight constructs as shown in Table 2, Chapter 2, are disposition to trust (faith in humanity and trusting stance), attitude toward online shopping, perceived risk associated with online shopping, past purchase experience with non-traditional shopping means, personal values, gender, age, and education.

**Disposition to Trust**

Disposition to trust is a well-discussed construct. This study borrowed and modified six items developed by Teo and Liu (2002). These items covered all the aspects of the concept of disposition to trust as defined by (McKnight, et al, 1998). A 7-point Likert scale is used for these items, with “1 = strongly disagree” and “7 = strongly agree.” These six items, three for faith in humanity and the other three for trust stance, are listed as follows:
1) Faith in humanity 1: Other people are well-meaning
2) Faith in humanity 2: Other people are trustworthy
3) Faith in humanity 3: Other people are reliable
4) Trusting stance 1: I trust other people until they give me some reason not to trust them
5) Trusting stance 2: I believe that I will get better interpersonal outcomes by dealing with them as though they are well-meaning
6) Trusting stance 3: I believe that I will get better interpersonal outcomes by dealing with them as though they are reliable

**Attitude Toward Online Shopping**

Authors studying consumer attitudes toward online shopping have suggested different meanings and measures. This study derived its own measures for this construct from the definition offered by (Shim, et al, 2001). Six questions were developed and a 7-point Likert scale was used as well. These six measures are:

1) The Internet makes my life more interesting
2) I enjoy shopping online
3) The Internet has brought great convenience to my life
4) The Internet makes my life easier
5) The Internet has improved my work productivity
6) Shopping on the Internet is easy

**Perceived Risk**

Perceived risk is an important aspect of behavioral control (Shim, et al, 2001). Based on this implication, three items describing perceived risk associated with online shopping
were borrowed from Shim, et al. (2001) but modified to measure this construct. Also, a
7-point Likert scale, with “1 = strongly disagree” and “7 = strongly agree,” was applied.
These three items are displayed as follows:

1) Shopping on the Internet is risky
2) There is too much uncertainty associated with shopping on the Internet
3) Compared with other methods of purchasing, shopping online is riskier

Past Purchase Experience

Past purchase behavior refers to both prior experience with the Internet and other
non-traditional shopping means. Consumers with strong intentions to shop electronically
have previous experience with other non-store shopping formats, such as paper catalogs,
as well as prior experience with the use of personal computers (Shim, et al, 1990). Based
on this understanding, three questions, which were on nominal scales, were created to
measure a consumer’s previous experience with non-traditional shopping means:

1) How many times have you made purchase from any website in the last six
   months?
2) About how long have you had access to the Internet?
3) Have you every ordered a product or service from a paper catalog?

Three more questions, borrowed from Shim, et al’s study (1990), were modified to
measure a consumer’s attitude toward non-traditional shopping means. These items were
places on 7-point Likert scales, with “1 = strongly disagree” and “7 = strongly agree.”
These three items are:

1) Most of the paper catalogs and mail advertising are helpful and informative.
2) I enjoy reading most of the paper catalogs and advertising mail I receive.
3) I enjoy reading or looking at most of the e-catalogs and e-advertising I receive.

**Personal Values**

Seven items derived from various studies (Chapter 2, Section 3) were used to measure the construct of personal values. These items were also placed on a 7-point Likert scale, with “1 = strongly disagree” and “7 = strongly agree,” and are listed as follows:

1) I am a reliable person

2) I am a responsible person

3) I am an open person

4) I am a fair person

5) I am a loyal person

6) I never promise what I cannot fulfill

7) I always try to act in a consistent manner in my daily life

**Gender, Age, and Education**

Nominal scales were used for consumer’s demographics. Gender was placed on a nominal scale with “1 = male” and “2 = female.” Age was placed on a seven-level nominal scale, while education was placed on a six-level nominal scale.

**Website Characteristics**

Five constructs of a website’s characteristics were identified in Chapter 2. These constructs were functionality, usability, efficiency, reliability, and likeability. Multiple items were developed for each construct from their definitions (see Table 3 in Chapter 2). 7-point Likert scales were used for all the items, with “1 = strongly disagree” and “7 = strongly agree.” A summary of these measures are shown as follows:

1) Functionality 1: MDotCom clearly explains how user information is used.
2) Functionality 2: MDotCom’s purchase system is stable and consistent.

3) Usability 1: It is easy to navigate MDotCom.

4) Usability 2: It is easy to get familiar with MDotCom.

5) Efficiency 1: Purchasing on MDotCom is a fast process.

6) Efficiency 2: It is easy to find what I want on MDotCom.

7) Efficiency 3: MDotCom has up-to-date information.

8) Efficiency 4: MDotCom has rich information about MM city.

9) Reliability 1: MDotCom has never crashed my computer.

10) Reliability 2: MDotCom is available any time.

11) Likeability 1: The graphics on MDotCom are likeable.

12) Likeability 2: MDotCom captures my attention.

13) Likeability 3: The color of MDotCom is pleasant.

14) Likeability 4: The layout of MDotCom is attractive.

**Calculus-based Trust: Reputation**

In the studies of consumer trust in e-commerce, different authors used different scales to measure variable Reputation (e.g., Jarvenpaa, et al., 1999). To make the survey instrument more managerial and to increase the response rate, this study used one single item to measure this construct. This item was placed on a 7-point Likert scale, with “1 = Strongly Disagree” and “7 = Strongly Agree.” This single item was: “MDotCom has good reputation.”

**Institution-based Trust: Cues**

Typical trusting infrastructure, as discussed in Section 3 of Chapter 2 includes tangible evidences such as regulation cues and guarantee cues. Five items were derived
to represent five major tangible evidences that a typical website should have. The 7-point Likert scale was also used, with “1 = Strongly Disagree” and “7 = Strongly Agree.” These measures are displayed as follows:

1) The security policy for credit card information on MDotCom is clear.
2) The privacy policy on MDotCom is clear.
3) Contact information for MDotCom (e.g., mailing address, 800 number) is clear.
4) MDotCom’s background information (e.g., history) is clear.
5) The third-party assurances (e.g., TRUSTe) on MDotCom is easy to see.

**Knowledge-based Trust: Repeated Interactions**

As identified in Chapter 2, indicators of repeated interactions between a website and a consumer include frequency of purchasing or obtaining information from a website, frequency of receiving marketing communications from an e-vendor, service quality, and overall satisfaction. Single questions placed on nominal scales were developed to measure frequency of interactions, which include:

1) Before today, about how many times had you visited MDotCom?
2) Have you ever purchased any travel-related product or service through MDotCom?
3) About how many times a month do you receive communication, such as emails, from MDotCom?

A single measure placed on a 7-point Likert scale was used to measure a consumer’s overall satisfaction, with “1 = Extremely Unsatisfied” and “7 = Extremely Satisfied.” It is noteworthy that frequency of previous purchase or visits here was different from that as identified in consumer characteristics. The items

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listed here were to measure a person's frequency of visits to and purchases from a specific website, while those in the block of consumer characteristics were to measure a person's frequency of visits to any website, emphasizing a person's overall experience with e-commerce.

This study proposed that online service quality mainly consisted of speedy service, customized service, and convenience. These three dimensions were top benefits appeared in the studies investigating motives that bring consumers to the Internet (e.g., Keeney, 1999; Lang, 2000; Bowen & Chen, 2002). The six items used to measure perceived online service quality were borrowed from Parasuraman, et al's SERVQUAL measurement scale, but were modified to fit the e-commerce context. They were placed on a 7-point Likert scale, with “1 = Strongly Disagree” and “7 = Strongly Agree.” These items are:

1) MDotCom responds to my inquiries in a timely manner.
2) MDotCom has given me individual attention.
3) The online customer service or help on MDotCom is available all the time.
4) MDotCom understands my specific needs.
5) MDotCom is willing to customize its services for me.
6) I can track my order through MDotCom anytime.

**Consumer Online Behavioral**

The construct of consumer online behavioral intent in this study was measured from two aspects: a consumer’s intention to purchase in the future and likelihood to recommend to others. In the literature, these measures were usually placed on a 5- or 7-point Likert scale, as “1 = Extremely unlikely” and “7 = Extremely likely.” To keep it
consistent with other measures, this study placed two questions for consumer online behavioral intentions on a 7-point Likert scale. These two measures are:

1) How likely are you to purchase a travel-related product or service through MDotCom?

2) How likely are you to recommend MDotCom to others?

In summary, multiple measures were created for such constructs as overall trust, faith in humanity, trusting stance, attitude associated with online shipping, perceived risk associated with online shopping, personal values, previous experience with non-traditional shopping means, website characteristics, trusting infrastructure (i.e., tangible cues on a website), and service quality. Single items would be used for other constructs such as calculus-based trust (i.e., reputation), overall satisfaction, frequency of Internet usage, and demographic variables. Both nominal and interval scales were applied. The next section presents how the survey instrument was constructed.

The Survey Instrument

The survey instrument consisted of four sections. The first section included screening questions relating to a participant's frequency of Internet usage, previous experience with other non-traditional shopping means, familiarity and overall satisfaction with a specific website. The second section includes questions measuring website characteristics, calculus-based trust effects, institution-based trust effects, knowledge-based trust effects, and overall trust. The third section included questions measuring consumer characteristics. The fourth section included questions designed to gather demographic information and consumer behavioral intentions.
The full version of the survey instrument had a total of 76 questions. Some of the questions were designed for the use of MDotCom only and would not be used in this data analysis. Therefore, Appendix I only shows all the questions used in this study. The instrument was pre-tested for its content validity, completeness, readability, completion time, and web page design. A total of 27 research experts and students were consulted. Based on the feedback, jargon words were clarified; redundant questions were removed; and some sentences were re-worded. The font, color, labels, and graphics on the web page hosting the survey instrument were changed to be more “participant”-oriented.

In this survey instrument, both nominal and interval scales were used. All the statements in section 1 and section 2 were placed on 7-point Likert scales. Likert scales require respondents to indicate a degree of agreement or disagreement with each statement. Likert scales are widely used in marketing survey research, especially for attitude measurement (Malhotra, 1999). Several advantages are evident in applying Likert scales: 1) They are easy to construct and administrate; 2) They generally follow from an appealing model; 3) They usually possess high reliability; 4) They can be adopted to measure different kinds of attitudes and have generated meaningful results in many previous research studies (Nunnally, 1978); and finally, many existing studies relating to consumer trust and relationships use Likert scales. Therefore, it is reasonable for this dissertation to use Likert scales. Once Likert scales are chosen, the range of the scale needs to be decided. Generally speaking, 5-point and 7-point scales are most commonly applied in marketing survey research. The odd-numbered Likert scale provides a midpoint, allowing respondents who have neutral feelings to answer the questions. In addition, the wider the range of the scale, the greater variances would be
expected. However, a larger sample size is required for the wider scale range. Therefore, when there is a limitation of collecting data from a large sample size, a 5-point scale is recommended. In this study, collecting a large enough sample size was not regarded as a problem. Therefore, applying a 7-point scale could be realized.

Finally, the wording of the majority of the Likert scale statements follows a positive format, which is consistent with the previous studies. Malhotra (1999) says that it is important to follow a consistent wording format when using Likert scales in a summated context so that a high or low score consistently presents a favorable or unfavorable response. Most of the Likert scale statements in this instrument were positively worded, but there were a few exceptions, which were well established items borrowed from previous studies. The scores of these variables were reversed when factor analysis was conducted in Chapter 4.

Sampling Procedures

Population and Sampling

After purifying the survey instrument, this study proceeded to formal data collection. Before selecting the sample, a population must be defined. In this dissertation, the population was defined as all the U.S. online visitors who have purchased or obtained information from any website at least once in the past six months. A convenience sampling technique was used in this dissertation. The respondents in this study were chosen primarily because they happened to log on MDotCom during the specific time periods. MDotCom, a disguised name for a real commercial website, is a travel-related portal. It provides visitors with travel-related information about a tourist destination as
well as accepts reservations on hotels, rental cars, show tickets, guide tours, and other travel-related products. MDotCom has millions of clicks every month. The visitors to MDotCom represent a large group of online visitors from different parts of the world and possess the information sought by the researcher and about which inferences were to be made.

**Sample Size**

Sample size refers to the number of online visitors to be included in this study. Determining the sample size involves both qualitative and quantitative considerations. The qualitative considerations, as stated by Malhotra (1999), include: 1) The importance of a decision. More information and precision are needed for an important decision. This demands a larger sample size. However, sometimes, as the sample size increases, each unit of information is obtained at greater cost. 2) The nature of the research, i.e., whether the research is qualitative or quantitative. Usually, a qualitative research does not require a large sample size. 3) Sample sizes used in similar studies. 4) Incidence rates, i.e., the number of eligible respondents. 5) Completion rates, and 6) Resource constraints, which include time, money, and personal.

Quantitative considerations, as suggested by different statisticians, involve the following major issues: 1) The absolute precision desired in the study. A high level of precision requires a large sample size. 2) A specified level of statistical significance, which is also called alpha level ($\alpha$, or significance level), or the odds that the observed result is due to chance. A high significance level requires a large sample size. 3) The number of variables involved in the study. The cumulative effects of sampling error across variables can be reduced in a large sample. 4) The statistical techniques to be
applied. If sophisticated analysis of the data using multivariate techniques is required, the sample size should be large.

An appropriate sample size for a research can be calculated. Formulas that calculate the sample size based on the absolute precision approach to estimate a population parameter with either a known population variance or an unknown population variance can be found in many marketing research books, such as the one by Churchill, Jr. (1995). However, the sample size criteria based on estimating the population parameter was not used in this study.

