

**Website Success: An Integrated Theoretical Model**

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## **Abstract**

As evidenced by the sheer number of websites presently on the Internet and the exorbitant amount of dollars that are spent on maintaining corporate websites determining the successfulness of these websites is of the utmost importance. In building a successful website the design must match the organization's objectives and these objectives need to be clearly defined. However, the objectives of a website differ depending upon the website type. As a result, from the user perspective, this results in varying ideas of satisfaction as well as success. Thus, from the user perspective determining success across websites is both goal and context specific. This dissertation investigated five variables which were believed to impact website satisfaction: information quality, system quality, perceived effectiveness, social influence, and trust. Theories in information systems success and information technology adoption provided theoretical foundations for this dissertation. The research was conducted by surveying multiple respondents, who were regular users of two different websites, each fitting into a different category within the taxonomy of websites. Structural equation modeling techniques were used to build the models of determinants of satisfaction for each website.

The research results indicate that depending upon the type of website being evaluated different determinants of satisfaction were present. Four variables were found to be significant determinants of website satisfaction in the online community website: information quality, perceived effectiveness, social influence, and trust. However, in the information specific search website only three variables were found to significantly predict website satisfaction: information quality, system quality, and perceived effectiveness. Thus, this dissertation has shown that website users' determinants of satisfaction and overall successfulness is dependent upon the context of the website being evaluated and that determinants of satisfaction are goal specific. Several contributions were made by this study. In particular, this research is one of the first to empirically measure determinants of satisfaction, from the user perspective, in varying website contexts.

## **Dedication**

To my fiancée, Megan McBride, who supported me in my achievements with her constant love and support, and whose wonderful attitude helped me through all the difficult times along the way.

And to my parents, Fred and Becky, who never stopped believing in me and supporting me throughout this nine year process. Without their help I would have never been able to make it through.

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## **Chapter One**

### **Introduction**

The incredible speed of the Internet's ascension from an obscure Department of Defense experiment to a cultural icon has been remarkable. In less than a decade, the Internet has extended into nearly every facet of society, from commerce to education to gaming and is employed in a variety of uses, from scholarly research to casual browsing (surfing). Although the Internet remains an unfinished product, it has accumulated enough of a history to permit meaningful analysis of the trends characterizing its evolution.

Since the early 1990's when the Internet exploded into the mainstream, it has made an enormous impact on the way people access information and on the way business operations are carried out. It has changed more than just the way individuals gather information about a particular topic or product or the way businesses try to streamline operations. The Internet has redefined peoples' expectations about the accessibility of information. No longer is the computer savvy person willing to wait on hold or stand in line to get a specific form or piece of information. They want to just point and click, accessing the required information within a matter of seconds. This cultural change is not isolated to the United States or to one particular ethnic group; it breaks traditional borders and puts everyone on a level playing field with accessibility of information.

The business world has also experienced a dramatic culture change. The Internet has forced businesses to rethink and adapt existing business models in order to further emphasize productivity, efficiency, and the streamlining of all business processes. Most

large traditional brick-mortar organizations now have an online presence --- their own websites. These online websites have served as virtual facades, allowing companies to engage customers, provide a clear explanation of their business processes and models, and allow online transactions to streamline the business process. There are even companies that are completely virtual companies (e.g. Amazon.com), offering no traditional brick-mortar outlet. The dotcom bust of the late 1990s led to the reevaluation of these virtual stores, but as time has passed, e-retailer giants such as Amazon.com and ebay.com have further strengthened their grip on the marketplace, and sustained long-term profits are becoming a reality (Mullaney 2003). Does the long-term profitability of a company's electronic outlet hold the answer to the company's success? What if a company's purpose for being on the web is more than just to have an Internet presence or to sell products? How is success defined? What qualifies as a successful website and what does not? As these questions begin to be analyzed, more questions arise. Who is the intended user of the website? What is the user's primary purpose for visiting the site? What are individual organizations trying to get out of their websites?

Although companies and other organizations have spent millions of dollars on the creation and maintenance of their websites, they are still struggling with how to effectively evaluate user satisfaction and how to measure the success of a website from the organization's perspective. For several years, researchers from various disciplines have studied different perspectives of website success and have generated quite a number of interesting yet isolated findings. These findings have provided different although sometimes overlapping perspectives on how to evaluate and determine website success.

In the information technology domain (information systems, information technology, computer science), research has typically focused on the evaluation of generic information systems to determine effectiveness. More specifically, most of the studies have examined generic organizational information systems embedded within organizational settings. As a result, the systems examined are often times mandated systems, where the users and their characteristics are known. Prior literature examining website success, where there is a larger user base that breaks the traditional organizational boundaries in which users are relatively unknown, has been limited primarily to e-commerce contexts. Finally, all of these studies have taken the consumer or end-user view. Studies taking the organizational perspective usually address the implementation of an information system and primarily focus on user resistance studies, implementation stages, and adoption or intention to use the system, but do not directly address the issue of determining website “success.”

Up to this point, research in the area of information systems (IS) success has focused on identifying factors that predict the use of or intention to use a generic information system (DeLone and McLean 1992; Seddon 1997; Venkatesh et al. 2003). The existing models have yet to be applied to varying website contexts. Prior literature suggests several key areas where additional research is needed and several causal mechanisms that require further investigation. DeLone and McLean (1992) suggest testing their model in voluntary contexts and Rai et al. (2002) suggest evaluating the existing IS success models in varying contexts, specifically website contexts.

The goal of this dissertation is to organize this diverse research in the area of IS success and information technology (IT) adoption, and to present a more integrated view

of the concept of website success. This research proposes an integrated model of website satisfaction, incorporating constructs from both the IS success and IT adoption literature. In addition, the model incorporates trust factors to identify determinants of website satisfaction in multiple website contexts. This evaluation is done according to the taxonomy of websites based on user goals (Belanger et al. forthcoming), which is presented later in this chapter.

### **Purpose of the Study**

The number of websites on the Internet has fluctuated over the last couple of years. Today there are approximately 47 million websites, two years ago there were 38 million, and last year there were 35 million ([http://news.netcraft.com/archives/web\\_server\\_survey.html](http://news.netcraft.com/archives/web_server_survey.html) 2004). As evidenced by the ever changing number of websites, the web is a dynamic environment that is evolving on a daily basis. Because of the sheer quantity of sites present on the Internet, evaluating the successfulness of a website has added importance. Of the 47 million sites present on the Internet, how many are reaching their target audience and accomplishing their goals and objectives? How is success measured in these various website contexts?

Determining success is of the utmost importance because some organizations spend literally millions of dollars annually on building and maintaining their websites. These organizations expect a return on their investment. In order to achieve this, the design of the website must match the firm's objectives, and those objectives must be met. In addition, the goals of the site need to be clearly defined. For example, an e-commerce

site such as Amazon.com has the goals of selling products via the Internet, maximizing profits, and attracting repeat visitors. The goal of a search engine website such as Google.com, however, is to identify relevant information on a particular topic in a short period of time in order to attract repeat users (maximizing site traffic). The goals and objectives of a website differ depending upon the website type, resulting in varying ideas of satisfaction as well as success. As a result, determining success across websites from the perspective of the user is goal and context specific.

### **Research Framework**

There is a long tradition in information systems research of evaluating the success of generic information systems. There are a variety of measures that have been used to do this. System effectiveness, which is measured in terms of how well a system attains its design objectives, has been a widely used measure of system success (DeLone and McLean 1992; Gelderman 1998; Montazemi et al. 1996; Parikh et al. 2001; Parikh and Fazlollahi 2002). Another widely used measure of system success is user satisfaction which measures users' attitudes toward the system rather than the system's technical capabilities (DeLone and McLean 1992; Doll and Torkzadeh 1988; Ives et al. 1983; Melone 1990). Because attitude leads to action, user satisfaction prompts user acceptance of the system and higher system usage (Davis et al. 1989; Doll and Torkzadeh 1988; Fishbein and Ajzen 1975; Iivari and Ervasti 1994). A system succeeds when its intended users use it as frequently as needed (Iivari and Ervasti 1994).

The particular models of success used as a foundation for this work were selected on the basis of their importance in prior research. DeLone and McLean (1992) performed a comprehensive review of multiple information system success measures and suggest that there is not one single success measure, but many. These measures fall into six interrelated and interdependent categories: system quality, information quality, use, user satisfaction, individual impact, and organizational impact. DeLone and McLean (1992) state that when an IS success model consists of six interdependent constructs, a measurement instrument of “overall success” based on items arbitrarily selected from the six interrelated and interdependent categories is likely to be problematic. Researchers should therefore systematically combine individual measures from the six IS success categories to create a comprehensive measurement instrument. The selection of success measures should also consider contingency variables, such as the independent variables being researched; the organizational strategy, structure, size, and environment of the organization being studied; the technology being employed; and the task and individual characteristics of the system under investigation (Weill and Olson 1989).

Within the broad context of information systems success, some researchers have focused on particular aspects of success. Seddon (1997) attempted to measure information system success and predict information systems “use”. Seddon concludes that perceived net benefits will often be the most appropriate measure of information system effectiveness and predictor of intended information system use. Seddon (1997) defines success as a measure of the degree to which the person evaluating the system believes that the stakeholder (in whose interest the evaluation is being made) is better off. Seddon (1997) clarifies the meaning of IS use, introducing four new variables to the

DeLone and McLean (1992) model: Expectations, Consequences, Perceived Usefulness, and Net Benefits to Society. Seddon (1997) takes the perspective of the stakeholder into consideration when evaluating success, acknowledging that success is defined differently depending on the stakeholder. For example, for users looking for product information such as the content of a book from Amazon.com, success would be whether they found the information and their satisfaction with the search experience. From the firm's perspective (Amazon.com), however, success is measured by net profits because the objective is to maximize profits.

The most prominent IS success models existing in the literature today are DeLone and McLean (1992), Seddon (1997), and Venkatesh et al. (2003). DeLone and McLean (1992) state that there are six interrelated and independent categories of success measures (see Figure 1). Seddon (1997) offers a re-specified model adapted from DeLone and McLean (1992) and provides the ability to apply the success model to specific contexts (see Figure 2). The Venkatesh et al. (2003) model predicts behavioral intention to use a system and is a unified model of the eight most predominant behavioral IT acceptance theories that presently exist in the acceptance literature. These theories and models include the theory of reasoned action (TRA), the technology acceptance model (TAM), the motivational model, the theory of planned behavior (TPB), a model combining the technology acceptance model and the theory of planned behavior, the model of PC utilization, the innovation diffusion theory, and the social cognitive theory (see Figure 3).