The required sample size in this dissertation was primarily dependent upon the variables in the study and statistical techniques. This dissertation identified 29 potential factors that might be influential on the formation of consumer trust (see Table 3, Chapter 2). Green's (1991) rule of thumb for a case-to-IV ratio is \( N \geq 50 + 8m \) (\( N \) = sample size; \( m \) = the number of IVs). Based on this formula, the required minimum sample size for this dissertation will be 282, i.e. \( 50 + (8 \times 29) = 282 \).

In conjunction with the case-to-IV ratio, the proposed statistical techniques, Principal Component Factor Analysis (PCA) and Multiple Regression Analysis (MR), would also influence the required sample size.

Researchers have different opinions regarding the required sample size for factor analysis. Based on Comrey & Lee's (1992) sample size guideline for factor analysis, a sample with 50 cases is very poor; 100 cases is poor; 200 cases is fair; 300 cases is good; 500 is very good; and 1,000 is excellent. Tabachnick & Fidell (1996) state that if the factor analysis is applied in an exploratory or confirmatory study, a minimum of 300 responses will be required. However, these authors add that 150 cases will be deemed
sufficient when the factor solutions have many variables with high loading scores. Hair, et al’s, (1998) rule of thumb for factor analysis is that, at the high end, there should be at least ten responses for each item and at the low end, five responses for each item is tolerable. Based on Hair, et al’s, view an adequate sample size for this dissertation should be between 145 cases (5*29) and 290 (10*29).

Several guidelines regarding the required sample size for multiple regression analysis are set. Anderson & Gerbing (1988) contend that a minimum sample size of 150 is needed to obtain the parameter estimates that have the small enough standard errors of practical usage. Hair, et al’s, (1995) suggestion for calculating the required sample size for a multiple regression analysis is 15 to 20 observations per independent variable. Based on Hair, et al’s, view, an adequate sample size for this study should be between 435 cases (15*29) and 580 cases (20*29).

There are more suggestions on the decision of an appropriate sample size. However, researchers need to be cautious about a large sample size recommended by a given guideline. A large sample size has potential drawbacks. Although an increase in sample size reduces sampling error, it often leads to an increase in the total error of a research effort because other errors increase more than proportionately with sample size (Churchill, Jr., 1995). The larger the non-response problem, the greater the question of whether the responses secured are representative of the selected sample. Response error can also increase when the sample size is increased. A larger sample will typically mean the use of more interviewers if the study is being done by phone or in person. This raises a host of issues with respect to the selection and training of the interviewers so that they all handle the interviews in the same way. Otherwise, the different responses secured can
be as much a function of the interviewers. A study shows that non-sampling error is the major contributor to total survey error, while random sampling error is minimal (Churchill, Jr., 1995). Researchers such as Hair, et al. (1995) point out that over-sensitivity would be caused by a fairly large sample size, such as 400 to 500. This means that it is possible that the detected significant differences might be caused by a large sample size rather than the actual difference among the respondents.

Therefore, Tabachnick, et al. (1996) suggest that in addition to considering the number of variables, researchers should also consider the statistical and practical reasons when deciding a sample size. Tabachnick, et al. (1996) further state that researchers apply "the smallest number of cases that has a decent chance of revealing a relationship of a specific size."

Drawing upon different views, the author of this study concluded that a sample size between 200 and 300 would be sufficient for 29 variables and could accommodate different general sample size requirements for applying the proposed statistical techniques, Factor Analysis and Multiple Regression Analysis. Any sample size between 200 and 300 responses should be large enough to detect legitimately significant differences and small enough to prevent statistical over-sensitivity toward slight variations.

Data Collection

Pros and cons of web page-based surveys

The Internet offers both web page-based surveys and e-mail for prospective researchers to use for data collection (Sheehan & Hoy, 1999). A web page-based survey
refers to that a researcher posts a survey instrument on the Internet and lets online visitors self-select to complete the survey. A web page-based survey tends to collect data from individuals all over the world. Web page-based surveys have numerous advantages compared with traditional survey methods (Sheehan, et al., 1999). First, a web page-based survey has design flexibility. It can take advantage of the graphic power available through programming languages such as HTML and JavaScript to create an attractive, interesting, and compelling survey that is inviting to respondents (Schillewaert, Langerak & Duhamel, 1998). The use of CGI scripts allow adaptive questioning, which means that the questions that a respondent is asked depend on his or her answers to previous questions (Kehoe & Pitkow, 1996). This allows for follow-up questions that can enrich responses as well as easier navigation for respondents. Second, a web page-based survey can achieve broad reach. Web page-based polls have been noted for their ability to generate a high number of responses (Kehoe, et al., 1995). The GVU polls at the Georgia Institute of Technology generate more than 10,000 responses per poll.

Third, a web page-based survey can save time. A high volume of responses can be collected very quickly (Smith, 1997; McCullough, 1998). For example, studies have shown that several hundred responses can be generated over the course of a single weekend (McCullough, 1998). This time factor alone suggests huge benefits over traditional surveying techniques in terms of being able to collect and analyze data quickly, and implement decisions based on the findings. Fourth, a web page-based survey is cost-effective. The costs of both data collection and analysis can be minimized by the use of web-based surveys (McCullough, 1998). Except for the high start-up costs for equipment and web page design, the actual implementation of a survey can be almost
free, with no costs for paper or postage. Data analysis can be simplified by a direct transfer from the form to the analysis software, where limited data cleaning would be necessary (McCullough, 1998).

The fifth benefit of a web page-based survey is anonymity. Web page-based surveys allow for anonymity in responses, since the respondent can choose whether to provide his or her name. Previous research (Kiesler & Sproull, 1986) has indicated that anonymity may affect response rates positively, as respondents may be more willing to respond without fear that their answers may be identifiable to them.

Another benefit of a web page-based survey is that it can minimize interviewer error. Since respondents give their answers directly to a form on a web page, there is no need for an interviewer to have contact with the respondents (Schillewaert, et al., 1998). Therefore, survey responses will be free from errors caused by interviewers, resulting in cleaner data (McCullough, 1998).

However, web-based surveys do present some limitations that researchers must recognize when they consider this method. The first limitation is the generalizability of the survey results. Web page-based surveys might attract respondents to the web page with messages posted in news groups, links on other web pages, banner ads, and other types of methods. As a result, all segments of the Internet population may not be represented in the sample (Kehoe & Pitkow, 1996). In addition, not all Internet users have the same browsers, and different browsers may not present images and text on web pages in the same manner. For example, some users use only a text-based web browser (such as Lynx) and may not be able to respond to the survey. Some web based-polls are announced in Usenet newsgroups. Therefore, if potential respondents are not a frequent...
visitor to newsgroups, they may not be aware of the survey announcement posted in them and, thus, may not have the opportunity to complete the survey. The self-select nature of web page-based surveys also may affect their generalizability (Pitkow & Recker, 1994; Schillewaert, Langerak & Duhamel, 1998; Zikmund, 1991). Those who are interested in and fill out the survey might not represent the target population.

The low response rate can also affect the generalizability of the survey results. Although a web page-based survey can generate a large number of responses, the number of real respondents is extremely small compared with the total number of online visitors who are informed about the survey. Without knowing the characteristics of those who do not respond to the survey, it is difficult to generalize research findings beyond the universe of those responding to the survey.

Another disadvantage of a web page-based survey is multiple and/or inappropriate responses. Web page-based polls generally allow for multiple responses from a single individual, as well as responses from individuals outside of the population of interest (e.g. persons in countries where a product or service is not available, or from persons who are younger or older than the population of interest). This could also bias the results. The absence of an interviewer, as stated above, can create advantages such as reduced interviewer bias and errors. However, the absence of an interviewer also indicates disadvantage. If respondents cannot clarify any ambiguous questions, they might fill out the questionnaire with misunderstanding and confusion (Zikmund, 1994).

**Data Collection Method For This Study**

This study implemented a web page-based survey to collect the necessary data. In addition to acquiring the advantages brought by a web page-based survey, as mentioned
above, another main reason for this study to use this approach resides in the nature of this dissertation: focused on online trust. In existing studies relating to online trust, authors either use a traditional method (e.g., pencil-and-paper in classrooms) or a lab simulation method. The traditional method, as commented by Yoon (2002), poses a great threat to the research validity because it does not take into account the on-site assessments of a website's characteristics such as its design, contents, and other functions. The simulation method, as revealed in Ba, et al.'s study (2002), where the survey is tested through a lab experiment as well as a real setting, can result in idealistic results. In contrast, data collection in real Internet settings is believed to be more “appropriate” and “suitable” for studies addressing e-commerce.

Data for this study were collected in a real setting, MDotCom, in a three-week time period in spring of 2003. The data collection process included the following steps. First, the author created a website containing the survey instrument. Second, a pop-up window with a short invitation message and the link to the URL of the survey website was designed and run on MDotCom. This pop-up window was served to randomly selected visitors to MDotCom. In the first week, the pop-up window was served to the every 30th visitor (i.e., a ratio of 1:30th) to MDotCom. In the second week, the ratio was first changed to 1:20th and later on 1:15th in order to increase the usable response rate. The survey was a self-administered questionnaire. The invitation message shown in the pop-up window and the URL of the survey website were deliberately designed not to reveal the purpose of this survey. No incentives were provided to elicit respondents. Those who voluntarily chose to complete the questionnaire at their convenience were instructed at the beginning of the questionnaire that the survey would take approximately ten
minutes to finish and they should answer all the questions. After a respondent clicked a "submit" button placed at the end of the questionnaire, the respondent was re-directed to a thank-you page containing the author's contact information and a consent letter assuring data confidentiality to the respondent and his/her rights as a voluntary participant.

This study strived to overcome some drawbacks inherited in web page-based surveys. For example, anyone who was served the pop-up window got a cookie delivered to his/her machine and this machine was not served the survey instrument a second time. Thus, multiple responses could be reduced to minimum.

Data Analysis

Principal Factor Analysis (PCA) and Multiple Regression Analysis (MR) were two major statistics applied in this study. However, before the main data analysis is run, it is important to consider a set of issues concerning the data set, which is also called "data screening." As suggested by Tabachnick, et al. (1996), these important issues in data screening should include: the accuracy of a data file, missing data, outliers, and assumptions. The following text discusses with these issues before elaborating the rationale for applying PCA and MR.

Accuracy of Data File

The accuracy with which data have been entered into the data file is fundamental to an honest analysis of the data. A data entry error or mistake in coding can lead to outliers and distorted statistical results. The best way to insure the accuracy of a data file is to proofread the original data against a computerized listing of it (Tabachnick, et al., 1996).
However, this method sounds plausible for a small data file, but impossible for a large data file. The first step with a large data set is to examine uni-variate descriptive statistics through a statistical software program such as SPSS, SAS, and BMDP (Tabachnick, et al., 1996).

Missing Values

The assumption for many statistical analyses is that a dataset is complete without missing values. Missing values can complicate the theory required, obscure the results, and may reduce the precision of calculated statistics because there is less information than originally planned. Therefore, it is important for researchers to address whether and how missing values in their data sets are handled; this can affect the generalizability of their results (Hair, et al., 1998).

The simplest and most direct approach for dealing with missing values is to include only those observations with complete data, also known as the complete case approach. However, missing data are a fact of life in multivariate analysis. Another simple way to handle missing values is to drop any case or variable with missing values. However, deletion of cases or variables can result in substantial loss of responses when the missing values are scattered throughout cases and variables. Another remedy for handling missing values is to substitute missing values with estimated values based on valid values of other cases or variables. There are several methods of replacing missing values as discussed in the literature.

The first method is to replace missing values with well-educated guesses. This method is deemed reasonable only when the researchers have prior knowledge and previous related work experience regarding the missing information, the sample size is
large, and the number of missing values is small (Tabachnick, et al., 1996). The second method is to replace the missing values with the mean score of the variable. When other information is not accessible, the mean score is the best guess about the value of the variable. Replacing the missing values with the mean score is an effort to minimize the effect of the substitution, maintaining the unchanged mean of the variables, and thus, the other statistics, such as correlations, are not impacted much (Tabachnick, et al., 1996; Malhotra, 1999). However, the researchers need to be aware of the loss in variance, since the missing values are replaced by the mean score, and the mean score might be closer to itself than to the missing value. Another opinion on replacing missing values is to estimate missing values by regression. The missing values are predicted by the regression equation generated from the cases with complete data. The merit of using regression is that the replacement is more objective than the researcher’s guesses and also the regression is not as blind as simply inserting the grand mean. However, four major downsides come along with using regression. First, because the missing value is predicted from other variables, the scores will fit together better than they should. Second, the variance will be reduced because of the closeness to the mean. Third, good independent variables are required because the prediction of the missing values is derived from a regression equation, which uses the variable with missing values (incomplete data) as dependent variable and the variables without missing values (complete data) as IVs. Fourth, out-of-range estimates are not acceptable. In other words, the estimates from regression can only be used when the estimated value falls within the range of the values for complete cases (Tabachnick, et al., 1996).
Some authors suggest that a combination of several methods is used to derive a composite estimate, usually the mean of the various estimates, for the missing values. The rationale of this approach is that the use of multiple approaches minimizes the specific concerns with any single method and the composite will be the best possible estimate. The choice of this approach is primarily based on the trade-off between the researcher's perception of the potential benefits versus the substantially higher effort required to make and combine the multiple estimates (Hair, et al., 1998).

Another set of approaches of obtaining an estimated value for the missing value is to incorporate the missing data into the analysis, either through a process specifically designed for missing data estimation or as an integral portion of the standard multivariate analysis. One example is the EM (Expectation-Maximization) approach in SPSS. It is an iterative two-stage method (the E and M stages) in which the E-stage makes the best possible estimate of the missing data and the M-stage then makes estimates of the parameters (means, standard deviations, or correlation) assuming the missing data were replaced. The process continues going through the two stages until the change in the estimated values is negligible and they replace the missing data (Hair, et al., 1998).