## Research Questions

This prior research outlines the need for a more comprehensive view of information success as well as the need to extend the existing IS success models into differing contexts, specifically Internet websites. There have been calls for research to empirically validate and extend these predominant IS success and IT adoption models into varying contexts (DeLone and McLean 1992; Seddon 1997; Rai et al.2002; Venkatesh et al. 2003). Motivated by these calls for research, the evolving world of the Internet, and the increasing number of websites competing for user visits, the question remains as to what constitutes website user satisfaction. Therefore, the questions this research will seek to answer are as follows:

*Q1: From the perspective of the end user, what is the appropriate model of website success?*

*Q2: From the perspective of the end user, does the proposed model of website success “fit” when extended to a broader typology of websites than exists in the current IS literature?*

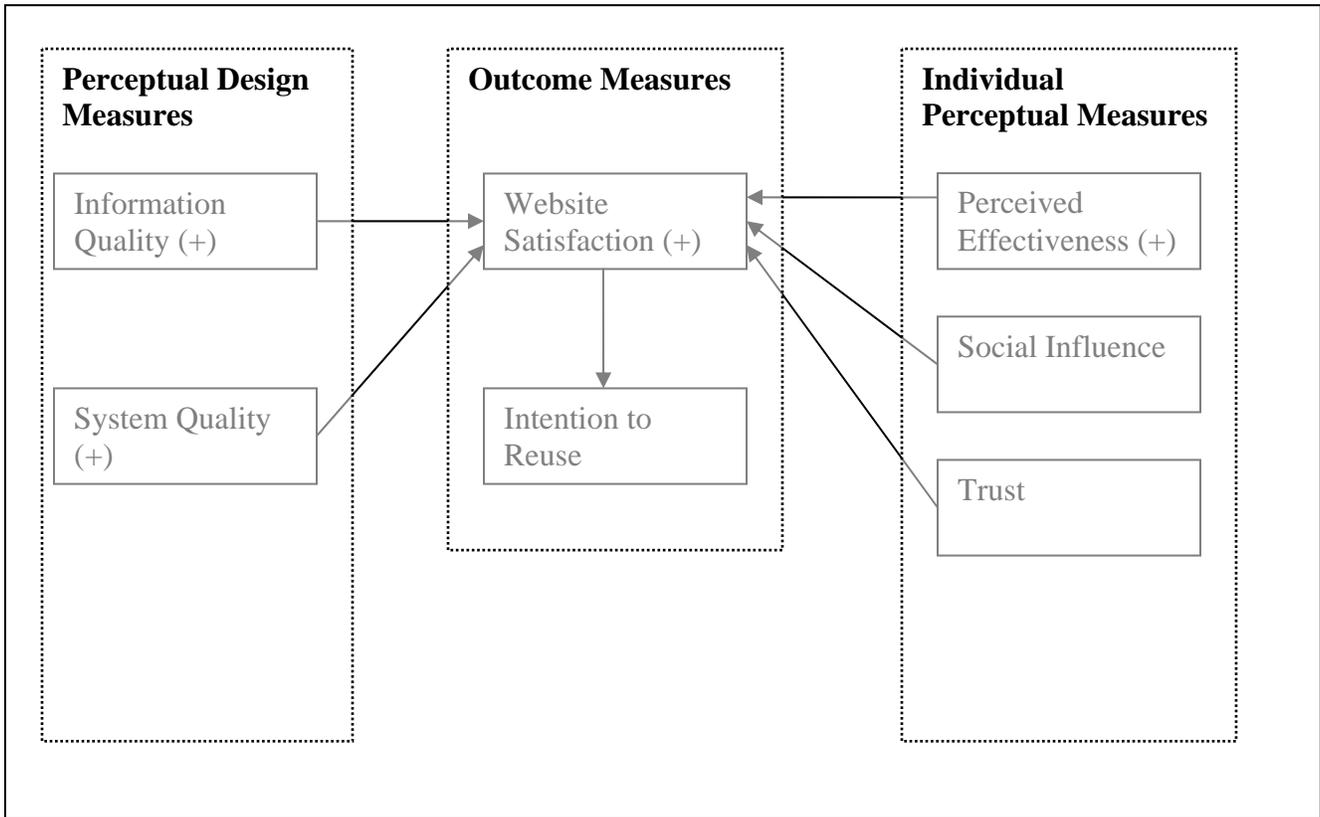
This research will proceed in three stages. The first will organize the diverse research in the area of website success to develop a conceptual model of website satisfaction (see Figure 4). The second stage will empirically validate the proposed model when applied in the context of specific categories of websites based on the

taxonomy (Belanger et al. forthcoming) presented later in this chapter. Finally, the third stage will discuss the results and implications for future research.

### **Detailed Research Model**

Figure 4 represents the proposed research model of website satisfaction being evaluated in this dissertation. Figure 4 presents the expected relationships between the constructs of interest, and summarizes the variables selected to operationalize each of the constructs which are described in Chapter Two.

**Figure 4. Detailed Research Model**



The general proposition of this research is that outcome measures, specifically website satisfaction and the intention to use a website, are dependent upon both the website's design and users' individual perceptions. These factors can be classified along two axes: system design measures which can be found in the IS success literature (DeLone and McLean 1992), and individual perceptual measures which can be found in the IT adoption literature (Venkatesh et al. 2003).

## **Independent Variables**

The particular variables that make up the research model were selected on the basis of their importance in prior research. This section briefly discusses the perceptual design measures (system quality and information quality) and individual perceptual measures (perceived effectiveness, social influence, and trust). All of these are more extensively explained in the literature review presented in Chapter Two.

### **System Quality**

DeLone and McLean (1992) define system quality in terms of the measures of the information processing system itself. Seddon (1997) states that system quality is concerned with whether or not the system is free from “bugs,” the consistency of the user interface, ease of use, quality of documentation, and the quality and maintainability of the program code. To date, current measures of system quality are primarily concerned with mandatory or “quasi-voluntary” usage systems.

In this study, system quality has two components: back-end website quality and front-end website quality. Because the website serves as an intermediary between the user and the information system, an expanded definition of system quality is required for clarity. Back-end website quality is the effectiveness of the website’s underlying information system that ensures functionality of the website. Front-end website quality is the degree to which the website’s interface and design ensures its usability, navigation, and interactivity. In the current study, the front-end of the website deals with the actual interface and all parts of the website that the user comes directly in contact with. In

combination, back-end and front-end website quality comprise the overall system quality of the website, ensuring its functionality and ease of use.

### **Information Quality**

While some research has measured system performance, other research has focused on the output of information. Traditionally, in systems research, this output has been in the form of a report. In the context of websites, the information output is still considered to be a report of some sort, only in a different format; web pages are visual output on a computer screen resulting from user input or query. The webpage displays information, which is the product of the underlying information system, the back-end of the website.

Bailey and Pearson (1983) developed a nine item scale that assesses the quality of a system's output and its effect on overall user satisfaction. They discovered that the most important factors affecting information quality are accuracy, reliability, and timeliness. Information quality was found to be the most significant predictor of user satisfaction with a system. However, their study was done using a generic information system in a mandatory-work setting. The authors therefore call for further development of the measurement tool, stating that additional validation efforts are needed in a broader context of user environments.

Seddon (1997) defines information quality as the degree to which the information that is generated by the system is relevant, timely, and accurate. Seddon (1997) notes that not all areas of IT involve the production of information. However, in the context of

this study, information quality is applicable because a website displays information which is the product of the underlying information system (system quality).

McKinney et al. (2002) developed a six-item scale for measuring website information quality. In their study, information quality is shown to be a factor in predicting overall website satisfaction. Information quality is shown to include six variables: relevance, understandability, reliability, adequacy, scope, and usefulness. McKinney et al. (2002) conducted their study in an e-commerce setting and the authors call for future research in the area of web satisfaction in other contexts. This dissertation follows the approach taken by Rai et al. (2002), who developed a seven-item scale for measuring information quality. Rai et al. (2002) also calls for future research in broader contexts than the mandatory usage context.

### **Perceived Effectiveness**

Effectiveness has been widely researched in various forms throughout the IS literature. The essence of a “successful” website, regardless of its purpose, is whether or not using the website will effectively accomplish a desired goal and lead to a user’s satisfaction. There has been much research done in the area of system effectiveness (Davis 1989; Davis et al. 1989; Moore and Benbasat 1991; Compeau and Higgins 1995; Compeau et al. 1999). However, effectiveness has taken a different form in each study. Ginzberg (1978) states that just because a user actually uses an information system does not mean that it is effective. Again, this prior research has focused primarily on generic information systems, usually in a mandatory setting. This dissertation adopts the Venkatesh et al. (2003) performance expectancy measure because it has been shown in

prior IT adoption literature to be a significant predictor of behavioral intention to use an information system. According to Venkatesh et al. (2003), perceived effectiveness is made up of four root constructs: perceived usefulness, relative advantage, outcome expectations, and compatibility. Venkatesh et al.'s (2003) performance expectancy construct is labeled perceived effectiveness to better semantically represent the objective of Venkatesh et al.'s (2003) construct in the context of this research.

### **Social Influence**

Thompson et al. (1991) use the term “social norms” to describe their construct and acknowledge its similarity with “subjective norm” within the Theory of Reasoned Action. Both theories contain the explicit or implicit notion that the individuals’ behavior is influenced by how they think using the technology will affect how others will view them (Venkatesh et al. 2003). Image has been found to be a significant predictor of IT adoption (Moore and Benbasat 1991), and is comprised in Venkatesh et al.'s (2003) measure of social influence. However, Venkatesh et al. (2003) found their social influence construct to be significant in predicting usage only in a mandatory use setting. In addition to usage studies, there have also been studies of e-commerce settings that have found image to be a significant predictor of intention to purchase (Chen and Wells 1999). There has also been extensive research in marketing journals investigating this link between a brand’s image and its website, known as e-branding (Muller and Chandon 2003). These studies have been done in voluntary settings, but in e-commerce contexts exclusively. This dissertation will investigate the significance of the social influence construct in various voluntary website goal contexts.