Which method should be used as a remedy for missing data depends on the patterns of missing values, i.e., the degree of randomness of missing data. If values in a data set are missing completely at random (MCAR), any method mentioned above can be employed for missing data and no potential biases will be created. If values in a dataset are missing systematically, EM approach is more appropriate than any other method for missing value replacement (Hair, et al., 1998).
Missing Value Analysis module (MVA) added to SPSS 11 version provides researchers a powerful means of detecting the pattern of missing values in a data set. The missing value procedures that can be performed by this add-in include three primary functions: 1) Describes the pattern of missing data: where the missing values are located, how extensive they are, whether pairs of variables tend to have values missing in different cases, whether data values are extreme, and whether values are missing randomly; 2) Estimate mean, standard deviation, covariance, and correlations using listwise, pairwise, regression, or EM method. The pairwise method also displays counts of pairwise complete cases; and 3) Fills in (replaces) missing values with estimated values using regression or EM method.

Outliers

The presence of outliers will increase the possibility of making Type I and Type II errors because results will be overly influenced by the outliers. Thus, influential outliers should be identified and removed before data analyses. Several steps that can be used to identify outliers are as follows.

First, the dataset should be screened using univariate descriptive statistics and graphics to insure all values are within range and means and standard deviations are reasonable. Then, each variable is explored by boxplot or stem-and-leaf graphics to insure there are no outliers in each individual variable.

Second, before running a multivariate analysis, e.g., multiple regression analysis, influential outliers need to be removed. The multiple regression analysis (MR) is sensitive to outliers. Supposedly, all the cases should contribute equally to the regression solution. However, if some cases are distant from others, those remote cases will have
much more impact on the regression function. Many methods have been suggested in the statistical literature, including both graphical plots and statistical tests. Graphic detection of outliers includes residual plots against fitted values, plots of Cook’s distance, Centered Leverage, and Mahalanobis distance against case numbers. However, the outliers are not necessarily influential. To identify influential outliers, statistical tests must be implemented.

Some widely used methods of statistical tests for identifying influential outliers include residuals (e.g., studentized residuals, standardized residuals, and studentized deleted residuals), DFFITS, Cook’s Distance, COVRATIO, Centered Leverage, and DFBETAS.

Residuals are instrumental in detecting violations of model assumptions, and they also play a role in identifying influential outliers on the dependent variable (Hair, et al, 1998). Different kinds of residuals, such as studentized residuals, standardized residuals, deleted residuals, and/or studentized deleted residuals, can be used in a combined manner to identify outliers that have possible influences on the overall regression function. The cut-off point depends on the significance level that an author is pursuing.

DFFITS is usually used to measure the difference of the fitted value when one single case is and is not included in fitting the regression function. Under this method, a case will be considered influential if the absolute value of DFFITS exceeds 1 for small to medium data sets and $2/\sqrt{p/n}$ for large data sets.

In contrast to this measure, Cook’s Distance considers the influence of one single case on all fitted value (Neter, et al, 1996). Cook’s Distance is considered the single most representative measure of influence on overall fit of a regression function.
Although its threshold is $4/(n-k-1)$, a rule of thumb is to identify observations with a Cook's distance of 1.0 or greater (Hair, et al, 1998). A similar measure to Cook's Distance is COVRATIO, which estimates the effect of the observation on the efficiency of the estimation process. A COVRATIO represents the degree to which an observation impacts the standard errors of the regression coefficients. Values above the threshold of $1+3p/n$ make the estimation process more efficient, whereas those less than $1-3p/n$ detract from the estimation efficiency (Hair, et al, 1998).

Centered Leverage is helpful in identifying observations that are substantially distant from the mean values of the other observations. The rule of thumb for situations in which $p$ is greater than 10 and the sample size is over 0.50 is to select observations with a leverage value greater than twice the average ($2p/n$).

DFBETA can be used to detect the influence of a single observation on each regression coefficient. A threshold of $\pm 1.0$ or $\pm 2.0$ is suggested for small sample sizes, and $\pm 2\sqrt{n}$ for medium and larger data sets (Hair, et al., 1998; Neter, et al., 1996).

The identification of influential outliers, as stated by Hair, et al. (1998), should not rely on one single measure, because no single measure totally represents all dimensions of influence. Therefore, the diagnosis of influence outliers should be the result of an application of multiple measures. Further, Neter, et al. (1996) suggest that to round out the determination of influential cases, it is usually a good idea to examine in a direct fashion the results from an analysis that would be made with and without the case(s) of concern. If the results are not essentially changed, there is little need to think of remedial actions for the cases diagnosed as influential.
Assumptions

In Factor Analysis

The critical assumptions underlying factor analysis, as stated by Hair, et al. (1998), are more conceptual than statistical. From a statistical standpoint, the departures from normality, homoscedasticity, and linearity apply only to the extent that they diminish the observed correlations. Only normality is necessary if a statistical test is applied to the significance of the factors, but these tests are rarely used. In fact, some degree of multicollinearity is desirable, because the objective of FA is to identify interrelated sets of variables.

However, there are some modes that can help determine the appropriateness of factor analysis. The first measure is Anti-image Correlation Matrix, which has covariances and correlations among variables. Large values indicate that FA perhaps is not suitable for the data set. Another measure for the appropriateness is Measure of Sampling Adequacy (MSA). The guidelines for interpreting this measure as summarized by Hair, et al. (1998) are: 0.80 or above is meritorious; 0.70 or above is middling; 0.60 or above is mediocre; and 0.50 or above is miserable; and below 0.50 is unacceptable.

The Bartlett test of sphericity is another statistical test for the presence of correlations. The Determinant tests the singularity of variables. A small determinant indicates correlated, but not perfectly correlated (also called singularity), relationships.

In Multiple Regression Analysis

The assumptions of multiple regressions must be evaluated. There are four major assumptions for linear regressions mentioned in various statistics books: normality, linearity, homoscedasticity, and multicollinearity.
The assumption of linearity is that there is a straight-line relationship between two variables (where one or both of the variable can be combinations of several variables). The linearity of the relationship between dependent and independent variables represents the degree to which the change in the dependent variable is associated with the independent variable. Linearity is important in a practical sense that Person's r only captures the linear relationships among variables. If there are substantial nonlinear relationships among variable, they are ignore. Nonlinearity can be diagnosed either from residuals plots or from bivariate scatterplots between pairs of variables (Tabachinick, et al., 1996).

Screening continuous variables for normality is an important early step in almost every multivariate analysis, particularly when inference is goal. Although normality of the variables is not always required for analysis, the solution is usually quite a bit better if the variables are all normally distributed. If the variables are not normally distributed or are nonnormal in very different ways, the solution is degraded. (Tabachinick, et al., 1996). Normality of variables is assessed by either statistical or graphical methods.

For ungroup data, the assumption of homoscedasticity is that the variability in scores for one continuous variable is roughly the same at all values of another continuous variable. For grouped data, this is the same as the assumption of homogeneity of variance when one of the variables is discrete (the grouped one) the other is continuous (the DV): the variability in the DV is expected to be about the same at all levels of the grouping variable (Tabchinick, et al., 1996).

Another dimension of the assumption of homoscedasticity is that each predicted value is independent. By this it means that the predicted value is not related to any other
prediction; that is, they are not sequenced by any variable. Also, the homoscedasticity can be assessed by either statistical or graphical methods.

The impact of multi-collinearity is another assumption that must be considered when MR is applied. Collinearity is the association, measured as the correlation, between two independent variables. Multi-collinearity refers to the correlation among three or more independent variables (evidenced when one is regressed against the others). The impact of multicollinearity is to reduce any single independent variable’s predictive power by the extent to which it is associated with the other independent variables. As multicollinearity increases, the unique variance explained by each independent variable decreases and the shared prediction percentage rises. Because the shared prediction can count only once, the overall prediction increases much more slowly as independent variables with high multicollinearity are added. To maximize the prediction from a given number of independent variables, the researcher should look for independent variables that have low multicollinearity with other independent variables but also have high correlations with the dependent variables. To exam multicollinearity between/among independent variables, Tolerance, Variance Inflation Factor (VIF), Condition Index, Variance Proportions, and Pearson’s Linear Correlation can be used. Collinearity Statistics with a tolerance less than .1, a VIF larger than 10, a condition index larger than 30, variance proportions in excess of 0.90, and a Pearson’s linear correlation values in excess of 0.50 are indicators of possible higher degree of collinearity or multicollinearity among the independent variable. (Dielman, 1996; Tabachnick, et al., 1996; Hair, et al., 1998).
Reliability and Validity of Measurement

Fundamentally, as defined by Carmines & Zeller (1983), reliability refers to "the tendency toward consistency found in repeated measurements of the same phenomenon." Reliability indicates the extent to which the results obtained from a measurement scale are repeatable; the more consistent the results given by repeated measurements, the higher the reliability of the measuring procedure (Nunnally, 1978).

Four basic methods are used to estimate the reliability of the measurements: retest method, alternative-form method, split-half method, and internal consistency method. Among the above-mentioned methods, the internal consistency given by Cronbach's alpha is the most common reliability estimating method (Carmines, et al., 1983; Malhotra, 1999).

Cronbach's alpha is the average of all possible split-half coefficients resulting from different ways of splitting the scale items. The variables designed to measure a construct should share a common essence and the alpha values should reveal the degree to which the variables in the same construct are related. The value of Cronbach's alpha coefficient ranges from zero to one. A Cronbach's alpha value greater than .70 is considered to be adequate and acceptable (Nunnally, 1978). However, Cronbach's alpha has some drawbacks. One major one is that as the number of the variables in the construct increases, the alpha coefficient tends to increase. Therefore, researchers should be cautious about the increase of alpha value simply driven by the increased number of variables.

A research project needs to possess a certain level of reliability; however, having a highly reliable measure does not guarantee that the scale instruments are valid. A valid
measurement should measure what the research purports to measure (Kerlinger & Pedhazur, 1973). To obtain construct validity, research should be guided by a rigorous conceptual model that indicates the relationships among each construct (Malhotra, 1996). The proposed model in this dissertation, which indicated how the constructs related to others, was developed under a theoretical framework derived from the literature information, as discussed in Chapter 2.

The following three basic types of validity should be employed to examine the research instrument validity: content validity, construct validity, and criterion-related validity (Carmines, et al., 1983). To possess content validity, research needs to “measure the full domain of content that is relevant to the particular measurement situation” and accurately ask the questions (i.e., specific words and form) (Carmines, et al., 1983). Content validity is also called face validity, which is a qualitative evaluation of how well the content of a scale instrument adequately covers the entire domain of the construct being measured.

Three aspects are included in construct validity: convergent validity, discriminant validity, and nomological validity (Malhotra, 1999). Based on the definitions given by Malhotra (1999), convergent validity is the extent to which a measure correlates positively with other measures of the same construct; Discriminant validity is the extent to which a measure does not correlate with other constructs from which it is supposed to differ, demonstrating a lack of correlation among differing constructs; and nomological validity assesses the relationship between the theoretical constructs and seeks to confirm significant correlations between the constructs as predicted by a theory. As proposed by Cronbach and Meehl (1955), nomological validity should be taken more seriously during
developing a scale. To show a measure has a nomological validity, the correlation between the measure and other related construct should behave as expected in theory (Cadogan, Diamantopoulos, & de Mortanges, 1999). The Pearson correlation coefficients could be applied to examine these validities.

Another dimension of validity of a measurement is the criterion validity, which is also referred to as predictive validity. Technically, one can differentiate between two types of criterion-related validity (Carmines, et al., 1983). If the criterion exists in the present, then concurrent validity is assessed by correlating a measure and the criterion at the same point in time. Predictive validity, on the other hand, concerns a future criterion that is correlated with the relevant measure. This study examined the concurrent validity through the effectiveness of the regression equations. In this dissertation, predictive measures and the criterion variables are in the same model: Consumer online behavioral intent can be predicted by consumer trust. Details about the assessment of reliability and validity of the measurement used in this study are in Chapter 4 as well as the appendixes.

**Principle Component Factor Analysis**

The general purpose of factor analysis is to find a way to condense the information contained in a number of original variables into a smaller set of new, composite dimensions or factors with a minimum loss of information, that is, to search for and define the fundamental constructs or dimensions assumed to underlie the original variables (Gorsuch, 1982; Rummel, 1970; Hair, et al., 1998). More specifically, factor analysis techniques can satisfy either of two objectives (Hair, et al., 1998): 1) identifying structure through data summarization or 2) data reduction. The principal component analysis (PCA), also called exploratory factor analysis, and common factor analysis
(CFA) are the two most widely applied factor analytical techniques. Generally speaking, PCA is used for data reduction and CFA is used to test theory and reveal other possible constructs.

In this dissertation, some constructs were measured with multiple items. The use of multiple variables increases the difficulties of interpretation and the possibility of multicollinearity. Therefore, PCA was implemented to help to eliminate the aforementioned problems by creating a smaller set of uncorrelated factors. Then, composite scores were calculated for each factor for the following use of multiple regression analysis. As suggested by Hair, et al. (1998), if data are used only in the original sample or orthogonality must be maintained, factor scores are suitable. If generalizability or transferability is desired, then summated scales or surrogate variables are more appropriate. This study strives to achieve generalizability. Therefore, summated scores were calculated for each factor.

**Multiple Linear Regression Analysis and Hypothesis Testing**

In this dissertation, the relationships among overall trust, its antecedents, and consequences are investigated. Multiple linear regression analysis was employed to test the hypothesized relationships among constructs (see Figure 1 in Chapter 2). In Section 3 of Chapter 2, five hypotheses were proposed. The relationship between trust and its antecedents can be directly translated into the following equations for analysis:

- Overall Trust = f (Consumer Characteristics, Website Characteristics, Calculus-based Trust, Institution-based Trust, Knowledge-based Trust)

Once composite scores were obtained for some constructs with multiple items, the dependent variable, overall trust, would be regressed on all the independent variables,
including both metric and non-metric antecedents to identify significant relationships. How these purposes were fulfilled will be presented in the next Chapter, data analysis.

Summary

This chapter describes how measures for trust constructs were developed through the literature information; how the data were collected; how the data must be handled before the formal data analysis, and how the survey instrument should be validated. The next chapter presents the results of the data analysis by applying factor analysis and multiple linear regression analysis.
CHAPTER 4

ANALYSIS AND RESULTS

Introduction

This chapter is about the results of the statistical analyses and hypothesis testing. It has four sections. The first section describes the data and discusses how the data were cleaned up, potential non-response bias was assessed, and how missing values were handled. The second section presents the respondents' demographic profile. The third section provides the output from applying principal component factor analysis (PCA). The fourth section reports the results of hypothesis testing through multiple linear regression analysis.

Data Description and Screening

Non-response Bias

A total of 500 responses were received, which resulted in 300 usable ones. The discarded responses were either incomplete due to ineligibility or contained the same answer to all or almost all the questions in section 1 and 2 in the survey instrument. The usable rate was 60%. Incorporating the fact that MDotCom has thousands of clicks everyday but it took more than three weeks for this study to obtain 500 responses, it was estimated that the actual response rate to this survey was lower than one percent.
Internet surveys usually have very poor response rates (Malhotra, 1999). Although it is normal to have a very low response rate for a web page-based survey, it is important to assess the non-response bias in this data set. That is, it must be verified that the respondents to this survey did not differ from those who did not or refused to participate. Since it was hard to know who saw the pop-up window but did not respond to the survey, it was impossible to directly examine the non-response bias. However, the representativeness of the respondents could be evidenced from a comparison of the key respondents’ demographic information in this study to that in general Internet user surveys, such as GVU’s annual Internet user surveys (1994-1998) and demographic report conducted by Pew Internet & American Life Project (Cyberatlas, 2002). These surveys were designed to monitor Internet user trends. Table 3 in the next section is a summary of key demographic information of respondents in this study. Column four in this table displays the percentage of key demographics in this study, while Column six lists the reference percentage of all American Internet users provided by Pew Internet & American Life Projects. The two columns show consistent patterns, expect that participants in this study was better educated. Specifically, the Internet users’ gender was almost evenly distributed; the largest group of users are at the age range of 30 to 49 years old; and more than half of the Internet users have some college or above education. This comparison indicates that the respondents to this survey were not abnormally representing a unique group of Internet users, rather, representing a group of “typical” Internet users. Therefore, it seems safe to say that the non-response bias was not a problem in this study.
**Missing Value Analysis**

Descriptive summary, including Frequency and Descriptive, was used to screen the data set. Basic statistics, including mean, median, mode, sum, variance, range, minimum, maximum, skewness, and kurtosis, were checked. No values were found to be out of range or abnormal. In addition, graphics, such as box plots, stem-and-leaf, and histogram, were used to check individual variables. Then, the data screening proceeded to the examination of missing values.

This study used Missing Value Analysis (MVA), an add-in in SPSS 11 version, to handle the missing values in the collected data. The system-missing values, i.e., no responses to some questions, in this study on each case and variable were less than five percent. Incorporated with user-missing values, i.e., responses to "I don't know," the total missing values on each case or variables were still less than twenty percent. However, although the group comparisons and assessment of correlations and co-variances of observations with missing values versus valid data did not show many large t-values, and high correlations and co-variances, the multivariate test for MCAR indicates a non-random missing pattern. The Chi-square obtained through the Little’s MCAR test was significant at the level of P< 0.00. Thus, EM method was appropriate for estimating and replacing all the missing values in the data set.

The identification and treatment of outlying observations and assessment of assumptions will be reported in the third section, principal component analysis, and in the fourth section, multiple regression analysis. The next section outlines the respondents' demographic profile.
<table>
<thead>
<tr>
<th>Demographic Profile And Internet Usage Of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demographic</strong></td>
</tr>
<tr>
<td>Gender</td>
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<td>Time on Internet</td>
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<tr>
<td>Information search</td>
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<td>Purchase</td>
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</tbody>
</table>

Respondents' Demographic Profile and Internet Usage

A demographic profile and Internet usage of MDotCom's visitors who responded to this survey are presented in Table 3 (see above). The respondents' gender was almost evenly distributed, with approximately 54 percent male and 46 female. In terms of age, approximately 57% of all respondents were in the 30-49 year old age group. In terms of education, approximately 62% of all respondents had some college or college degree. The respondents' usage of websites in the past six months was high. All respondents have searched for information from any website at least once in the past six months, and of which 91% have searched information from any website for more than five times. Approximately 86% of all the respondents have purchased products or services at least once from any website in the past six months. In terms of time on the Internet, approximately 73% of all respondents have had access to the Internet for more than four years. The frequency of Internet usage indicated that almost all respondents were experienced Internet users. In sum, the profile of the respondents appeared to show a group of active Internet users, whose key demographics were consistent with those in other Internet user surveys.

Principle Component Factor Analysis

Having cleaned the data set and replaced missing values with estimated values through EM method, this study progressed to the first step of the formal data analysis, factor analysis. As stated in Chapter 3, multiple items were developed to construct some factors. Principal Component Factor Analysis (PCA) was performed to reduce items and
obtain composite scores for constructs with multiple-items for the subsequent use in multiple regression analysis.

**Principle Component Factor Analysis**

A total of 54 key continuous variables were contained in Section 2 and Section 3 of the survey instrument. These variables were derived to reflect such latent variables as consumer characteristics, website characteristics, calculus-based trust effects, knowledge-based trust effects, and overall trust. Principal Factor Analysis was performed on these variables. Two negatively worded items were reverse-coded before the analysis. The latent root criterion of 1.0 was utilized for factor extraction. The cutoff point of .35 was first used for item inclusion (Hair, et al, 1998). The varimax rotation procedures produced ten factors that explained approximately 73% of the variance. Items designed to measure the same constructs were highly loaded on these constructs. Some items were cross-loaded on different constructs with low loadings, i.e., lower than .43. Items-total statistics, including squared multiple correlation, variance and alpha if the item deleted, were implemented to assess the relationships of these cross-loadings. It was found that these cross-loadings did not contribute much to these constructs that they were not intended to represent. Then, this study used .45 to clean up these cross-loadings. Two items, one in factor 1 and the other in factor 4, had loadings much lower than the other items within the same factors. In the same manner, items-total statistics were implemented and these items were found not to contribute much to their own factors. Therefore, the author deleted these two items and re-ran the data deduction process. The entire solution was improved. The total explained variance was increased to 74.85% and all the loadings also were increased slightly, while the reliabilities remained the same or
slightly increased. Table 4 displays the final solution with a cutoff point of 0.45 and a total of 52 variables. Since all the items were loaded as predicted in Chapter 2 and 3, the same labels were used to label these items.

Overall, the solution of factor analysis was quite "neat." All the variables were loaded highly, i.e. higher than .50, with factors that they were predicted to represent, but had low loadings, i.e., lower than .43, with those factors that they were not predicted to represent but to correlate with. This made the interpretation of the factor loadings rather straightforward. Factor 1 contained thirteen variables developed in Chapter 3 to measure website characteristics and explained 32% of the variance. Factor 2 consisted of all the seven variables measuring a person's personal values and explained 10% of the variance. Factor 3 included all the variables measuring a person's attitude towards online shopping and explained approximately 7% of the variance. All the measures for service quality were highly loaded on Factor 4, explaining approximately 6% of the variance. Measures for trusting infrastructure were loaded on Factor 5, explaining approximately 5% of the variance. Factor 6 had all the four items measuring consumer overall trust, accounting for more than 4% of the variance. Factor 7 was loaded with three items for one dimension of disposition to trust, faith in humanity. Factor 8 was loaded with all the items for a person's perceived uncertainty or risk with online shopping. Factor 9 had three items for the other dimension of disposition to trust, trust stance. Factor 10 included the three items measuring a person's past purchase experience with catalogs. Most of the loadings of these items with their own factors were above .70.
<table>
<thead>
<tr>
<th>Factor</th>
<th>Factor Loading</th>
<th>Eigenvalue</th>
<th>Variance Explained (%)</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Website Characteristics (WC)</td>
<td>.85</td>
<td>16.71</td>
<td>32.14</td>
<td>0.95</td>
</tr>
<tr>
<td>Easy to get familiar with</td>
<td>.85</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Easy to navigate</td>
<td>.83</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attractive layout</td>
<td>.82</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capturing attention</td>
<td>.81</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pleasant color</td>
<td>.79</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Easy to find what I want</td>
<td>.77</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up-to-date information</td>
<td>.72</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rich information</td>
<td>.72</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likeable graphics</td>
<td>.66</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Available all the time</td>
<td>.65</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fast purchasing process</td>
<td>.60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explaining how information is used</td>
<td>.57</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stable and consistent purchase system</td>
<td>.55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Personal Values (PV)</td>
<td>.88</td>
<td>5.57</td>
<td>10.71</td>
<td>0.95</td>
</tr>
<tr>
<td>I am responsible person</td>
<td>.88</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am a reliable person</td>
<td>.87</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am a loyal person</td>
<td>.87</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am fair person</td>
<td>.87</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I never promise what I cannot fulfill</td>
<td>.83</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I try to act in a consistent manner</td>
<td>.81</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am an open person</td>
<td>.73</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Attitude Toward Online Shopping (Attitude)</td>
<td>.88</td>
<td>3.44</td>
<td>6.63</td>
<td>0.89</td>
</tr>
<tr>
<td>It makes my life easier</td>
<td>.88</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It brings convenience to my life</td>
<td>.82</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I enjoy it</td>
<td>.76</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It improves work productivity</td>
<td>.73</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It is easy</td>
<td>.73</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It makes my life interesting</td>
<td>.73</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Service Quality (SQ)</td>
<td>.76</td>
<td>2.91</td>
<td>5.59</td>
<td>0.92</td>
</tr>
<tr>
<td>Online help is available all the time</td>
<td>.76</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quick response to my inquiries</td>
<td>.74</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Giving me individual attention</td>
<td>.72</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customizing its services for me</td>
<td>.72</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Understanding my specific needs</td>
<td>.72</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Trusting infrastructure (Cues)</td>
<td>.71</td>
<td>2.40</td>
<td>4.61</td>
<td>0.92</td>
</tr>
<tr>
<td>Clear privacy policy</td>
<td>.71</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clear security policy</td>
<td>.71</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4
Factor Analysis of 52 Variables

<table>
<thead>
<tr>
<th>Factor</th>
<th>Factor Loading</th>
<th>Eigenvalue</th>
<th>Variance Explained (%)</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company background</td>
<td>.69</td>
<td>2.17</td>
<td>4.18</td>
<td>0.86</td>
</tr>
<tr>
<td>Clear contact information</td>
<td>.68</td>
<td>1.73</td>
<td>3.33</td>
<td>0.91</td>
</tr>
<tr>
<td>Third-party insurances</td>
<td>.65</td>
<td>1.46</td>
<td>2.82</td>
<td>0.87</td>
</tr>
<tr>
<td>6. Overall Trust (Trust)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am not sure trusting this company is good*</td>
<td>.81</td>
<td>1.29</td>
<td>2.48</td>
<td>0.86</td>
</tr>
<tr>
<td>I have doubts about trusting this company*</td>
<td>.80</td>
<td>1.21</td>
<td>2.33</td>
<td>0.78</td>
</tr>
<tr>
<td>I feel I can trust this company</td>
<td>.70</td>
<td>1.21</td>
<td>2.33</td>
<td>0.78</td>
</tr>
<tr>
<td>I have good reason to trust this company</td>
<td>.59</td>
<td>1.21</td>
<td>2.33</td>
<td>0.78</td>
</tr>
<tr>
<td>7. Faith in Humanity (Faith)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other people are trustworthy</td>
<td>.90</td>
<td>1.29</td>
<td>2.48</td>
<td>0.86</td>
</tr>
<tr>
<td>Other people are reliable</td>
<td>.86</td>
<td>1.29</td>
<td>2.48</td>
<td>0.86</td>
</tr>
<tr>
<td>Other people are well-meaning</td>
<td>.83</td>
<td>1.29</td>
<td>2.48</td>
<td>0.86</td>
</tr>
<tr>
<td>8. Perceived Risk (Risk)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertainty associated with online shopping</td>
<td>.89</td>
<td>1.29</td>
<td>2.48</td>
<td>0.86</td>
</tr>
<tr>
<td>Online shopping is risky</td>
<td>.85</td>
<td>1.29</td>
<td>2.48</td>
<td>0.86</td>
</tr>
<tr>
<td>Online shopping is riskier than other e-means</td>
<td>.85</td>
<td>1.29</td>
<td>2.48</td>
<td>0.86</td>
</tr>
<tr>
<td>9. Trust Stance (Stance)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I trust others until a reason comes up</td>
<td>.84</td>
<td>1.29</td>
<td>2.48</td>
<td>0.86</td>
</tr>
<tr>
<td>I will get better outcomes by dealing with people as though they are well-meaning</td>
<td>.84</td>
<td>1.29</td>
<td>2.48</td>
<td>0.86</td>
</tr>
<tr>
<td>I will get better outcomes by dealing with people as though they are reliable</td>
<td>.61</td>
<td>1.29</td>
<td>2.48</td>
<td>0.86</td>
</tr>
<tr>
<td>10. Experience with Other Non-traditional Shopping Means (Catalog Attitude)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I enjoy reading catalogs</td>
<td>.84</td>
<td>1.29</td>
<td>2.48</td>
<td>0.86</td>
</tr>
<tr>
<td>Most of them are helpful and informative</td>
<td>.78</td>
<td>1.29</td>
<td>2.48</td>
<td>0.86</td>
</tr>
<tr>
<td>I enjoy e-catalogs and e-advertising</td>
<td>.77</td>
<td>1.29</td>
<td>2.48</td>
<td>0.86</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>74.85</td>
</tr>
</tbody>
</table>


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Reliability and Validity

The PCA solution showed an almost perfect “match” between the theoretical structure and the observed structure. Appendix II provides reference for cross-loadings with a cutoff point of .35. All the items were highly loaded on their predicted factors and low-loaded on factors that they were not supported to predict. This implied that the measurement achieved its face validity, nomological validity, and had high reliability. The Cronbach’s coefficient alpha values for all the factors ranged from 0.78 to 0.95. A Cronbach’s alpha value greater than .70 is considered to be adequate and acceptable (Nunnally, 1978). Therefore, it is confident to say that the measures were reliable.