## **Trust**

Trust is the foundation of any transaction that takes place between two parties. However, trust is a term that has acquired many meanings and every discipline views trust from its own unique perspective (Singleton et al. 1988). When individuals transact with a website, they are interacting in a highly uncertain situation, which can inhibit their intentions to proceed. This is particularly true in the case of an e-commerce website (Gefen 2000). The uncertainty results from the fact that websites are hosted by some unknown party and are inevitably independent and not fully predictable. Users of individual websites need to know the intentions of those website owners (Gefen 2000). Unless the uncertainty is reduced, customers can not carry on transactions with websites they wish to use. One of the most effective ways of reducing uncertainty is through trust (Hart and Saunders 1997; Gefen 2000).

The issue of trust may be even more important when transacting with a website than when transacting by off-line methods. This is due to the fact that the cultivation of trust is particularly important when uncertainty and risk are inherent, as is the case with the Internet (Crosby et al. 1990; Grazioli and Jarvenpaa 2000). Remote users are allowed to globally access critical files on computers worldwide, which makes the Internet inherently insecure. Uncertainty is further heightened by the fact that the parties involved in the transaction are not in the same place and can not rely on trust-building behaviors like handshakes and other body language because their physical separation prevents them from directly observing each other's behavior (Clarke 1997).

Security and privacy are also components of trust. There have been numerous studies that have focused on Internet security issues, specifically in e-commerce settings.

Even though there have been marked advances in Internet security technologies, website users do not adequately understand the security controls in place on the Internet, especially in e-commerce contexts (Furnell and Karweni 1999). Moreover, users are not aware of which security controls are applied and implemented at any specific website. Because website users do not know enough about Internet security technologies, publicized security lapses make them wary. As a result, the actual strength of the security controls in place on a particular website may not fully explain user acceptance of the website (Suh and Han 2003).

### **Research Model and Propositions**

Seddon (1997) posits that different individuals are likely to evaluate the consequences of IS use in different ways: “IS success is thus conceptualized as a value judgment made by an individual, from the point of some stakeholder” (Seddon 1997, p. 248). After assessing the validity of existing IS success models, Rai et al. (2002, p. 66) call for future research that “should examine how existing IS success models perform in different contexts, including settings that range from strictly voluntary to strictly involuntary use, and recommend refinements as appropriate.” DeLone and McLean (2003) note that success models need to be extended into varying contexts in order to empirically validate existing models and make refinements where necessary.

An extensive review of the literature on information systems success, information technology, and satisfaction has led to the development of a proposed research model of

website satisfaction that will be extended to fit a broad typology of websites, determining success from the end user's perspective. The research model used in this dissertation will be tested in a voluntary website environment. In prior literature, Rai et al. (2002) show that the DeLone and McLean (1992) model exhibited a better fit compared to the Seddon (1997) model, when applied in a quasi-voluntary IS use context. Rai et al.'s (2002) study had students evaluate an information system in place at their mid-western university that provided online access to a database of student information. Access to information from the system was necessary for most of the tasks performed by the users, but its use was not mandatory. Traditional channels of obtaining information were also available to users, despite requiring more time and effort. The website context which is incorporated in this dissertation is similar to the use setting described above. A user is not required to use an organization's website to accomplish a desired task; however, it is likely that traditional means are more time consuming and cumbersome.

One of the objectives of this dissertation is to define website success. The research model presented in this dissertation lays the foundation for defining success from the perspective of the website user. From the organization's perspective, the definition of "success" is a little more cut and dry. From the organization's perspective it's the ability of their website to create an ongoing relationship with a consumer, which will either immediately or eventually lead to a transaction. Cotter (2002) discusses that metrics used to measure website effectiveness need to be tied not only to the type of website, but to the specific goal of that type of website at any given time.

To this point in the literature, research taking the user perspective has focused on the consumer in an e-commerce setting and the need for firms to identify and point their

websites towards consumer expectations. Waite and Harrison (2002) use consumer surveys to study consumer expectations of banking websites. Their general findings reveal and underscore the importance of identifying and satisfying consumer expectations in order to achieve website success. For example, consumers' expectations when using an information specific search site are to be able to search and quickly find relevant information on a particular topic. In contrast, when using an e-commerce type website, consumers expect to find a desired product at a cheap price.

According to the existing IS success literature, use and satisfaction have been the predominant measures of success (DeLone and McLean 1992; Seddon 1997; Venkatesh et al. 2003). Following this line of thinking in the context of websites, success is dependent upon goal accomplishment; satisfaction with a particular website will lead to continued, repeated use. There have been calls in prior IS success literature for model validation in more contexts (Rai et al. 2002). Motivated by this call for research, this dissertation proposes a website satisfaction model linking IS success and IT adoption factors found in prior literature in the context of user website goals.

**Proposition: Website satisfaction and overall website success are dependent upon the website goal that is being evaluated. Therefore, there will be different factors affecting success for different types of website goals.**

## Taxonomy of Website Goals

To begin an investigation of website success, two tasks need to be accomplished: 1) existing websites need to be categorized in order to accurately evaluate them on specified criteria; and 2) the goals of the website and of the website's potential audience need to be identified. To date, websites have typically been classified based on functionality: online storefronts, web presence sites, content sites, malls, incentive sites, and search agents (Hoffman et al. 1996). Belanger et al. (forthcoming) produced a taxonomy of websites based on a set of user goals. According to this taxonomy each website can have many different audiences with many different goals.

In practice, two websites may have similar functions or features but different goals, and therefore different definitions of user satisfaction. Belanger et al.'s (forthcoming) taxonomy is a starting point for an investigation of success based on hypothesized goals for various websites. Each of the classifications should therefore have some goals that are unique to that classification but not specific to one particular website type. In many cases a website will combine multiple classifications from the taxonomy. For example, an "Informed Decision, Biased" website may extend to "Individual E-commerce". This simply means that the goals and success measures from these two classifications will be combined.

**Table 1. Taxonomy of Website Goals**

<i>Website goal</i>	<i>Definition</i>
<b>Informed decision - biased</b>	Gives product information with the goal of influencing the decision process of users
<b>Informed decision – unbiased</b>	Helps the user make an informed decision but without bias towards a particular decision
<b>Life enrichment</b>	Increases the general awareness of a topic, but not necessarily of a product
<b>Online learning</b>	Offers a forum for educational purposes
<b>Entertainment</b>	Offers entertainment (games, music, etc.)
<b>Knowledge enhancement</b>	Quickly informs visitors of current events or a specific topic
<b>E-commerce</b>	Allows transactions online with another party (supplier, customer, partner, government, etc.)
<b>Online community</b>	Gathers and shares information on a certain topic or area of interest and acts as a forum for people with similar interests
<b>Information specific search</b>	Provides the ability to search and find relevant information on a particular topic
<b>Interactive service management</b>	Allows individuals or organizations to service their accounts online
<b>Online application</b>	Allows individuals or organizations to access applications on a web-based platform

### **Expected Contributions**

This dissertation attempts to fill gaps in the information systems literature by 1) identifying a more comprehensive definition of success in the various contexts of websites presently on the Internet and 2) producing an integrated model of website satisfaction for various categories of website goals (based on the presented taxonomy) from the existing models in the IS success, IT adoption, and IT satisfaction literature. This dissertation will also show that website satisfaction is indeed goal and context specific. The results of the research will aid in the design of websites to fulfill specific goals of the website vendor and to facilitate user satisfaction.

## **Overview of the Dissertation**

The remainder of this document is organized as follows: Chapter Two contains a review of the literature with sections on perceptual design measures (system quality and information quality), individual perceptual measures (perceived effectiveness, social influence factors, and trust), and outcome measures (website satisfaction and success); Chapter Three describes the research design and methodology; Chapter Four provides a detailed analysis of the data collected; Chapter Five discusses the research results and their implications; and Chapter Six provides a conclusion, including contributions, limitations of the study, and recommendations for future research.

## **Chapter Two**

### **Literature Review**

The intended research will be conducted using a multi-theoretical perspective, combining views from both the marketing and information systems literature. This chapter is organized as follows: the first section more clearly defines the research context by describing what is meant by website success and website satisfaction; the second section will examine the predominant IS success models existing in the literature today; the third section provides an overview of the literature on the constructs of interest that were identified in Chapter One; and the final section discusses the expected results of the research. The subsections of this chapter are extensive at times since the constructs selected for this study come from very rich research areas in terms of theory and empirical work.

#### **Website Success**

Measuring success is a difficult task because the meaning of success can change depending on the perspective that the stakeholder adopts. There are two opposing perspectives that can be taken in the determination of success: 1) the website user and 2) the organization or party who hosts the website. From the perspective of the end-users, their expectations need to be met and their interaction with the website has to be a positive experience, in order for the website to be considered successful. According to the Expectation/Disconfirmation theory, in order to meet user expectations, a minimum number of criteria have to be met. There are also other factors whose presence will lead

to satisfaction, but the absence of which will not lead to dissatisfaction. These are known as “enhancing factors” (Waite 2002), which provide “extra” satisfaction beyond what is expected. Finally, there are success factors which, if not delivered will cause dissatisfaction, and if delivered above a certain level can enhance satisfaction (Waite 2002).

The predominant way of determining success from the user’s perspective when the user’s satisfaction and likelihood of return are of interest is through surveys. There are two broad categories of success indicators discussed in the marketing satisfaction literature: consumer interaction goals and consumer expectations. However, these success categories are specific to consumers in an e-commerce context, ignoring contexts where the interaction between user and website are not transactional in nature.

From the perspective of the firm, success varies depending upon the objectives and goals of the site. For example, an e-commerce site’s objective would be to sell products or services and to maximize profit. However, the objective of a search engine’s website, such as Yahoo.com, would be to quickly gather relevant information in a timely manner with the goal of creating repeat visits. The perspective taken is critical in the determination of success.