Convergent validity and discriminant validity were assessed through performing the Pearson’s correlation analysis all the 52 variables (not presented herein for brevity). High correlations (i.e., higher than 0.50) were found within items significantly loaded on the same factors. Low correlations (i.e., lower than 0.50) were found between items loaded on different factors. This indicated that all the items were behaving the way as theoretically predicted and measuring what they were supposed to measure; that the measurement had high convergent validity and discriminant validity, and achieved nomological validity. The predictive validity of the model will be discussed in the next section.

Multiple Linear Regression Analysis

Summated scales were created for all the ten factors by taking the average of all the items within a factor. Table 5 provides a summary of all the independent variables of
trust included in the model test along with their abbreviations. Before proceeding to regression analysis, the data were examined for outliers and assumptions.

Table 5
Descriptive Statistics for All the Antecedents of Consumer Trust in the Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. WC</td>
<td>5.16</td>
<td>0.93</td>
</tr>
<tr>
<td>2. Cues</td>
<td>4.93</td>
<td>0.96</td>
</tr>
<tr>
<td>3. SQ</td>
<td>4.55</td>
<td>0.92</td>
</tr>
<tr>
<td>4. Satisfaction</td>
<td>5.00</td>
<td>1.32</td>
</tr>
<tr>
<td>5. Reputation</td>
<td>4.92</td>
<td>1.01</td>
</tr>
<tr>
<td>6. Faith</td>
<td>4.40</td>
<td>0.87</td>
</tr>
<tr>
<td>7. Stance</td>
<td>4.92</td>
<td>0.91</td>
</tr>
<tr>
<td>8. Attitude</td>
<td>5.18</td>
<td>0.96</td>
</tr>
<tr>
<td>9. Risk</td>
<td>3.88</td>
<td>1.14</td>
</tr>
<tr>
<td>10. Catalog Attitude</td>
<td>4.17</td>
<td>0.99</td>
</tr>
<tr>
<td>11. PV</td>
<td>5.82</td>
<td>0.93</td>
</tr>
<tr>
<td>12. Gender*</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>13. Age*</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>14. Education*</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>15. Purchase frequency*</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>16. Access*</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>17. Catalog purchase*</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>18. Visits to MdotCom*</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>19. Purchase with MdotCom*</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>20. MC*</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

**Note.** * Non-metric variable

**Assumptions**

The major assumptions for multiple linear regression analysis were checked: linearity, normality, homoscedasticity and independence of error terms, and non-multicollinearity. Both graphic analysis and statistical tests were used in this study to assess whether a group of independent variables met these assumptions.

The linearity assumption was confirmed in three ways. First, the normality probability plot showed that a linear relationship existed between dependent variable (i.e.,
trust) and its independent variables (i.e., eleven continuous variables). Second, partial regression plots were conducted to examine the linear relationship of a single independent variable to the dependent variable. Appendix III (Figure 3-14) shows the normality probability plot and all the partial regression plots. The actual data distribution closely follows the diagonal in the normal probability plot, indicating a normal distribution. The partial regression plots showed that the linear relationships between dependent variable (DV), trust and such independent variables (IVs) as reputation, website characteristics (WC), risk, service quality (SQ), and satisfaction were well defined, indicating that these IV have strong and significant effects in the DV. Other variables, including attitude towards online shopping, previous experience with catalog, personal values (PV), trust stance, faith in humanity, and cues, were less well defined, both in slope and scatter of points, indicating lesser effects in the equation. But for all these variables, no nonlinear pattern was shown, therefore met the assumption of linearity for each independent variable. Third, curve estimation was used to further confirm the above results and it revealed no curvilinear patterns, either.

The normality probability linear plot (Figure 3 in Appendix III) also suggested agreement with the multivariate normality, because such a plot that departs substantially from linearity indicates that the error distribution is not normal (Neter, et al 1996). As stated by Hair, et al (1998), multivariate normality means that the individual variables are normal in a univariate sense and that their combinations are also normal. Therefore, if a variable is multivariate normal, it is also uni-variate normal. But the reverse is not necessarily true. In this case, the normality probability plot indicates multivariate normality. Thus, we can assume the univariate normality exists with each variable.
The partial regression plots used to study the linearity and normality are also appropriate for examining whether the variance of the error terms is constant. Figures (3-14) in Appendix III show that residuals in most plots seem to spread randomly and do not appear to show many discernable patterns. The diagnosis for homoscedasticity was also made through plotting the studentized residuals against the standardized dependent variable. The dispersion of the dependent variable across the residuals looked larger in the midrange than at the tails, indicating some heteroscedasticity (Appendix III, Figure 15). This led to the statistical examination of each individual independent variable in an attempt to detect the source of heteroscedasticity. Levene's test in independent-samples t-tests was conducted on each independent variable and revealed that only three variables, faith, stance, and catalog attitude, had equal variances of error terms. In this study, the consequences of heteroscedasticity were not regarded as a severe problem, because all the other assumptions (independence of observations and non-multicollinearity will be discussed soon) have been met. Therefore, heteroscedasticity would not result in biased parameter estimates. As stated by Tabachnick, et al (1996), there is even more predictability in this analysis if the linear relationship between variables is captured and the heteroscedasticity is accounted for. However, it was hard to know whether the heteroscedasticity contributed to a linear relationship between variables in this study and thus the analysis might be weakened by the unequal variances. Further, the results from regression analysis with heteroscedasticity are not longer BLUE (i.e., best linear unbiased estimates). Based on these considerations, this study launched several remedies for this violation. First, transformations were done on each IV. Such transformation methods as inverse, square root, square, and logarithm were tried on each variable, but little
improvement was found on either individual variable or the regression equation. Then, the study implemented Weighted Least Square (WLS) to re-estimate the regression function, which resulted in similar results to the non-weighted Least Square regression analysis, indicating that the final estimated model was optimal. Details on WLS analysis will be presented in the later paragraph.

Another assumption concerning error terms deals with the independence of observations. This assumption was assessed through a sequence plot, the studentized residuals against the identification number (id) that represented the order in which the data was collected. Figure 16 in Appendix III contained no consistent pattern. In addition, this assumption of independence of the observations was examined through the value of Durbin-Watson, which was 1.9, very close to 2, indicating non-autocorrelation among observations. Thus, the condition of independence of observations has been met.

The non-multicollinearity assumption was assessed through the values of Tolerance, VIF, Index, and Variance Proportions. All the Tolerance values were over 0.1 and all the VIF values were under 10. Some Index values exceeded 30, but no two variance-proportions in the same row were over 90. Thus, it could be concluded that this assumption was met. Tables 10 and 11 in Appendix III display these values.

In summary, all the major assumptions, except equal variance, that underline the use of multiple linear regression analysis were verified in this section. The following text addresses the issue of outliers.

**Outliers**

This study used both graphic inspection and statistical measures to identify outliers. The graphic inspection, residual plotting, was coupled with the examination of
assumptions. This study applied seven diagnostic measures simultaneously in order to achieve the best results. These measures included Residuals (i.e., studentized residuals, standardized residuals, and studentized deleted residuals), Cook’s Distance, Centered Leverage, DFFITS, COVRATIO, and DFBETAS. Table 6 is a summary of cutoff values for these measures. Appendix IV is a display of outlying cases identified by these different methods. Having conducted numerous trials, this study found that the values of Cook’s Distance and studentized residuals had the most influence on the estimated equation. Therefore, this study used the following process to identify and delete influential outliers. First, thirty-six cases with Cook’s distance greater than 0.010 were deleted. Then, three cases with residuals greater than 1.96 or less than –1.96 were deleted. Thus, a total of 39 outliers were deleted as influential outliers. This resulted in a sample size of 261 for the following multiple regression analysis. The multiple regression analysis was made with and without the deleted cases. Two different results came up, with the former improved dramatically, both in the overall equation and the coefficients.

Table 6
A Summary of Cutoff Values for Diagnostic Measures of Influential Outliers

<table>
<thead>
<tr>
<th>Measures</th>
<th>Formula</th>
<th>Cutoff Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Studentized residuals</td>
<td>--</td>
<td>± 1.96*</td>
</tr>
<tr>
<td>Standardized residuals</td>
<td>--</td>
<td>± 1.96*</td>
</tr>
<tr>
<td>Studentized deleted residuals</td>
<td>--</td>
<td>± 1.96*</td>
</tr>
<tr>
<td>Cook’s Distance</td>
<td>--</td>
<td>0.01</td>
</tr>
<tr>
<td>Centered Leverage</td>
<td>2p/n</td>
<td>0.08</td>
</tr>
<tr>
<td>DFFITS</td>
<td>2*(k+1)/(n-k-1)</td>
<td>0.408</td>
</tr>
<tr>
<td>COVRATIO</td>
<td>1 ± 2p/n</td>
<td>&gt; 1.12; &lt; 0.80</td>
</tr>
<tr>
<td>DFBETAS</td>
<td>± 2/sqrt{n}</td>
<td>±0.1154</td>
</tr>
</tbody>
</table>

Note. * Significant level: 5%; n = sample size; k = number of variables; p = number of parameters.
Table 7
Representing Non-metric Variables with Dummy Variables

<table>
<thead>
<tr>
<th>Non-metric Variable</th>
<th>Original Level</th>
<th>Dummy Coding</th>
<th>New Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Gender</td>
<td>1 = male</td>
<td>1 = 0</td>
<td>Male vs. female</td>
</tr>
<tr>
<td></td>
<td>2 = female</td>
<td>2 = 1</td>
<td></td>
</tr>
<tr>
<td>2. Age</td>
<td>1 = 18-25</td>
<td>1 = 0</td>
<td>Younger vs. older</td>
</tr>
<tr>
<td></td>
<td>2 = 26-29</td>
<td>2 = 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 = 30-39</td>
<td>3 = 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 = 40-49</td>
<td>4 = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 = 50-59</td>
<td>5 = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 = 60-65</td>
<td>6 = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7 = 65+</td>
<td>7 = 1</td>
<td></td>
</tr>
<tr>
<td>3. Education</td>
<td>1 = &lt; high school</td>
<td>1 = 0</td>
<td>Low vs. high education</td>
</tr>
<tr>
<td></td>
<td>2 = high school</td>
<td>2 = 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 = some college</td>
<td>3 = 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 = college degree</td>
<td>4 = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 = graduate</td>
<td>5 = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 = professional degree</td>
<td>6 = 1</td>
<td></td>
</tr>
<tr>
<td>4. Purchase frequency</td>
<td>1 = none</td>
<td>1 = 0</td>
<td>Low vs. high frequency</td>
</tr>
<tr>
<td></td>
<td>2 = once</td>
<td>2 = 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 = 2-3 times</td>
<td>3 = 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 = 4-5 times</td>
<td>4 = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 = 5 times</td>
<td>5 = 1</td>
<td></td>
</tr>
<tr>
<td>5. Access to Internet</td>
<td>1 = &lt; one year</td>
<td>1 = 0</td>
<td>Short vs. long time on Internet</td>
</tr>
<tr>
<td></td>
<td>2 = 1-2 year</td>
<td>2 = 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 = 3-4 years</td>
<td>3 = 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 = &gt; 4 years</td>
<td>4 = 1</td>
<td></td>
</tr>
<tr>
<td>6. Catalog experience</td>
<td>1 = yes</td>
<td>1 = 1</td>
<td>Yes vs. no</td>
</tr>
<tr>
<td></td>
<td>2 = no</td>
<td>2 = 0</td>
<td></td>
</tr>
<tr>
<td>7. Visits to MDotCom</td>
<td>2 = 1-5 times</td>
<td>2 = 0</td>
<td>Light vs. heavy users</td>
</tr>
<tr>
<td></td>
<td>3 = 6-10 times</td>
<td>3 = 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 = more than 10 times</td>
<td>4 = 1</td>
<td></td>
</tr>
<tr>
<td>8. Purchase with MDotCom</td>
<td>1 = no</td>
<td>1 = 0</td>
<td>Yes vs. no</td>
</tr>
<tr>
<td></td>
<td>2 = yes</td>
<td>2 = 1</td>
<td></td>
</tr>
<tr>
<td>9. MC</td>
<td>1 = none</td>
<td>1 = 0</td>
<td>No vs. yes</td>
</tr>
<tr>
<td></td>
<td>2 = once</td>
<td>2 = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 = 2-3 times</td>
<td>3 = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 = 4-5 times</td>
<td>4 = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 = &gt; 5 times</td>
<td>5 = 1</td>
<td></td>
</tr>
</tbody>
</table>
Non-metric Data

There were qualitative variables, also called non-metric variable to be included in the final regression analysis. These non-metric variables as shown in Table 5 were: gender, age, education, overall purchase frequency, access on the Internet, catalog experience, visits to MDotCom, purchases with MDotCom, and MC. All these variables, except gender, were converted into dichotomous variables by splitting each variable into two groups with relatively equal cases. Then, these variables were coded with dummy coding. Table 7 (above) is a summary of this re-categorization and the dummy coding of all the variables.