From the organization’s perspective, the definition of success is the website’s ability to create an on-going relationship with a consumer (user), which will either immediately or eventually lead to a transaction of some sort. Gathering clickstream data is the predominant way of determining success from the firm’s perspective. A firm gathers clickstream data from the traffic on its site and makes inferences regarding the site’s success or effectiveness. However, organizational metrics to measure site effectiveness

need to be tied not only to website type, but also to the specific goals of the user, which are not directly highlighted in this kind of research. Instead, the marketing clickstream data research seems to focus on goals: (1) interaction goal of the consumer; and (2) conversion behavior of the consumer, i.e. the process by which visits lead to purchases. In addition to the interaction goal of consumers, this type of research uses visit quantity as a consumer differentiator, such as Park and Fader's (2003) "zero-class" visitors – ones who have not previously visited the site. Bucklin and Sismeiro (2003) investigate two key consumer decisions – whether the visitor will exit the site or continue to browse, and the amount of time the visitor will stay on a page.

### **Website Satisfaction**

Customer satisfaction is critical for establishing long-term client relationships and plays a significant role in sustaining profitability and determining the overall success of a website (Patterson et al. 1997). Web customer satisfaction (called e-satisfaction by Szymanski and Hise 2000) is of great importance (McKinney et al. 2002). The need for further research in e-satisfaction has been accentuated by the increasing demand for long-term profitability of both dotcom companies and traditional companies that are "net-enhanced" (Straub et al. 2002).

Customer satisfaction in an e-commerce setting has been widely researched in the marketing literature. Customer satisfaction in an e-commerce setting is the consequence of the customer's experiences during various purchasing stages: (1) need arousal, (2)

information search, (3) alternatives evaluation, (4) purchase decision, and (5) post-purchase behavior (Kotler 1997). However, there is a need for customer satisfaction research beyond the e-commerce setting. A search engine website such as Google.com is equally concerned about its user's satisfaction as is an e-commerce website such as Amazon.com.

Although the antecedents to customer satisfaction are well documented in classical contexts (Oliver 1980; Yi 1990; Oliver 1997; Szymanski and Henard 2001), customer satisfaction in an Internet context, specifically website satisfaction, has not been subjected to conceptual or empirical scrutiny beyond the e-commerce setting. General levels of e-satisfaction have been reported (Buskin 1998; Ernst and Young 1999) and research has been done in an e-commerce context attempting to identify e-satisfaction determinants (Szymanski and Hise 2000; McKinney et al. 2002). However, there has been no empirical research done to determine the antecedents of website satisfaction in a context other than that of an e-commerce website.

Taking a systems perspective, end-user satisfaction is an important area of IS research because it has been found to be a significant factor in measuring IS success and use (Ives and Olson 1984; Doll and Torkzadeh 1988; DeLone and McLean 1992; Doll et al. 1994; Seddon 1997). Based on the IS success literature there are several studies in end-user satisfaction that explicitly separate information and system features when identifying the structure and dimensionality of the satisfaction construct. DeLone and McLean (1992) and Seddon (1997) make an explicit distinction between information aspects and system features as determinants of satisfaction. McKinney et al. (2002) make a similar distinction between the two in assessing web-customer satisfaction.

A similar separation of theoretical constructs can be found in the marketing literature. In modeling overall satisfaction, Spreng et al. (1996) identified attribute satisfaction and information satisfaction as antecedents of overall website satisfaction. Information satisfaction is based on the quality of the information used in deciding to purchase a product, whereas attribute satisfaction measures the consumer's level of contentment with a product (Spreng et al. 1996). Szymanski and Hise (2000) found that aspects associated with product information and website design are important determinants in achieving customer satisfaction. These studies have been done in e-commerce settings and have focused on factors specific to that context. It is the objective of this dissertation to extend the literature base into other settings beyond e-commerce, specifically various categories of websites based on user goals (see Figure 1).

Research that looks beyond an e-commerce context and takes a more holistic view of website satisfaction has shown that information is the primary concern of the user, while the delivery mechanism is secondary (Pitt et al. 1995). Because an important role of websites is information delivery, the quality of the information is critical (Katerattanakul and Siau 1999; Zhang et al. 2000). That being said, the importance of the website's performance in both delivery of the requested information and in its design and usability can be independent of the quality of the information. As a result, it is possible to make a distinction between information quality and system quality (back-end and front-end website quality).

The idea of satisfaction when applied to a broader spectrum of websites than just the e-commerce domain also encompasses principles that extend beyond the technological advantages of the output produced by the system and the speed with which

it is produced. There are certain factors that are more perceptual in nature, factors that are salient in the users' mind that are the direct result of interaction with the website. An individual's perception of the effectiveness of a website is dependent upon the user's perception of how well the website aided in the accomplishment of the individual's desired goal.

Social influence is concerned with an individual's perception that other important people favor a particular website. Venkatesh et al. 2003 found that although none of their social influence constructs were significant in voluntary use contexts, each of the constructs was found to be important when usage was mandated. As mentioned above, this study focused on predicting behavioral intention to use. In contrast, the setting for this dissertation is a voluntary use context, where the individuals will use the website and assess their satisfaction with it. There has been an extensive amount of literature done in the marketing domain on the role of brand loyalty and image on the Internet (Chen and Wells 1999; Chiagouris and Wansley 2000). The social influence constructs may indeed be found to be significant when attempting to measure satisfaction and success. This is an especially important topic when addressing customer retention issues.

There has been an extensive amount of research done in the area of trust, specifically in the e-commerce setting (Ahuja 2000; Gefen 2000; McKnight and Chervany 2001-2; Belanger et al. 2002; McKnight et al. 2002). Trust is an essential component for any type of interaction but may be especially important when transacting with a website. This is because the cultivation of trust is particularly important when uncertainty and risk are inherent as they are on the Internet (Crosby et al. 1990; Grazioli and Jarvenpaa 2000). Remote users are allowed to globally access critical files on

computers worldwide, which makes the Internet inherently risky from the standpoint of security. Uncertainty is further heightened by the fact that the parties involved in the transaction are not in the same place and can not rely on things like physical proximity, handshakes, and body language (Clarke 1997). In addition, the parties involved are unable to directly observe each other's behavior (Grazioli and Jarvenpaa 2000). Studies have shown that face-to-face interactions evoke higher levels of trust (Cassell and Bickmore 2000). Trust is essential in cultivating an ongoing relationship between users and websites.

### **IS Success Models**

IS success and IT adoption models have traditionally attempted to predict use. However, the predominant models have only been tested in mandated usage contexts. Rai et al. (2002) call for future research to examine how IS success models perform in different contexts. They state that models of IS success need to be critically evaluated, refined, and tested in emergent IS use settings, such as e-commerce. However, e-commerce is only a single type of website present on the Internet. Rai et al. (2002) also point out that traditional IS systems were targeted at internal organization users at operational, tactical, and strategic levels. The focus of a majority of the past IS success research has been on explaining IS use in these settings, where IS use has been typically assessed by how much time was spent using the system (Rai et al. 2002). However, a majority of organizations now have some sort of web presence, and these systems are targeted at external users.

One way of studying these external users is by collecting clickstream data. Clickstream data is a way to monitor a user's browse window and record when the browser window is in focus and what URL is currently being viewed (Catledge and Pitkow 1995). Even though clickstream data captures user actions, this data is unreliable in drawing inferences of user intentions because it simply reports navigation patterns through a site. Inferences regarding user intentions can not be made on the basis of clickstream data, as a result, measures of website utilization seem appropriate since building user dependency on a website may be a way to cultivate loyalty and achieve retention. Assuming that traditional IS success models are applicable to various categories of websites, such systems would shift the behavioral focus from the internal organizational use of a system to metrics that assess current and recurring patterns of user interactions.

The DeLone and McLean (1992) and Seddon (1997) success models have been empirically validated in prior literature. Rai et al. (2002) called for future research to apply the existing success models (DeLone and McLean 1992 and Seddon 1997) to specific contexts. Venkatesh, Morris, et al. (2003) present a unified model that predicts behavioral intention to use an information system. This model is considered to be a unified model because it empirically compares eight prominent user acceptance models that exist in the literature today. The following section briefly describes the three predominant competing IS success models that exist in the literature presently.

### **DeLone and McLean (1992)**

The DeLone and McLean (1992) study was one of the first attempts at a comprehensive review of the literature base in IS success, identified by the authors as being the elusive dependent variable in IS research. The authors organize a broad base of diverse research (180 articles) and present a more integrated view of IS success. In producing the taxonomy, DeLone and McLean (1992) explain that information is the output of every information system and that it can be measured at different levels, including the technical level, the semantic level, and the effectiveness level. The technical level is defined as the accuracy and efficiency of the system which produces the information; the semantic level is the success of the information in conveying the intended meaning; and the effectiveness level is the effect of the information on the person who receives it (Shannon and Weaver 1949). Effectiveness was relabeled influence by Mason (1978) and defined as a “hierarchy of events which take place at the receiving end of an information system which may be used to identify the various approaches that might be used to measure output at the influence level” (Mason 1978, pg. 227).

DeLone and McLean (1992) note that this application of communication theory to the measurement of information systems suggests that there may need to be separate success measures for each of the levels of information. DeLone and McLean (1992) then produced six distinct categories of information systems. The six distinct categories are placed within three levels of information: system quality is the technical level measure; information quality is the semantic level measure; and use, user satisfaction, individual impact, and organizational impact make up the effectiveness (influence) level measures

(Shannon and Weaver 1949). Thus, DeLone and McLean (1992) suggest that there is not one single success measure, but many, which fall into six interrelated and interdependent categories. Their taxonomy proposed six major categories of information systems success: system quality, information quality, use, user satisfaction, individual impact, and organizational impact. System quality is defined as the measures of the information processing system itself, including system accuracy, system flexibility, and system reliability. Information quality is defined as the measures of the information system output, such as the accuracy of the information produced, relevance, and completeness. Information use is defined as the consumption by the recipient of the output of an information system. Information use includes measures such as frequency of access and number of reports produced. User satisfaction is defined as the recipient response to the use of the output of an information system. User satisfaction has been suggested as a measure of IS success for empirical IS research by several IS researchers (Ein-Dor and Segev 1978; Hamilton and Chervany 1981). The most predominant measure of user satisfaction is overall satisfaction. Individual impact is defined as the effect of information on the behavior of the recipient. DeLone and McLean (1992) note that of all the measures of IS success, “impact” is the most difficult to define because it is closely related to performance. However, “impact” could also be an indication that an information system has given the user a better understanding of the decision context, improved the user’s decision making productivity, changed user behavior, or changed the individual’s perception of the importance or usefulness of the information system (DeLone and McLean 1992). Finally, organizational impact is defined as the effect of information on an organization’s performance.