The Levene's test for the homogeneity of variances was conducted on each non-metric variable through one-way ANOVA. No significant Levene's test statistics were found, indicating that the assumption of equal variances was met and all the non-metric variables could be included in the regression analysis.

Hypotheses Testing

The results of performing stepwise multiple regression analysis are shown below in a regression function equation, with trust as the dependent variable. Trust was regressed on 20 independent variables (see Table 5 above). All coefficients shown here are standardized beta values and significant at the level of 0.05 or better.

The Stepwise Regression Model:

\[
\text{Trust} = 0.43 \text{Reputation} + 0.18 \text{WC} - 0.17 \text{Risk} + 0.19 \text{SQ} + 0.11 \text{Satisfaction} - 0.09 \text{Education} \quad \text{Model 1}
\]

The level of support of the estimated coefficients for each hypothesis is based on the following criteria (Bolaglu, et al, 1999):
1. 0.00 - 0.05 indicates weak support
2. 0.051 - 0.30 indicates moderate support
3. 0.301 - 1.00 indicates strong support

H1: This hypothesis is partially supported. A consumer’s education and perceived risk towards online shopping significantly influence this consumer’s overall trust in using a website. The coefficients, -0.09 for education, and -0.17 for perceived risk, were significant, moderate, but negative. This provides evidence that the higher a consumer’s education, the less trust this consumer has in using a website; the riskier a consumer perceives online shopping, the less trust this consumer has in using a website.

H2: This hypothesis is fully supported. A website’s characteristics significantly influence a consumer’s overall trust in using a website. The coefficient, 0.18, provides positive and moderate support implying that the higher level of likeability, efficiency, usability, functionality, and reliability of a website leads to higher level of consumer trust.

H3: This hypothesis is fully supported. An e-vendor’s reputation significantly influences a consumer’s overall trust in using a website. The coefficient, 0.43, provides strong support for H3 indicating that an e-vendor’s good reputation positively and strongly influences a consumer’s perceived trustworthiness of this e-vendor.

H4: This hypothesis is not supported. Cues do not significantly influence a consumer’s overall trust in using a website.

H5: This hypothesis is partially supported. Service quality and overall satisfaction, significantly influence a consumer’s overall trust in using a website. The coefficient for
satisfaction, 0.11, and the coefficient for service quality, 0.19, is significant, moderate, and positive. That is, the higher a consumer perceives an e-vendor’s service quality, the higher this consumer’s trust in this e-vendor; the higher a consumer’s overall satisfaction with an e-vendor, the higher this consumer’s trust in this e-vendor.

In summary, a total of six variables, reputation, website characteristics, service quality, overall satisfaction, perceived risk, and education significantly influence a consumer’s overall trust in an e-vendor. These variables together explained approximately 65% of the variance in overall trust, indicating that the explanatory power of the function model was strong.

**Weighted Least Square (WLS)**

To remedy the problem with nonconstancy of the error term variance, Weighted Least Squares (WLS) was implemented by developing a standard deviation function. The Levene’s test indicated that residuals vary with all except two (i.e., stance and catalog attitude) metric independent variables. A fit of a first-order model where the absolute residuals of these IVs were regressed on them yielded an estimated standard deviation function. The weights then were obtained from this function, as \( w = 1/(s^2) \), where \( s \) was the fitted values from the standard deviation function. The next step was to use this weighting variable in the SPSS Regression. The analysis obtained the estimated regression function through stepwise method resulted in the following model (see Model 2). A comparison of Model 1 and Model 2 revealed little difference between correspondent regression coefficients, suggesting that there was no need to re-estimate the standard deviation function and the weights based on the residuals for the weighted
regression in Model 2 and the heteroscedasticity did not have big impact on the estimated model in this study.

\[
\text{Trust} = 0.43 \text{ Reputation} + 0.19 \text{ WC} - 0.17 \text{ Risk} + 0.18 \text{ SQ} + 0.11 \text{ Satisfaction} - 0.09 \text{ Education}
\]

Model 2

Validating the Results

The primary concern of validating the results of the regression model is to ensure that the results are generalizable to the population and not specific to the sample used in estimation (Hair, et al, 1996). There are four approaches most commonly recommended in the literature. The most direct approach is to obtain another sample from the population and assess the correspondence of the results from the two samples. The second approach is to divide the sample into two sub-samples, estimate the regression model for each sub-sample, and compare the results. However, this approach requires a large sample size. The third approach is to compare the results with theoretical expectations, earlier empirical results, and simulation results. The fourth approach is to evaluate alternative regression models.

This study used the third and fourth approaches to validate its results. Overall, the results of hypothesis testing were consistent with those in earlier empirical studies in e-commerce, as discussed in the second section of Chapter 2. An e-vendor's reputation was tested to be significant in the formation of a consumer's trust in an online bookstore and a music store (Jarvenpaa, et al 2000). The significance of website characteristics was found in the studies by Sultan, et al (2002) and Yoon (2002). Perceived risk was identified as a factor negatively associated with a consumer's trust in an e-vendor Phelps,
et al (2001). Sultan, et al (2002) found that education had negative impact on a consumer’s level of trust in an e-vendor, i.e., people with higher-level of education seem to have less trust in e-vendors. Customer satisfaction and service quality were two well-addressed constructs in traditional literature and their positive impact in an exchange relationship has been widely recognized.

This study also validated the results of hypothesis testing through evaluating an alternative regression model. The regression model presented above was a result of stepwise regression procedure, which is a popular automatic search method and ends with a single regression model as “best.” A primary alternative to the stepwise regression estimation method is the confirmatory approach whereby the researcher specifies the independent variable to be included in the regression equation. In this manner, the researcher retains complete control over the regression variate in terms of both prediction and explanation. This approach, as stated by Hair, et al, (1998), is especially appropriate in situations of replication of prior research efforts or for validation purposes.

This research used this approach and directly entered all the independent variables, a total of 20 quantitative and dichotomous variables, into the regression equation at one time. The results in the right column of Table 8 are very similar to the final results achieved through stepwise estimation (see the left column of Table 8). An examination of the R-squared, adjusted R-squared, standard error of estimate, standardized beta coefficients, and t-values in two models revealed that the results of the hypothesis testing through stepwise regression estimation could be the “best” estimates. Appendix V provides references for all the relevant multiple regression tests mentioned above.
Table 8
A Comparison of Model Results: A Confirmatory Approach and Stepwise Regression Method

<table>
<thead>
<tr>
<th></th>
<th>Stepwise Regression</th>
<th>Confirmatory Regression</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R²: 0.650</td>
<td>R²: 0.667</td>
</tr>
<tr>
<td>Adj. R²:</td>
<td>0.642</td>
<td>0.638</td>
</tr>
<tr>
<td>Std. Error of the</td>
<td>0.5220</td>
<td>0.5247</td>
</tr>
<tr>
<td>Estimate:</td>
<td>F = 78, df = 6, sig. &lt; 0.000</td>
<td></td>
</tr>
<tr>
<td>Reputation</td>
<td>.43 7.76 .00</td>
<td>Reputation .41 6.97 .00</td>
</tr>
<tr>
<td>WC</td>
<td>.18 3.02 .00</td>
<td>WC .14 2.14 .03</td>
</tr>
<tr>
<td>Risk</td>
<td>-.17 -4.52 .00</td>
<td>Risk -.16 -3.81 .00</td>
</tr>
<tr>
<td>SQ</td>
<td>.19 3.36 .00</td>
<td>SQ .15 2.40 .02</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>.11 2.58 .01</td>
<td>Satisfaction .10 2.19 .03</td>
</tr>
<tr>
<td>Education</td>
<td>-.09 -2.42 .02</td>
<td>Education -.10 -2.60 .01</td>
</tr>
</tbody>
</table>

The predictive validity of the measurement was assessed through regressing purchase intention in the future and recommend on trust. Trust positively, strongly, and significantly influences a consumer’s likelihood to purchase in the future at the level of p < 0.000, explaining more than 17% of the variability in a consumer’s purchase intention. The standardized beta coefficient, 0.41, indicates a strong effect of trust on purchase intention. Also, trust has a strong influence on likelihood to recommend at the level of p < 0.000, being able to explain more than 26% of the variability in likelihood to recommend with a standardized beta coefficient of 0.52. Appendix VI provides more details for these simple linear regression models.

Summary

This chapter presents the statistical analysis and results of hypothesis testing. Seven factors, reputation, website characteristics, service quality, overall satisfaction, perceived

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risk, age, and education were found to be significant in the formation of a consumer’s overall trust in an e-vendor. Also, this chapter assessed the reliability and validity of the measurement. The final chapter summarizes the study, discusses the implications of the results of hypothesis testing, offers suggestions, states the limitations of the study, and outlines an agenda for future research.
CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter summarizes the findings of this dissertation and discusses their implications. This chapter has five sections. The first section is a summary of this dissertation. The second section is a discussion of the specific results and implications of the hypothesis testing. The third section gives suggestions for e-vendor managers. The fourth section states the major limitations of this study. Finally, the chapter concludes with an agenda for future research.

Summary of the Dissertation

As the result of reviewing literature information in traditional disciplines, this study derived a hierarchical framework of trust sources from which trust might emerge. Based on this hierarchical framework, a theoretical model of the formation of consumer trust in e-commerce was developed. This model consisted of the major antecedents and consequences of consumer trust in e-commerce. Hypotheses that highlighted the potential relationships between consumer trust and its antecedents were formed.

The major research goal of this dissertation was to identify the important factors that significantly influence the formation of a consumer's overall trust in a website. By collecting empirical data and applying multivariate statistical analysis, this study
achieved this goal. This study also examined other relationships as suggested in the model of consumer trust in e-commerce and determined that trust indeed have strong impact on two major dimensions of customer loyalty, purchase intention and likelihood of recommendation.

The data for this study were collected through a web page-based survey, which was advertised on a real commercial website, MDotCom, through a pop-up window. The data collection lasted for three weeks in April and May of 2003. A total of 500 responses were received. Of these, 300 responses were usable. The respondents' socio-demographics were consistent with those of the general online public as identified in other surveys, indicating that the sample was representative of the population.

Since e-commerce is a relatively new research area, no pre-existing measurement scales could be directly applied to this study. As a result, this study developed its own measurement scale. The assessment of reliability and validity of the measurement showed that measures had high internal consistency and achieved content validity, discriminant, convergent, and nomological validity. The measurement was also tested to have predictive validity.

Principal component factor analysis was applied to obtain composite scores for some constructs measured with multiple items. Stepwise multiple linear regression analysis was employed to test the hypotheses. A total of five hypotheses with 20 factors were posited and tested in this study. Six factors were identified to have significant influence on the formation of a consumer’s overall trust in a website. They are reputation, website characteristics, service quality, overall satisfaction, perceived risk, and education.
following section discusses the results of hypothesis testing and their possible implications.

Interpretation of the Hypothesis Testing

This section discusses the specific hypothesis tests and their possible meanings. This is followed by an interpretation of the general implications that stem from this research effort.

Hypothesis 1

Individual characteristics significantly influence a consumer's overall trust in a website. Such individual characteristics include disposition to trust (faith in humanity and trusting stance), attitude towards online shopping, perceived risk, prior experience with non-traditional shopping means, personal values, gender, age, and education.

Two of the nine consumer characteristics, perceived risk and education, were tested to be significant. These factors had moderate but negative effects on overall trust. The result can be interpreted as: 1) If a person's perceived risk associated with online shopping is high, this person's overall trust in an e-vendor would be low; and 2) People with higher education (at least some college) have less trust in an e-vendor. No significance was found on other consumer characteristics, including gender, age, personal values, attitude towards online shopping, previous shopping experience with non-traditional means, and disposition to trust.

These findings suggest that compared to other consumers, more educated consumers may rely more on their own knowledge than on a website in inferring an e-vendor's trustworthiness. This view has its support in the theory of consumer behavior. Education
implies more knowledge, which can make a person more confident and resourceful. In a marketing study, Cox (1962) found that people with high self-confidence rejected advice because they did not feel they needed it and rather preferred to trust their own judgment (also see Webster, 1968). Resourceful people usually can find more alternative ways to assess the trustworthiness of a company. The test of this hypothesis also suggests that online prospects have different perceived uncertainty associated with online shopping. This finding can be interpreted in two ways. One is that less educated Internet users perceive less risk associated with online shopping. The other is that some online users are risk-takers, while the others might be risk-averse or neutral users. Less educated users are easy to trust or mistrust due to a lack of resources, thus, they might perceive less risk with online shopping. Risk-takers love adventures and trying out new things, and thus, they might perceive less risk with online shopping. On the other hand, risk-neutral or risk-averse users are not easy to trust, thus, they might perceive high risk with online shopping. Perceived risk, as seen in the literature, is usually associated with personal information privacy and computer system security. It is expected that time alone will reduce the level of consumer perceived risk with online shopping, with the implementation of effective policies and technological advancement.

Hypothesis 2

Website characteristics significantly influence a consumer's overall trust in this website. Such website characteristics include functionality, usability, efficiency, reliability, and likeability.

This hypothesis is supported by the test. The coefficient, 0.175, is significant at the level of P < 0.05. This finding is consistent with that in other studies that tested the
effects of website features (e.g., Yoon, 2002; Sultan, et al, 2002), and suggests that a well
designed website have positive effects on consumer trust. The construct was measured
by multiple items, which include fourteen items for likeability, functionality, usability,
efficiency, and reliability. In other words, a website’s attractive “physical appearance,”
color, layout, and graphics has have positive effects on consumer trust; a website’s stable
and consistent purchase system, easy navigation, rich information, up-to-date
information, and availability also help consumers infer a sense of trustworthiness of an e-
vendor. Serving as the only “storefront” of an e-vendor, a website is usually the “first
impression” that a consumer gets about an e-vendor. Online prospects usually have some
expectations for a trustworthy e-vendor, such as situation normality (Chapter 2: section
1). If a website presence fits these expectations, it certainly instills a sense of
trustworthiness.