DeLone and McLean (1992) state that an IS success model consisting of these six interdependent constructs implies that a measurement instrument of “overall success” based on items arbitrarily selected from the six I/S categories is likely to be problematic. Researchers should systematically combine individual measures from the six I/S success categories to create a comprehensive measurement instrument. The selection of success measures should also consider contingency variables, such as the independent variables being researched; the organizational strategy, structure, size, and environment of the organization being studied; the technology being employed; and the task and individual characteristics of the system under investigation (Weill and Olson 1989).

DeLone and McLean’s article (1992) is a theoretical study assuming a mandatory usage context of a generic information system. The authors conclude this paper with the comment that their model needs further development and validation before it can serve as a basis for the selection of appropriate IS success measures. In this dissertation, the system quality and information quality constructs in the DeLone and McLean (1992) model will be applied to the different categories of website goals, according to the proposed taxonomy of websites presented earlier in Chapter One, and empirically validated in a voluntary usage context. To test and empirically validate the model in a website context, the success measures will be chosen as prescribed by DeLone and McLean (1992); specific measures will be chosen from each success category to fit the specific context of the websites.

## **Seddon (1997)**

Seddon's (1997) model provides both a logical separation and a link between IS success models, which focus on beliefs about system quality, information quality, and perceptions of net benefits from IS use, and a behavioral model of IS use (Rai et al. 2002). Seddon (1997) suggests that DeLone and McLean (1992) tried to do too much with their model, and as a result, the model is confusing and mis-specified. Seddon (1997) points out that the problem with the DeLone and McLean (1992) model is that it combines both process and causal explanations of IS success. Seddon (1997) also notes that there are three meanings of IS use in the DeLone and Mclean (1992) model. In addition, Seddon states that the DeLone and McLean (1992) model is really a combination of three different models:

- A variance model of IS success, in which the independent variables are system quality and information quality, and the dependent variable is IS use as a proxy for benefits from use and user satisfaction;
- A variance model of IS use as a behavior
- A process model of IS success, in which IS use is an event that necessarily precedes outcomes such as user satisfaction, individual impact and organizational impact. (pg. 244)

The major contribution of the Seddon (1997) paper is the re-specified model of IS success (See Figure 2). Seddon (1997) defines success as a measure of the degree to which the person evaluating the system believes that the stakeholder (in whose interest

the evaluation is being made) is better off. Seddon (1997) distinguishes success from net benefits by stating “if Net Benefits could be measured with precision, IS success would be equivalent to Net Benefits. However, IS success also has political and emotive overtones of ‘we won’ about it, which are less evident in Net Benefits” (p. 246). Seddon (1997) also clarifies the meaning of IS use, introducing four new variables (Expectations, Consequences, Perceived Usefulness, and Net Benefits to Society) to the DeLone and McLean (1992) model. Seddon (1997) takes the perspective of the stakeholder into consideration when evaluating success, acknowledging that success is defined differently depending upon the stakeholder.

The Seddon (1997) IS success model (shown in Figure 2) indicates that user satisfaction and perceived usefulness are both closer to the notion of Net Benefits than the other four measures. Thus, the complete success model shows that user satisfaction is dependent upon six variables (system quality, information quality, net benefits to individuals, net benefits to organizations, and net benefits to society). Perceived usefulness is hypothesized to depend upon the same variables. This approach was adopted from extending the regression model approach that was used in Seddon and Kiew (1994). Seddon (1997) points out that it may not be valid in all situations and that it needs to be tested empirically.

### **Venkatesh et al. (2003)**

Venkatesh et al.’s (2003) model of IT adoption discusses and empirically compares eight prominent user acceptance models that presently exist in the literature. The authors construct a unified model that integrates elements across the eight models

and empirically validate the unified model. The eight prominent models that are reviewed are the theory of reasoned action (TRA), the technology acceptance model (TAM), the motivational model, the theory of planned behavior (TPB), a model combining the technology acceptance model and the theory of planned behavior, the model of PC utilization, the innovation diffusion theory, and the social cognitive theory. The newly created unified model, called the Unified Theory of Acceptance and Use of Technology (UTAUT), consists of four core determinants of intention and usage and was shown to outperform the eight existing models. The four core determinants are performance expectancy, effort expectancy, social influence, and facilitating conditions.

Performance expectancy is defined as the degree to which individuals believe that using the system will help them improve their job performance (Venkatesh et al. 2003). Five constructs from the eight different models that comprise performance expectancy are perceived usefulness, extrinsic motivation, job-fit, relative advantage, and outcome expectations (Venkatesh et al. 2003). Recent literature has shown that there are similarities between constructs: usefulness and extrinsic motivation (Davis et al. 1989, 1992), usefulness and job-fit (Thompson et al. 1991), usefulness and relative advantage (Davis et al. 1989; Moore and Benbasat 1991; Plouffe et al. 2001), usefulness and outcome expectations (Compeau and Higgins 1995; Davis et al. 1989), and job-fit and outcome expectations (Compeau and Higgins 1995). Venkatesh et al. (2003) found the performance expectancy to be the strongest predictor of intention and to be significant in both voluntary and mandatory settings, which is consistent with previous model tests (Agarwal and Prasad 1998; Compeau and Higgins 1995; Davis et al. 1992; Taylor and Todd 1995; Thompson et al. 1991; Venkatesh and Davis 2000). For the purposes of this

research, the performance expectancy construct will be modified slightly to incorporate an Internet setting and is renamed perceived effectiveness to be more semantically correct in representing goal accomplishment instead of increased job performance, as has been common in prior literature (DeLone and McLean 1992; Venkatesh et al. 2003).

Effort expectancy is the degree of ease associated with the use of the system (Venkatesh et al. 2003). Venkatesh et al. (2003) identify three constructs from the eight models which make up the concept of effort expectancy: perceived ease of use, complexity, and ease of use. Venkatesh et al. (2003) note that the similarity among these three variables has been documented in prior literature (Davis 1989; Moore and Benbasat 1991; Thompson et al. 1991; Plouffe et al. 2001). Venkatesh et al. (2003) found that their effort expectancy construct was significant in both voluntary and mandatory usage contexts, but only in the initial usage of the technology. It became insignificant after periods of extended and sustained usage which is consistent with previous research (Davis 1989; Thompson et al. 1991; Thompson et al. 1994; Agarwal and Prasad 1997; Agarwal and Prasad 1998). Venkatesh et al. (2003) note that effort oriented constructs are usually found to be more salient in the early stages of a behavior. This initial stage is when process issues are hurdles that need to be overcome by users and later are forgotten, giving way to concerns about specific features of the system (Davis 1989; Szajna 1996; Venkatesh 1999).

Social influence is the degree to which an individual perceives that others who are deemed important to them believe that they should use the system (Venkatesh et al. 2003). Social influence is comprised of subjective norms, social factors, and image. Thompson et al. (1991) use the term “social norms” to define their construct, and

acknowledge its similarity to “subjective norm” within the Theory of Reasoned Action. Venkatesh et al. (2003) note that their social influence constructs contain the explicit or implicit notion that people’s behavior is influenced by the way in which they believe others will view as a result of having used the technology. Venkatesh et al. (2003) found that none of the social influence constructs were significant in voluntary contexts; however, all of them were found to be significant when usage was mandatory. Venkatesh and Davis (2000) suggest that these effects in a mandatory context could be attributed to compliance that causes social influence to have a direct effect on intention. In contrast, social influence in voluntary contexts, as in this study, functions by influencing perceptions about the technology. In the case of this dissertation, the technology being evaluated will be a specific website.

Facilitating conditions are the degree to which an individual believes that an organizational and technical infrastructure exist to support the system (Venkatesh et al. 2003). Facilitating conditions are comprised of three root constructs: perceived behavioral control, facilitating conditions, and compatibility. Venkatesh et al. (2003) note that each of these root constructs is operationalized to include aspects of the technological and/or organizational environment that are meant to remove barriers to use. The authors found that when both their performance expectancy constructs as well as their effort expectancy constructs are present in the model, facilitating conditions becomes a non-significant construct in predicting usage intention.

## **Variables of Interest**

The variables of interest in this dissertation are comprised of constructs from the three theoretical models previously discussed and the component of trust. The proposed model suggests that website satisfaction is dependent upon six variables: Information Quality, System Quality, Perceived Effectiveness, Social Influence, and Trust. What follows is a comprehensive literature review of the variables of interest.

### **System Quality**

Traditionally, when evaluating the “success” of information systems, some IS researchers have studied the processing system itself. Kriebel and Raviv (1980, 1982) created and tested a productivity model for computer systems, including performance measures such as resource utilization and investment utilization. Alloway (1980) developed 26 criteria for measuring the success of a data processing operation, which include the efficiency of hardware utilization as a criterion for systems success. Swanson (1974) developed multiple measures of system success, which include the reliability of the computer system and on-line response time. Emery (1971) suggested measuring specific system characteristics such as response time and system accuracy. Hamilton and Chervany (1981) proposed the currency of the data, response time, turnaround time, data accuracy, reliability, flexibility, and completeness as measures of system quality.

DeLone and McLean (1992) define system quality as the measures of the information processing system itself and investigate its effect on use and user satisfaction. Seddon (1997) states that system quality is concerned with whether or not

the system is free from “bugs,” the consistency of the user interface, ease of use, quality of documentation, and the quality and maintainability of the program code.

McKinney et al. (2002) explore the effect of system quality on web-customer satisfaction. Their study was done in an e-commerce setting and provides instruments for operationalizing key constructs in the analysis of Web satisfaction in an e-commerce setting. Their four item scale includes access, usability, navigation, and interactivity. The access of the website refers to its availability, responsiveness, and load speed. The usability of a website is concerned with the extent to which the website is visually appealing, consistent, fun, and easy to use. The navigation factor evaluates the links to needed information and navigation patterns. The interactivity factor evaluates the search engine and the personal design, e.g., the shopping cart feature, of the website.

Presently, measures of system quality have been primarily concerned with mandatory or “quasi-voluntary” usage systems. However, the Internet in its present form today is a voluntary usage system, and the present definitions of system quality do not reflect such. Therefore, in this dissertation, system quality is evaluated on two axes: back-end and front-end quality. This is an adapted definition of system quality taken from the previous literature on system success as outlined above. Because the website serves as an intermediary layer between the user and the information system, an alternate definition is required for clarity.

### Back-End Website Quality

Back-end website quality is the effectiveness of the website's underlying information system that ensures its functionality and accessibility. In this dissertation, the system being evaluated is the underlying information system of the website.

The accessibility of a website refers to its speed of access and availability (McKinney et al. 2002; Bailey and Pearson 1983; Novak et al. 2000; Selz and Schubert 1998; Wilkerson et al. 1997). Accessibility is the principal advantage of the Internet as a whole, but because websites are what comprises the Internet, if a website is down and not accessible, it is worthless. The website needs to be reliable, which means that it is operationally stable. Prior research subscales for accessibility include system responsiveness and loading time (McKinney et al. 2002).

### Front-End Website Quality

Front-end website quality is the effectiveness of the website's design that ensures its usability, navigation, and level of interactivity. In this dissertation, the front-end of the website deals with the actual interface and all parts with which the user comes in direct contact. Front-end website quality should provide an interface that is easy to use, is easily navigable, and provides an appropriate level of interactivity that ensures the user remains engaged with the website. Front-end website quality is thus dependent upon usability and design.

The usability and design of websites has received considerable attention in both the human computer interaction (HCI) literature and in Internet specific usability research (Palmer 2002). Usability (Abels et al. 1997; Bailey and Pearson 1983; Davis 1989; Doll

et al. 1998; Doll and Torkzadeh 1988; Doll et al. 1994; Dumas and Reddish 1993; Eighmey 1997; Eighmey and McCord 1998; Moore and Benbasat 1991; Schubert and Selz 1998; Venkatesh and Davis 1996; Wilkerson et al. 1997; Zmud 1978) is concerned with the extent to which the website is visually appealing, consistent, fun, and easy to use (McKinney et al. 2002). Prior to widespread use of the Internet, usability of information systems was equivalent to a set of design principles with five key elements: 1) consistency of the interface, 2) response time, 3) mapping and metaphors, 4) interaction styles, and 5) multimedia and audiovisual capabilities (Nielsen 1993). Consistency suggests the need for common placement of navigation tools, such as buttons and bars. Response time focuses on the speed at which the system provides a response to user activity. Mapping and metaphors in usability emphasizes navigation from place to place within the system and the adoption of specific metaphors (Przystupa 1993), such as shopping carts, to aid in user activity. Interaction styles concentrate on system messages that are generated in response to user activity. The fifth usability element is the degree to which multimedia and audiovisual capabilities are incorporated.

As the Internet evolved and became increasingly popular, usability research began to focus more specifically on extending the basic usability principles into the web environment (Schneidermann 1998; Nielsen 2000). Nielsen (2000) extended these design principles for web design to include 1) navigation, 2) response time, 3) credibility, and 4) content. This implies that easily navigable sites with fast reliable content are going to be perceived more favorably.

Navigation (Abels et al. 1997; Wilkerson et al. 1997) is concerned with evaluating the links to needed information that are provided on the various pages of the website

(McKinney et al. 2002). Navigation is an element of usability that is an important design element, allowing users to easily find and acquire the information they are seeking (Machlis 1998). Thus, it is essential to create good links and navigation mechanisms (Radosevich 1997). Every webpage attached to the website must have consistent navigation links to enable the user to move around efficiently and effectively (Lohse and Spiller 1998). Graphic design, layout, and actual content are components of making the page easier to use (Rasmussen 1996).

Interactivity (Abels et al. 1997; Eighemy 1997; Eighemy and McCord 1998; Selz and Schubert 1998; Wilkerson et al. 1997) has been discussed in prior research as being concerned with evaluating the search engine and design of the site. Text links are vital; navigation and content are inseparable; and the design should focus on navigational structure, searching, readability, and graphics (Spool 1997). Sanjoy and Wenyu (1998) find that the degree and nature of interactivity have a statistically significant effect on the quality of corporate websites, which are traditionally web-presence sites.

As websites have matured (specifically in e-commerce contexts), some uniformity has begun to occur, with de facto standards beginning to emerge (for example, the use of product catalogs, shopping carts, and navigation protocols) (Palmer 2002). Design principles have also matured along with technology, but because this maturation process is usually not disruptive, basic design principles tend to endure (Pearrow 2000).

Research continues to identify approaches to improve ease of use of websites on the Internet (Levi and Conrad 1996; Boling 1995). Results often focus on the speed at which the webpage downloads, success in finding a page, and organization of the information that was gathered during use of the website (Pitkow and Kehoe 1996). A

website with high usability should produce a desirable perception and increase users' intention to use the website. The appropriate design of a user interface includes organization, presentation, and interactivity (Schneiderman 1998). Enabling greater interactivity for its user is a key capability of the Internet. Users who access the Internet to gather information, purchase goods and services or even to accomplish a desired goal are influenced by the interactivity of the website (Jarvenpaa and Todd 1997; Alba et al. 1997).

**Table 2: Empirical Measures of System Quality**

<b>Authors</b>	<b>Description of Study</b>	<b>Back-End Measure(s)</b>
Abels et al. (1997)	User-based website design criteria	1) Use 2) Content 3) Structure 4) Linkage 5) Special features 6) Appearance
Bailey and Pearson (1983)	Overall I/S; 8 organizations, 32 managers	1) Convenience of access 2) Flexibility of system 3) Integration of Systems 4) Response Time
Belardo et al. (1982)	Emergency management DSS; 10 emergency dispatchers	1) Reliability 2) Response Time 3) Ease of Use 4) Ease of learning
Conklin et al. (1982)	Transaction processing; one organization	Response Time
DeLone and McLean (1992)	IS Success	Specific measures for specific systems
Doll and Torkzadeh (1988)	End User Satisfaction – Ease of Use	1) Is the system user friendly? 2) Is the system easy to use?
Eighemy (1997)	User Perception of Websites	6 items on ease of use (usability)
Emery (1971)	System Characteristics	1) Content of the database 2) Aggregation of details 3) Human factors 4) Response time 5) System accuracy
Hamilton and Chervany (1981)	System Quality	1) Data currency 2) Response Time 3) Turnaround time 4) Data accuracy 5) Reliability 6) Completeness 7) System flexibility 8) Ease of use
Mahmood (1987)	Specific I/S; 61 I/S Managers	Flexibility of system
McKinney et al. (2002)	Website Satisfaction	1) Access 2) Usability 3) Navigation 4) Interactivity
Seddon (1997)	IS Success	1) No “Bugs” 2) Consistency of interface 3) Ease of use 4) Quality of documentation 5) Quality and maintainability of code
Srinivasan (1985)	Computer based modeling systems	1) Response Time 2) System Reliability 3) System Accessibility
Swanson (1974)	MIS appreciation	1) Reliability 2) Response time 3) Ease of use
Wilkerson et al. (1997)	Evaluation Criteria	1) Access 2) Usability 3) Navigation 4) Interactivity

## **Information Quality**

In contrast to research that has measured the quality of system performance, other studies have focused on the quality of the information system output, specifically, the quality of the information that the system produces. Larcker and Lessig (1980) developed six questionnaire items to measure the perceived importance and usability of information that is generated by an information system. Bailey and Pearson (1983) propose 39 system related items for measuring user satisfaction. Among these important items, listed in descending order of importance, were information accuracy, output timeliness, reliability, completeness, relevance, precision, and currency.

Ahituv (1980) incorporates five information characteristics into a multi-attribute utility measure of information value: accuracy, timeliness, relevance, aggregation, and formatting. Gallagher (1974) developed a semantic differential instrument to measure the value of a collection of IS reports. That instrument includes measures of relevance, informativeness, usefulness, and importance. Additional information characteristics developed by Swanson (1974) to measure MIS appreciation among user managers include uniqueness, conciseness, clarity, and readability measures. Zmud (1978) includes report format as an information quality measure in his empirical studies. Olson and Lucas (1982) propose report appearance and accuracy as measures of information quality in information systems geared towards office automation. King and Epstein (1983) propose multiple information attributes to yield a composite measure of information value. The information attributes in their study include sufficiency, understandability, freedom from bias, reliability, decision relevance, comparability, and quantitiveness.

Several information quality criteria have also been included within the broad area of “User Information Satisfaction” (Iivari 1987; Iivari and Koskela 1987). The Iivari and Koskela measure includes three information quality constructs: informativeness, accessibility, and adaptability. Informativeness consists of relevance, comprehensiveness, recentness, accuracy, and credibility. Accessibility consists of convenience, timeliness, and interpretability. Adaptability is concerned with the customization of the output format.

McKinney et al. (2002) developed a six item scale for measuring website information quality in the determination of website satisfaction in e-commerce settings. Among the items listed were relevance, understandability, reliability, adequacy, scope, and usefulness. Relevance is concerned with such issues as relevancy, pertinence, and the applicability of the information. Understandability encompasses variables such as being clear in meaning, easy to understand, and easy to read. The reliability measure is concerned with the degree of accuracy and perceived credibility of the information. Adequacy of the information was assessed by its sufficiency, completeness, and thoroughness. The scope of the information evaluates the extent of the information, range of information, and the level of detail provided by a website. The subscales for scope include a wide range of information and information that contains a number of different subjects. Perceived usefulness is the users’ assessment of the likelihood that the information will enhance their decision.

In Table 3, an overview of the studies which include information quality measures are shown. Up to this point in the research, most of the studies which include measures of information quality are from the perspective of the user and thus are fairly subjective

in nature. The various information quality measures are shown here as separate entities; however, they are often included as part of the measures of user satisfaction. Bailey and Pearson's (1983) study is an example of the linkage between information quality and user satisfaction.