Hypothesis 3

A website’s reputation significantly influences a consumer’s overall trust in this
website.

This hypothesis is strongly supported by the testing results. Its coefficient, 0.425, is
significant at the level of p < 0.000. Reputation not only has the largest beta coefficient,
but also explains a large portion of the variance in trust, approximately 50%. This
indicates that an e-vendor’s reputation is critical in the formation of a consumer’s overall
trust in this e-vendor. This particular finding implies that to secure consumer trust for a
website, managing the website’s overall image is the most important issue. A website’s
overall image also refers to e-branding, which is becoming a popular research interest for
both academics and practitioners. This finding confirms the previous empirical studies in
which reputation was also tested to have significant impact on consumer trust. This finding looks very logical. Good reputation or brand recognition is more important than any other factor in the model, because in an uncertain market environment it serves as a mental shortcut. A positive image, or a brand, is a class concept. A buyer attaches a word to this concept or this label, the name of a product or a company. Whenever the buyer sees this name, it conveys to him or her certain satisfaction, quality, and/or other benefits (Howard and Sheth, 1967). In e-commerce where traditional signage or physical evidences for consumers to make a trusting inference are lacking, intangible factors such as reputation become critical.

**Hypothesis 4**

*Trusting infrastructure implemented on a website significantly influences a consumer's overall trust in this website. Typical trusting infrastructure includes regulation cues (e.g., privacy and security policies) and guarantee cues (e.g., policies and third-party seals).*

This hypothesis is not supported by the testing results in this study, indicating that trusting cues, such as privacy and security policy, company history, contact information, and third-party seals, implemented on a website to entice consumer trust might not have significant influence on the formation of consumer trust. Although it is the expectation of many conceptual publications that trusting infrastructure should be able to help build consumer trust, part of this finding is consistent with other empirical studies, such as the one by Kimery, et al. (2002) who tested the effects of third-party assurances such as TRUSTe seal and BBBonline seal on consumer trust. The authors only found one significant but very weak relationship between one type of seal and consumer trust.
Kimery, et al. (2002) argued that a lack of significant relationships between third-party assurances and consumer trust might be due to a lack of awareness of these seals. This might be the case in this study, too. However, it is noteworthy to mention that there is a relatively high Pearson’s correlation between cues and website characteristics in the observed data. This is consistent with the literature information in Chapter 2. In fact, in website characteristics, one item, “how a user’s information will be used is clearly explained,” implies that consumers would like to see on a website messages ensuring their personal information privacy. Therefore, the insignificance of cues in the test might not imply that cues are not important. In other words, this construct might have been explained by another broader construct, website characteristics.

**Hypothesis 5**

A consumer’s repeated interactions with a website significantly influence a consumer’s overall trust in this website. Indicators of repeated interactions include frequency of purchases from a website, frequency of visits to a website, frequency of receiving marketing communications from this e-vendor, perceived service quality, and overall satisfaction.

Two indicators, perceived service quality and overall satisfaction, were tested to significantly influence consumer trust. The coefficients, 0.19 for service quality and 0.11 for overall satisfaction, were significant at the level of $p < 0.05$. This shows that the higher the perceived service quality and the overall satisfaction, the higher is the consumer trust. Service quality and overall satisfaction are two constructs for measuring post-purchase evaluations. They are experience-based intangible constructs and are often used in building a company’s positive image. Service quality in this study was measured...
by four items that represent an e-vendor's responsiveness to consumers' inquires, service customization, and availability.

Other indicators, including frequency of purchase, frequency of visits, frequency of marketing communications, were not significant. This implies that a consumer's previous experience with a website might not have significant influence on this consumer's overall trust. Given that trust is a prerequisite of online shopping, this finding is reflected by the very true reality of e-commerce: although the use of the Internet has gained exponential growth in recent years, the real online purchasers consist of only a small portion of the huge online population. A report by Boston consulting Group (1998) indicated that only 5 percent of unique online visitors become customers and only 1.6 percent of all visits result in purchase.

The relationship between a consumer's trust and this consumer's purchase intention from a website and likelihood of recommending this website to other people was not hypothesized, but tested to validate the conceptual model. The results showed that consumer trust did have significant as well as very strong influence on both purchase intention and likelihood of recommendation. That is, the higher a consumer's trust in a website, the more likely this consumer will purchase from this website in the future and the more likely this consumer will recommend this website to other people. This finding confirms the public view on the importance of trust in e-commerce.

Suggestions for E-vendor Managers

Figure 2 summarizes the major findings of this study by illustrating significant factors identified in the hypothesis testing. These factors were arranged in the order of relative
importance based on their standardized beta coefficients. The variance explained by each factor was shown in a parenthesis. The following text offers suggestions for e-vendor managers in regard to their Internet marketing strategies in building consumer trust.

Managers must work diligently on building brand recognition of their websites. Good reputation is the most important factor affecting consumer trust, disproportionately explaining more than 50% of the variance in overall trust. E-vendors who already have a

Figure 2  A summary of significant antecedents of consumer trust

Managers must work diligently on building brand recognition of their websites. Good reputation is the most important factor affecting consumer trust, disproportionately explaining more than 50% of the variance in overall trust. E-vendors who already have a
good reputation find that it provides a good start for them. For those who are unknown or new to the Internet market, they need to apply this old wisdom in their e-marketing strategy. For pure Internet businesses, successful e-branding tactics can be borrowed from Internet-leading marketers, such as amazon.com, yahoo.com, and expedia.com. For traditional Internet businesses, companies such as P&G and GM are good examples. These companies have created their own methods of getting consumers' attention and loyalty (Chiagouris and Wansley, 2000). Compared with the traditional media, the Internet offers many advantages in brand building. For example, it allows companies to communicate with prospects in a customized and direct way; its capability of broadcasting allows a company to reach numerous prospects faster and more inexpensively. Also, managers must be aware that the Internet has empowered their prospects who also can use these Internet capabilities to collect information and broadcast their own experiences. Word-of-mouth through the Internet travels faster and further. An examination of successful e-companies shows that these companies have been able to make good use of these Internet capabilities as well as old business wisdoms.

Although a good domain name and strategic alliance or partnership with well-known companies seem to serve as shortcuts of building brand awareness, other old wisdoms such as service quality and customer satisfaction are still critical in building long-term relationships with online consumers. Managers must make sure that they respond to consumers' inquiries in a timely manner, give each consumer individual attention, and allow consumers to track their purchases through their websites at any time. Managers must constantly monitor their targeted visitors' satisfaction. This can be done through creative post-purchase communications.
Managers must also remain diligent in maintaining a "good" website. It is not only important to keep a website that is graphically pleasant as well as functionally savvy. If this website allows consumers to make purchases through it, the purchase system must be stable, reliable, and fast. Consumers would like to know how their information would be used by an e-vendor. Managers must inform their visitors how their personal information would be used in an explicit way. It is the author's experience that the agreements on privacy and security on a typical website are usually long and in very small fonts. It is difficult for a consumer to read through those long statements. Managers need to make such agreements more effective through stating in some other format how a consumer's personal information would be, and would not be, used.

Consumers with different education levels have different perceptions toward an e-vendor's trustworthiness. It is necessary for managers to be familiar with their visitors and segment them based on their education. People with less education are quick to trust e-vendors, while those who have at least some college education tend to depend on their own judgment. Managers can use attractive website features to entice less educated visitors, and pay more attention to service quality and satisfaction with well-educated visitors. Managers can also segment their targeted visitors based on their perceived risk associated with online shopping into risk-takers, risk-neutral visitors, and risk-averse visitors. Attractive web features and new products can be used to attract risk-takers, while gentle guidance can be used to entice risk-neutral and risk-averse visitors.

Overall, the old business wisdoms are still applicable in e-commerce. Managers must have an integrated e-marketing program including e-branding, delivering quality service,
monitoring customer satisfaction, and building consumer profiles. Managers must also
have a well designed website that caters to targeted visitors.

Limitations

This study has made valuable contributions to research in e-commerce, specifically
our understanding of consumer trust. However, it has limitations that must be noted. The
major limitations were caused by the inaccessibility of statistical software programs and
the sampling. Effective tests of the proposed model and all the possible relationships
need sophisticated statistical techniques such as Structural Equation Model (SEM), which
correspondently demands more powerful software programs such as Lisrel. This study
could not access this kind of software programs. This inconvenience limited the amount
of insight that could be obtained from this research at the time when the dissertation was
written. The inability to utilize more advanced statistical techniques partially resulted in
the following limitations. First, this study only examined the direct effects of a set of
factors on consumer trust, but the feedback effects of trust on these factors were not
investigated. Second, the direct effects of antecedents of trust on consumer behavioral
intentions were not measured. Third, the correlations and interaction effects among the
identified antecedents were still left open. Fourth, the mediating role of trust was not
tested. And finally, overall trust, rather than specific dimensions of trust, was used in the
model. As stated in the literature review in Chapter 2, consumer trust in e-commerce is a
multi-dimensional construct. Therefore, it is important to measure the effects of
antecedents on each specific dimension and examine the effects of each trust dimension
on consumer behavioral intentions. Again, to achieve this goal, advanced statistical
techniques are required.

This study used convenience sampling, collecting its data through one travel-related
information portal, MdotCom. Therefore, this study is subject to all the limitations of
convenience sampling technique. For example, e-vendors must be cautious when
applying the findings in this study to other types of websites.

Conclusion and Future Research

Through an empirical data collection and analysis, this study identified six factors
that have significant impact on a consumer's overall trust in a website. In addition, this
study found that a consumer's overall trust indeed had strong influence on two major
dimensions of customer loyalty, intention to purchase from a website and
recommendation of this website to other people. Built on the effort of this study, a rich
agenda for future research in the area of consumer trust and loyalty in e-commerce has
been initiated.

First, it is important to investigate the inter-correlations among antecedents of trust as
presented in the conceptual model (see Figure 1, Chapter 2). As evidenced in the
literature, correlations among these factors can offset each other's explanation power. It
would be useful to measure this effect. It is also useful to test the feedback effects of
trust on its antecedents in the model. More sophisticated statistical programs, such as
SEM, if accessible, should be able to fulfill these objectives.

Second, each significant antecedent of trust, especially reputation, service quality, and
satisfaction, present a new research agenda. E-branding has been a major interest of both
academics and practitioners. Successful Internet companies, such as amazon.com and expedia.com, are good examples of building e-brands. Information about how a company can build brand recognition on the Internet and what are the major factors affecting an e-vendor's image would be extremely helpful for ambitious e-vendors. Although the issue of service quality has been well studied in traditional literature, little research has been done as it applies to e-commerce. As mentioned in Chapter 2, the old wisdoms are not completely applicable to the Internet environment. The measures of service quality in this study have provided a good start for further study on this area. As an influential factor of consumer trust, consumer overall satisfaction with a website demands more attention also. How an online consumer's overall satisfaction towards a website is formed and what is its relationship with online service quality are all intriguing questions.

This study tested 20 antecedents of consumer trust. There are other potential antecedents of consumer trust that were not controlled in this study, such as culture and offline presence. As mentioned by other authors (e.g., Jarvenpaan, et al, 1999; 2000), these factors might significantly influence a person's perceived trustworthiness of an e-vendor. While the offline presence of an e-vendor might give this e-vendor extra advantage in winning consumer trust, the issue of culture difference would be critical for companies that target global consumers. It is suggested that consumers in different cultures infer an e-vendor's trustworthiness based on different variables (e.g., Jarpenpaan, et al, 1999).

It is also meaningful to investigate other potential factors that might significantly influence a consumer's online loyalty. Trust has been tested to have strong effects on a
consumer's loyalty to an e-vendor. However, it explains only a small portion of the variability in each loyalty construct, thus, indicating that there are other important factors affecting consumer loyalty in e-commerce. For example, Bowen and Shoemaker (1998) identified that benefits, trust, switching costs, and perceptions of value as important determinants that lead to hotel consumer's commitment, the behavioral outcome of loyalty. A similar study focusing on online consumers could help identify other important factors, in addition to trust, that lead to consumers' commitment and loyalty in an online company.

In addition, the results presented in this dissertation were from "heavy" users of MM.com. All the first-timers to MM.com were filtered out by screening questions and were re-directed to a set of questions asking for demographic information, reasons for visiting, and likelihood to purchase and recommend in the future. It would be interesting and useful to compare the demographic information contained in two different sets of questions.

Another interesting research project might be to study the use of web page-based surveys in academic research. This research method has been widely used by industries. Some academic researchers have investigated its pros and cons. However, this area is still very new and has plenty of room that needs to be filled.

To summarize, this study has added to our knowledge of consumer trust in e-commerce. It is hoped that this study will inspire other researchers who share similar research interests, prompt new research questions, and provide e-business practitioners with useful and practical information.
APPENDIX I

SURVEY INSTRUMENT

LETTERS TO PARTICIPANTS

&

HUMAN SUBJECTS FORM
Investigation of Major Factors Affecting Consumer Trust in E-commerce

Part I General Information

1. How many times have you purchased products or services from any web site during the past 6 months?
   - None
   - Once
   - 2-3 times
   - 4-5 times
   - More than 5 times

2. How often have you searched for information from any website during the past 6 months?
   - None
   - Once
   - 2-3 times
   - 4-5 times
   - More than 5 times

3. About how long have you had regular access to the Internet?
   - Less than one year
   - 1-2 years
   - 3-4 years
   - More than 4 years

4. Have you ever made order from a paper catalog?
   - Yes
   - No

5. Before today, about how many times had you visited MDotCom?
   - None
   - 1-5 times
   - 6-10 times
   - More than 10 times

6. Have you ever purchased any travel-related product or service through MDotCom?
   - Yes
   - No

7. Check all the products or services that you have purchased through MDotCom.
   - Hotel room
   - Car rental
8. Have you ever confirmed any purchase you have made on MDotCom by calling an 800 number?
   Yes
   No

9. How often do you receive communication information from MDotCom every monthly?
   None.
   Once
   2-3 times
   4-5 times
   More than 5 times

10. What's your overall satisfaction with MDotCom? Using a 7-point scale, where “1 = Extremely unsatisfied” and “7 = Extremely satisfied,” please indicate the extent to which you think describes your overall satisfaction.