**Table 3: Empirical Measures of Information Quality**

<b>Authors</b>	<b>Description of Study</b>	<b>Information Quality Measures</b>
Bailey and Pearson (1983)	Overall I/S; 8 organizations, 32 managers	Output 1) Accuracy 2) Precision 3) Currency 4) Timeliness 5) Reliability 6) Completeness 7) Conciseness 8) Format 9) Relevance
King and Epstein (1983)	Overall I/S; 2 firms, 76 managers	Information 1) Currency 2) Sufficiency 3) Understandability 4) Freedom from bias 5) Timeliness 6) Reliability 7) Relevance to decisions 8) Comparability 9) Quantitativeness
Mahmood (1987)	Specific I/S; 61 IS managers	1) Report accuracy 2) Report timeliness
McKinney et al. (2002)	Web-Customer Satisfaction	1) Relevance 2) Understandability 3) Reliability 4) Adequacy 5) Scope 6) Usefulness
Miller and Doyle (1987)	Overall I/S; 21 financial firms, 276 user managers	1) Completeness of information 2) Accuracy of information 3) Relevance of reports 4) Timeliness of report
Srinivasan (1985)	Computer based modeling systems; 29 firms	1) Report accuracy 2) Report relevance 3) Understandability 4) Report Timeliness

## **Perceived Effectiveness**

Perceived effectiveness in this dissertation is defined as the degree to which individuals believe that using a specific website will help them gain an advantage in accomplishing their desired goal. Effectiveness in this dissertation is an adaptation of Venkatesh et al.'s (2003) performance expectancy construct. However, in the Venkatesh et al. (2003) study, the performance expectancy was used to predict behavioral intention to use a generic information system, whereas in this dissertation the construct will be applied in a website context predicting behavioral intention as well as website satisfaction.

In the Venkatesh et al. (2003) study, perceived effectiveness is made up of five root constructs that have been widely used in prior literature: perceived usefulness, extrinsic motivation, job-fit, relative advantage, and outcome expectations. Perceived usefulness is the degree to which people believe that using a particular system will enhance their performance (Davis 1989; Davis et al. 1989; Venkatesh et al. 2003). Extrinsic motivation refers to users' desire to perform an activity because it is perceived as being essential for achieving a desired outcome (Davis et al. 1992; Venkatesh et al. 2003). Job-fit is defined as how the capabilities of an information system enhance an individual's performance in accomplishing a specific task (Thompson et al. 1991; Venkatesh et al. 2003). Relative advantage is the degree to which using a website is perceived as being better than alternative methods (Moore and Benbasat 1991; Venkatesh et al. 2003). Outcome expectations relate to the consequences of the behavior. Venkatesh et al. (2003) split this factor into two dimensions: job related performance expectations and personal expectations (individual goals).

## **Social Influence**

The social influence construct in this dissertation is adopted from Venkatesh et al. (2003). Social influence is defined, for the purposes of this dissertation, as the degree to which individuals perceive that society as a whole will view them favorably for using a particular website. Social influence consists of three root variables: subjective norm, social factors, and image (Venkatesh et al. 2003). Subjective norm (Fishbein and Ajzen 1975; Ajzen 1991; Mathieson 1991; Davis et al. 1992; Taylor and Todd 1995a; Taylor and Todd 1995b) is the perception that most people who are important to oneself think that one should or should not participate in the action in question (Venkatesh et al. 2003). Social factors (Thompson et al. 1991) include the individual's internalization of the reference group's subjective culture, and specific interpersonal agreements that the individual has made with others in specific social situations (Venkatesh et al. 2003). Image (Moore and Benbasat 1991; Venkatesh et al. 2003) is defined, for the purposes of this research, as the degree to which individuals' use of a website is perceived as enhancing their image or status in their social setting.

Venkatesh et al. (2003) found that the constructs related to social influence (subjective norm, social factors, and image) are not significant in a voluntary context. Venkatesh and Davis (2000) explain that such effects could be attributed to compliance in mandatory contexts that causes social influences to have a direct effect on intention to use. In contrast, social influence in voluntary contexts, as in this research, exists by influencing perceptions about the technology. The technology evaluated in Venkatesh et al. (2003) as well as Venkatesh and Davis (2000) was generic information systems. However, a website is a much more dynamic environment than a generic information

system. Therefore, in this dissertation social influence will be evaluated in a different context than has been done previously.

There have been several studies in the marketing domain that have evaluated the effect of “brand loyalty” on website usage. Thorbjornsen and Supphellen (2004) find that brand loyalty is a much stronger determinant of website usage than conventional determinants, such as internet experience and the type of motivation for the visit (information/entertainment). In their study, it was also found that brand loyalty is positively related to frequency of website usage, but negatively related to visit duration. Goldsmith and Lafferty (2002) found that a positive response to an organization’s website will lead to a positive view of the brand (organization) as a whole. This finding is consistent with Chen and Well’s (1999) contention that websites influence brand attitudes and purchase intentions.

Chiagouris and Wansley (2000) state that the branding power of a website relies on its ability to bring a customer back for repeated interactions, the degree of permission granted by the user for ongoing dialogue, and the extent to which the access is being leveraged. Once the user is engaged with the website, the firm’s primary goal is to expand the engagement, which will elicit more trust, satisfaction, and loyalty from each customer.

## **Trust**

There are several facets to the concept of trust in a website environment. There are also several definitions of trust. Lee and Turban (2001) note that there is not one agreed upon definition of online consumer trust. A majority of the research that has been

done on the notion of trust has been done in an e-commerce context. McKnight and Chervany (2001-2) produced an interdisciplinary typology of trust that is related to e-commerce consumer transactions which consists of four concepts: disposition to trust, institution-based trust, trusting belief, and trusting intention. Other researchers have conceptualized trust as a corporate knowledge asset. Rogers and Gago (2004) state that for most individuals, “trust” is a knowledge corporate asset that may add, or rest value to the company (pg. 2). “Trust” in this sense means the ability of an individual to rely on the integrity and predictability of other individuals. Trust also involves feelings, values, beliefs, and risk.<sup>1</sup> Boon and Homes (1991) define trust as “a state involving confident positive expectations about another’s motives with respect to oneself in situations entailing risk” (pg. 194). Similarly, Robinson (1996) define trust as an individual’s “expectations, assumptions, or beliefs about the likelihood that another’s future actions will be beneficial, favorable, or at least not detrimental to one’s interests” (pg. 576). The relationship of trust with reciprocity, opportunism, and forbearance (Parkhe 1993) may affect the structure of trust. This structure of trust is based upon an individual willfully submitting to another, resulting in vulnerability, mutual interdependence, uncertainty, and partial loss of control (Rodgers and Gago 2004). Doney et al.’s (1998) review of the extant literature in economics, organization behavior, psychology, and sociology revealed two consistent themes: (1) trust as a set of beliefs or expectations, and (2) trust as a willingness to act on those beliefs (pg. 603).

Trust is viewed as a psychological construct arising through cognition and requiring social structure for its formation (Luhmann 1979). The object of trust may be

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<sup>1</sup> McKnight and Chervany (2002) reported that competence, predictability, benevolence, and integrity represented the most dominant definitions of trust in the literature.

an individual (Larzelere and Huston 1980) or an institution (Shapiro 1987). There have also been research studies that have shown that the level of trust in a relationship affects the degree of defensiveness (Kramer 1999). Thus, individuals can have difficulty concentrating on messages, perceived motives, values, and emotions of others, resulting in an increased distortion of messages. Therefore, interpersonal or organizational trust is required for effective decision making (Rodgers and Gago 2004).

This dissertation adopts a definition of “trust” that is based largely on Mayer et al. (1995) and the model of initial trust formation proposed by McKnight et al. (1998). This dissertation uses the term “trust” to mean a combination of *trusting beliefs*, defined as the belief that another is benevolent, competent, honest, or predictable in a given situation, and *trusting intention*, meaning one’s willingness to depend on another in a situation (McKnight et al. 1998). In many instances, trust is based on previous interactions (Gefen 2000). Although a supplier’s previous behavior does not guarantee that he or she will act as expected, trust will increase if the supplier behaved as expected previously (Suh and Han 2003).

In an e-commerce context, trust has been traditionally measured based on three characteristics: competence, benevolence, and integrity (Mayer et al. 1995; McKnight and Chervany 2001-2). Competence means that the truster believes that the trustee has the ability or power to do for me what needs to be done (McKnight and Chervany 2001-2). Benevolence is the extent to which I believe that the trustee wants to do good for me, aside from any egocentric profit motive (Mayer et al. 1995). Integrity is defined as the belief that the trustee makes good faith agreements, tells the truth, acts ethically, and fulfills promises (McKnight and Chervany 2001-2). McKnight and Chervany (2001-2)

present an additional characteristic of trust, predictability. However, Mayer et al. (1995) differentiates trust from predictability and explains that trust goes beyond predictability because an individual does not trust another party who is highly predictable to ignore the needs of others and act in a self-interested fashion. This dissertation adopts the trust characteristics that were presented by Mayer et al. (1995).

Trust is the foundation of any transaction that takes place between two parties. When individuals transact with a website, they are interacting in a highly uncertain situation, which can inhibit their intentions to proceed. This is particularly true in the case of an e-commerce website (Gefen 2000). The uncertainty results from the fact that websites are hosted by an unknown party and are inevitably independent and not fully predictable, even though users of a website need to know the intentions of the website they would like to use. Unless the uncertainty is reduced, customers can not carry on transactions with websites they wish to use. One of the most effective ways of reducing uncertainty is through trust (Gefen 2000; Hart and Saunders 1997).

Belanger et al. (2002) note that most definitions of trust capture the notion of risk taking, but most are operationalizations taken from the traditional marketing context and applied in an online setting. The majority of these definitions do not specify the online trust referents (i.e. the merchant or the computer system). Moorman et al. (1993) define consumer trust as “a willingness to rely on an exchange partner in whom one has confidence.” This definition suggests that trust reflects a continuum of readiness (i.e. readiness to engage in a relationship with another party, such as a salesperson) (Crosby et al. 1990). Consistent with the Belanger et al. (2002) study, this dissertation’s trust measure will focus on the electronic organization and its website as the exchange party.

A user's perception of security is an additional component of trust. Kalakota and Whinston (1996) define a security threat as a "circumstance, condition, or event with the potential to cause economic hardship to data or network resources in the form of destruction, disclosure, modification of data, denial of service, and/or fraud, waste, and abuse." Thus, security is the protection against these threats. Using this definition of security, threats can be made either through network and data transaction attacks, or through unauthorized access by means of false or defective authentication (Belanger et al. 2002). This definition needs to be adapted to be applicable to website users, acknowledging that a users' information is valuable. For website users, it must be recognized that (1) economic hardship encompasses damages to privacy (loss of information) as well as theft, for example, of credit card information and (2) authentication issues for website users will be reversed, as in whether the website is a 'real' website rather than whether the purchaser's identity is real. This definition is an adaptation of Belanger et al.'s (2002) tailored definition which specifically applies to an e-commerce setting.