<table>
<thead>
<tr>
<th>Extremely Unsatisfied</th>
<th>Extremely Satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

Part II

Please give your opinions of MDotCom by circling the number that expresses the extent of your agreement or disagreement with each statement below. Each statement is accompanied by a 7-point scale where “1 = strongly disagree” and “7 = strongly agree.”

<table>
<thead>
<tr>
<th>Statements</th>
<th>Strongly Disagree</th>
<th>Neutral</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1. The graphics on MDotCom are likeable</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>W1. MDotCom captures attention</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>W3. The color of MDotCom is pleasant</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>W4. The layout of MDotCom is attractive</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>W5. MDotCom clearly explains how my information is used</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>W6. MDotCom's transaction system is very stable and consistent</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>W7. It is easy to navigate MDotCom</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>W8. It is easy to get familiar with MDotCom</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Statements</th>
<th>Strongly Disagree</th>
<th>Neutral</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>W9. Purchasing on MDotCom is fast</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W10. It is easy to find what I want on MDotCom</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W11. MDotCom has up-to-date information</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W12. MDotCom has rich information about Las Vegas</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W13. The website has never crashed my computer</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W14. The website is available any time</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W15. The security policy for credit card information is clear</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W16. The policy for privacy is clear</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W17. Contact information (e.g., email, mailing address, 800 number) is clear</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W18. The website’s background information is clear</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W19. The third-party assurances on MDotCom (e.g., TRUSTe) are easy to see</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W20. The website responds to my inquiries in a timely manner.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W21. The website has given me individual attention</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W22. The online customer service is available all the time</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W23. The website understands my specific needs</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W24. MDotCom is willing to customize its services for me</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W25. I can track my order through MDotCom anytime</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W26. This web site has good reputation</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W27. I am not sure that trusting this e-company would be a good idea*</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W28. I have good reason to trust this web site</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W29. I feel that I can completely trust this web site</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W30. I have doubts about trusting this web site*</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: * Reverse-coded.
Part III

Please tell us about yourself by circling the number that expresses the extent of your agreement or disagreement with each statement below. Each statement is accompanied by a 7-point scale where “1 = Strongly disagree” and “7 = Strongly agree.”

<table>
<thead>
<tr>
<th>Statements</th>
<th>Strongly Disagree</th>
<th>Neutral</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1. Other people are well-meaning</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C2. Other people are trustworthy</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C3. Other people are reliable</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C4. I will obtain better interpersonal outcomes by dealing with people as though they are well-meaning</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C5. I will obtain better interpersonal outcomes by dealing with people as though they are reliable</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C6. I trust other people until they give me some reason not to trust them</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C7. The Internet makes my life more interesting.</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C8. I enjoy shopping online</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C9. The Internet has brought great convenience to my life</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C10. The Internet makes my life easier</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C11. The Internet has improved my work productivity</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C12. Shopping online is very easy</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C13. I believe that shopping on the Internet is risky</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C14. There is too much uncertainty associated with shopping online</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C15. Compared with other methods of purchasing, shopping online would be more risky</td>
<td>1  2  3  4  5  6  7</td>
<td></td>
<td></td>
</tr>
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<td>C25. I always try to act in a consistent manner in my daily life.</td>
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Part IV

Demographic Information – please tell us a little bit about yourself. Please be assured that the information provided is confidential and will be used only in an aggregated form.

1. Gender:
   - Male
   - Female

2. Age
   - 18 – 25
   - 26 – 29
   - 30 – 39
   - 40 – 49
   - 50 – 59
   - 60—65
   - 65+

3. What is the highest level of education you have had an opportunity to complete?
   - Less than high school
   - High school
   - Some college
   - College degree
   - Graduate
   - Professional degree
   - Other

   - United States
   - Canada
Mexico
Central/South America
Europe
Africa
Asia
Australia/New Zealand

5. How likely are you to purchase a travel-related product or service through MDotCom?

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6. How likely are you to recommend MDotCom to others?

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Thank you.
Letters to Participants

1. On the pop-up window

You are invited to participate in an interesting survey about your Internet experience! Your opinions will help MDotCom better meet your needs and wants in the future!

2. At the beginning of the questionnaire

Welcome to MDotCom Survey! This survey has 4 sections and takes about 10 minutes to finish. Please complete all the questions before you submit the survey. We greatly appreciate your participation!

3. After the survey was submitted: a thank-you letter

Thank you again for your time. If you have any questions or comments, please do not hesitate to contact the contractual project director, Sandy Chen, at (702) 693-6685 or chencf@unlv.edu.

For questions regarding the rights of research subjects, you may contact the UNLV Office for the Protection of Research Subjects at (702) 895-2794.

Best wishes.
Notice of Approval to Conduct Research
Involving Human Subjects

DATE: May 9, 2003

TO: Sandy Chen, Hotel Administration
    Dr. Billy Bai (Faculty Advisor)
    M/S 6023

FROM: Dr. Fred Preston, Chair
       UNLV Social Behavioral Sciences Institutional Review Board

RE: Status of Human Subject Protocol Entitled: An Investigation of Major
    Factors Affecting Consumer Trust When Using Websites

OPRS# 600S0403-120

This memorandum is official notification that the protocol for the project referenced
above has been reviewed by the Office for the Protection of Research Subjects (OPRS)
and has been determined as having met the criteria for exemption from full review by the
UNLV Social Behavioral Sciences Institutional Review Board (IRB) as indicated in
regulatory statutes 45CFR 46.101. The protocol has been reviewed via the expedited
review process and has been approved for a period of one year from the date of this
notification. Work on the project may proceed.

Should the use of human subjects described in this protocol continue beyond May 9,
2004, it will be necessary to request an extension. Should there be ANY changes to
the protocol, it will be necessary to submit those changes to the Office for the
Protection of Research Subjects.

If you have questions or require any assistance, please contact the Office for the
Protection of Research Subjects at 895-2794.

Cc: OPRS File
APPENDIX II

PRINCIPLE COMPONENT FACTOR ANALYSIS
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Table 9
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Note. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a Rotation converged in 8 iterations.
APPENDIX III

ASSESSMENT OF ASSUMPTIONS
1. Examination of Linearity

Figure 3 Normal P-P plot of regression standardized residuals

Figure 4 Partial regression plot of WC and Trust
Figure 5. Partial regression plot of Cues and Trust

Figure 6. Partial regression plot of SQ and Trust

Figure 7. Partial regression plot of Faith and Trust
Figure 8. Partial regression plot of Stance and Trust

Figure 9. Partial regression plot of Attitude and Trust

Figure 10. Partial regression plot of Risk and Trust
Figure 11. Partial regression plot of Catalog Attitude and Trust

Figure 12. Partial regression plot of PV and Trust

Figure 13. Partial regression plot of Reputation and Trust
2. Examination of heteroscedasticity

Figure 14. Partial regression plot of Satisfaction and Trust

Figure 15. Plot of studentized residuals against standardized predicted values
3. Examination of independence of error terms

Figure 16. Sequence plot: studentized residuals against case number (id)
4. Examination of multi-collinearity

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Tolerance and VIF

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Note. Dependent Variable: TRUST

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Note. Dependent Variable: TRUST

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### APPENDIX IV

**IDENTIFICATION OF OUTLIERS IN INDEPENDENT VARIABLES**

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*Note:* DFFIT method did not identify any influential cases. X = DFFBETAs. * Studentized residuals.
### Table 12
**Model Summary of Weighted Stepwise Regression Analysis**

<table>
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<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Change R Square</th>
<th>Sig. F Change</th>
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Note:

a Predictors: (Constant), Reputation
b Predictors: (Constant), REPUTATION, WC
c Predictors: (Constant), REPUTATION, WC, RISK
d Predictors: (Constant), REPUTATION, WC, RISK, SQ
e Predictors: (Constant), REPUTATION, WC, RISK, SQ, EDUCATION
f Predictors: (Constant), REPUTATION, WC, RISK, SQ, EDUCATION, SATISFACTION
g Dependent Variable: TRUST
h Weighted Least Squares Regression - Weighted by W

### Table 13
**Model Summary of Unweighted Stepwise Regression Analysis**

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<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Change R Square</th>
<th>Sig. F Change</th>
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Note:

a Predictors: (Constant), REPUTATION
b Predictors: (Constant), REPUTATION, WC
c Predictors: (Constant), REPUTATION, WC, RISK
d Predictors: (Constant), REPUTATION, WC, RISK, SQ
e Predictors: (Constant), REPUTATION, WC, RISK, SQ, SATISFACTION
f Predictors: (Constant), REPUTATION, WC, RISK, SQ, SATISFACTION, EDUCATION
g Dependent Variable: TRUST

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Table 14  
**Coefficients of Weighted Stepwise Regression Analysis**

<table>
<thead>
<tr>
<th>Model</th>
<th>Standardized Coefficients</th>
<th>t</th>
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*Note.  
a Dependent Variable: TRUST  
b Weighted Least Squares Regression - Weighted by W*

Table 15  
**Coefficients of Unweighted Stepwise Regression Analysis**

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*Note.  Dependent Variable: TRUST*

Table 16  
**Confirmatory Multiple Regression Analysis -- Model Summary**

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<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>R Square Change</th>
<th>Sig. F Change</th>
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*Note.  
a Predictors: (Constant), VISITS, ATTITUDE, GENDER, EDUCATION, ACCESS, PAPECATA, AGE, PURCHM, SATISFACTION, STANCE, RISK, CUES, PV, FAITH, REPUTATION, SQ, WC. b Dependent Variable: TRUST*
Table 17  
Coefficients of Confirmatory Regression Analysis

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<td>.880</td>
</tr>
<tr>
<td>REPUTATION</td>
<td>.414</td>
<td>6.973</td>
<td>.000</td>
</tr>
<tr>
<td>SATISFACTION</td>
<td>.100</td>
<td>2.194</td>
<td>.029</td>
</tr>
<tr>
<td>GENDER</td>
<td>.019</td>
<td>.500</td>
<td>.618</td>
</tr>
<tr>
<td>AGE</td>
<td>-.062</td>
<td>-1.560</td>
<td>.120</td>
</tr>
<tr>
<td>PUFREQUE</td>
<td>.067</td>
<td>1.650</td>
<td>.100</td>
</tr>
<tr>
<td>ACCESS</td>
<td>-.019</td>
<td>-.486</td>
<td>.628</td>
</tr>
<tr>
<td>PURCHM</td>
<td>.013</td>
<td>.313</td>
<td>.755</td>
</tr>
<tr>
<td>MC</td>
<td>-.038</td>
<td>-.949</td>
<td>.343</td>
</tr>
<tr>
<td>PAPECATA</td>
<td>-.037</td>
<td>-.942</td>
<td>.347</td>
</tr>
<tr>
<td>EDUCATION</td>
<td>-.102</td>
<td>-.596</td>
<td>.010</td>
</tr>
<tr>
<td>VISITS</td>
<td>-.003</td>
<td>-.073</td>
<td>.942</td>
</tr>
</tbody>
</table>

Note. a Dependent Variable: TRUST
APPENDIX VI

REGRESSION ANALYSIS FOR CONSUMER BEHAVIORAL INTENTS
1. Regression analysis for Purchase Intention in the future

Table 18  
**Model Summary of Purchase Intention**

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.408</td>
<td>.166</td>
<td>.163</td>
<td>1.3935</td>
<td>2.010</td>
</tr>
</tbody>
</table>

**Note:**  
(a) Predictors: (Constant), TRUST  
(b) Dependent Variable: PURCHASE INTENTION

Table 19  
**ANOVA for Purchase Intention**

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>113.404</td>
<td>1</td>
<td>113.404</td>
<td>58.402</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>568.941</td>
<td>293</td>
<td>1.942</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>682.345</td>
<td>294</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:**  
(a) Predictors: (Constant), TRUST  
(b) Dependent Variable: PURCHASE INTENTION

Table 20  
**Coefficients for Purchase Intention**

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>2.184</td>
<td>.390</td>
<td>5.605</td>
</tr>
<tr>
<td></td>
<td>TRUST</td>
<td>.607</td>
<td>.079</td>
<td>.408</td>
</tr>
</tbody>
</table>

**Note:**  
(a) Dependent Variable: PURCHASE INTENTION. N = 295
2. Regression analysis for Likelihood of Recommendation

Table 21
Model Summary for Likelihood of Recommendation

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.515</td>
<td>.265</td>
<td>.262</td>
<td>.9437</td>
<td>1.813</td>
</tr>
</tbody>
</table>

a Predictors: (Constant), TRUST  
b Dependent Variable: LIKELIHOOD OF RECOMMENDATION

Table 22
ANOVA for Likelihood of Recommendation

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>1</td>
<td>91.753</td>
<td>103.027</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>286</td>
<td>.891</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>287</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. a Predictors: (Constant), TRUST. b Dependent Variable: LIKELIHOOD OF RECOMMENDATION

Table 23
Coefficients for Likelihood of Recommendation

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>3.233</td>
<td>.272</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TRUST</td>
<td>.558</td>
<td>.055</td>
<td>.515</td>
</tr>
</tbody>
</table>

Note. Dependent Variable: LIKELIHOOD OF RECOMMENDATION. N = 288
REFERENCES


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Strategic Information Systems, 11(3-4), 325-344.


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