Security is one of the most daunting inhibitors presently facing Internet users. The challenges arise from the existing vulnerabilities of the Internet. When an individual uses a website, anybody from anywhere in the world could access any information being sent back and forth (Suh and Han 2003). The risk of information theft, theft of service, and corruption of data is always present. To compound the problem, the possibility of fraud increases significantly on the Internet because of the anonymity factor (Aldridge et al. 1997).

E-commerce transactions have been shown to be particularly vulnerable to security threats. The vulnerabilities of the Internet may inhibit potential customers from participating in e-commerce if they believe the level of risk is too great (Strader and Shaw 1997). If breaches in security do occur, website users may incur damage ranging from invasions of privacy to financial loss. Organizations may also incur losses ranging from the loss of information to bad public image. Organizations, particularly in the e-commerce domain, could even incur legal penalties from regulatory agencies (Suh and Han 2003). It is essential that security controls are in place to ensure confidentiality, reliability, and protection from the loss of valuable information. Therefore, a crucial prerequisite for not only e-commerce, but websites on the Internet as a whole, is to guard against security threats.

There has been a significant amount of research done on basic security control requirements in e-commerce settings (Aldridge et al. 1997; Bhimani 1996; Clarke 1998; Furnell and Karweni 1999; Gefen 2000; Ratnasingham 1998; Yang 1996). The basic security control requirements which have been identified in prior literature include authentication, nonrepudiation, confidentiality, privacy protection, and data integrity (Suh and Han 2003). Authentication ensures that the parties participating in the electronic transaction or communication are indeed who they claim to be. Nonrepudiation means that neither of the participating parties should have the ability to deny having participated in a transaction after it has occurred. Confidentiality ensures anonymity in a website setting, especially in an e-commerce setting (Suh and Han 2003). Privacy protection ensures that any personal information that is collected through electronic transactions is protected from disclosure without permission (Suh and Han 2003). Data integrity

ensures that any data that is transmitted is not created, intercepted, modified, or deleted illicitly (Suh and Han 2003). These basic security requirements are accomplished by a plethora of technologies including encryption, third-party certificates, digital signatures, and compliance with privacy policy (Ahuja 2000; Aldridge et al. 1997; Garfield and McKeown 1997; Ott 2000; Ratnasingham 1998).

There have also been a number of studies focusing on security issues found on the Internet, specifically in an e-commerce setting, which have primarily investigated the implementation and maintenance of security control (Aldridge et al. 1997; Bhimani 1996; Clarke 1998; Garfield and McKeown 1997; Yang 1996). Despite the fact that there have been marked advances in Internet and e-commerce security technologies throughout the last decade, website users do not adequately understand the security controls in place on the Internet, especially in an e-commerce setting (Furnell and Karweni 1999). Moreover, users are not aware of which security controls are applied and implemented at a specific website they are visiting. Because website users do not know enough about Internet security technologies, publicized security lapses make them wary. As a result, the actual strength of the security controls in place on a particular website may not fully explain user acceptance of the website (Suh and Han 2003).

One of the biggest advantages of the Internet is its ability to rapidly disseminate information among multiple parties. This exchange of information between parties is done via a website and is dependent upon the willingness of the users to interact with that website. However, it has been shown that privacy concerns affect user acceptance and satisfaction with a website. A 1998 Business Week/Harris poll of 999 consumers revealed that privacy was the biggest obstacle that prevented them from transacting

online. Privacy ranked higher than issues of cost, ease of use, and unsolicited marketing (Green et al. 1998).

In 1999, an IBM Multi-National Consumer Privacy Survey showed that eighty percent of the U.S. respondents felt that they had “lost all control over how personal information is collected and used by companies.” Seventy-eight percent of the respondents had refused to give personal information because they thought it was inappropriate and fifty-four percent cited concerns over the use of their personal information as reason for not completing a transaction. Overall, the survey found that seventy-two percent of U.S. respondents were worried about their personal information being collected.

A 2000 Pew Internet and American Life survey found that sixty-six percent of respondents felt that online tracking should be illegal, and eighty-one percent of the respondents reported that there should be legal limits on the amount of personal information that can be collected. Further, eighty-six percent reported that websites should be required to have an opt-in policy before collecting personal information (Paul 2001). Thus, adopting Belanger et al.’s (2002), definition, for the purposes of this dissertation, privacy is defined as the ability to manage information about oneself.

Undoubtedly, the importance of online consumer’s concerns over security and privacy are paramount in achieving system adoption. However, Suh and Han (2003) found that security and privacy were actually user perceptions because the average Internet user is not knowledgeable enough to distinguish between the various security features present on a particular website. Thus, perceptions of privacy and security are contingent upon the user’s confidence in the competency of the website.

In contrast to what has traditionally been done in e-commerce contexts, this dissertation will focus on benevolence, competence, and integrity as indices of trust because additional contexts beyond e-commerce will be evaluated. Benevolence is defined as the extent to which the trusting party believes that the trusted party wants to do things the right way (do good) rather than just maximize their profit (Belanger et al. 2002). Competence is defined as the ability of the website owner to deliver what is promised to the user, ensuring the privacy of their personal information, and security of the site. Perceived integrity is evidence of the marketer's honesty and sincerity (Belanger et al. 2002). For the purposes of this dissertation, trust is defined as the perception of confidence in a website owner's benevolence, competence, and integrity.

## **Chapter Three**

### **Methodology**

Users can have several motivations for going to websites, from browsing, entertaining, to acquiring goods and services. For a given site, one user may be positively influenced to return by the website's advanced customization capabilities, while another may be negatively affected by the lack of privacy that results from those same customization capabilities. The first user may wish to transact rapidly, not worrying about information given to the site, while the second might desire to browse the site more anonymously.

Because website success is both goal specific and audience specific, and because the internet is a "quasi-voluntary usage" setting, it is largely the user who determines the "success" of a website. Users are not forced to visit a specific website; they choose to visit one in particular over a selection of others that are available. If individuals who perform information specific searches go to Google.com every time they search, this is undoubtedly success from Google's perspective. However, the real question is why those users choose to go to that specific website every time they search for information. What are the factors that are contributing to the users' satisfaction with the website? What are the antecedents of this satisfaction with and loyalty to Google? What makes Google.com successful in the eyes of this user? Adapting Seddon's (1997) definition of IS success, website success can be defined for the purposes of this research as a measure of the degree to which the person who is evaluating the website believes that the stakeholder (in whose interest the evaluation is being made) is better off using the website.

Organizations rely on websites to communicate with external audiences, yet there is no universally accepted way of assessing a user's satisfaction with a website and determining "success". There are various models of IS success that exist in the literature today, but they have yet to be applied in Internet website contexts. After assessing the validity of existing IS success models, Rai et al. (2002, p. 66) called for future research that "should examine how existing IS success models perform in different contexts, including settings that range from strictly voluntary to strictly involuntary use, and recommend refinements as appropriate."

This dissertation will provide some descriptive and explanatory research on website satisfaction and overall website "success" from the perspective of the end user. Because user surveys are the principle method of study in IS success research (Venkatesh et al. 2003), this dissertation will emulate that approach. To date, the majority of the published research on IS success has either been theoretical or done on specific settings evaluating generic information systems, typically in a work setting or some other type of mandatory usage context. With the exception of e-commerce settings, prior IS research has largely ignored voluntary usage Internet contexts. Therefore, the various types of website goals that will be evaluated with this model will all be in a voluntary usage context and will be evaluated by a sample that is largely comprised of experienced web users. It will be interesting to see if the factors found to be significant in the model will be successful in evaluating website "success" when integrated with IS success constructs.

The present research proposes a model of website satisfaction, empirically tests it in the context of user website goals, and attempts to identify antecedents of website

satisfaction by conducting a survey of multiple respondents comprised of Internet website users who will assess their satisfaction of various types of websites after using the particular website to accomplish a given task. This chapter first presents the research hypotheses, followed by the research design, then discusses the research instrument in detail, and the survey preparation and administration.

### **Research Hypotheses**

The following is a list of detailed hypotheses that have been created after a thorough review of the literature. These hypotheses will be tested in this dissertation to empirically validate the proposed model of website satisfaction.

#### **Hypothesis 1**

The system quality construct will positively influence website satisfaction in each category of user website goals being evaluated.

#### **Hypothesis 2**

The information quality construct will positively influence website satisfaction in each category of user website goals being evaluated.

#### **Hypothesis 3**

The perceived effectiveness construct will positively influence website satisfaction in each category of user website goals being evaluated.

#### **Hypothesis 4**

The social influence construct will not significantly influence website satisfaction in each category of user website goals being evaluated.

#### **Hypothesis 5**

The trust construct will not significantly influence website satisfaction in each category of user website goals being evaluated.

**Hypothesis 6**

Website satisfaction will positively influence intention to re-use the website when applied in each category of user website goals being evaluated.

In addition to the main effects that are expected, the literature review in Chapter Two suggests that certain demographic variables may have a moderating effect on the outcome measures. However, the primary purpose of this research is to integrate existing IS success and IT adoption models and to propose a unified model of website satisfaction, specifically investigating the antecedents of website satisfaction. Demographics will be collected to investigate any potential moderating effects; however, this was done for the purpose of any supplemental analyses that might be necessary and for potential future research. Any potential moderating effects that are identified are beyond the scope of this dissertation and will be explored in future research.

**Research Design**

This research project involves two phases of data collection. The first phase will ask website users a set of pre-task questions. After subjects answer the pre-task questions, they will visit a specific website (a category from the website taxonomy) and accomplish a task given to them. After visiting the website and attempting to complete the assigned task, the subjects will be asked to proceed to the second phase of the data collection during which they will respond to a series of questions aimed at assessing their satisfaction with the specific website they visited during their task.

## Research Instrument

The survey instrument was created by combining existing measures of success in information systems and adapting them to a different context. This section describes in detail all the variables contained in the questionnaire. The questionnaire contained five sections: 1) pre-visit questions; 2) perceptual design measures; 3) individual perceptual measures; 4) outcome measures and 5) general information (demographics). The questionnaires are coded for the two specific categories of website goals evaluated, based on the taxonomy (Belanger et al. forthcoming) presented in Chapter One. Specifically, an information specific search and an online community website will be evaluated.

### Section I. Pre-Visit Questions

Pre-visit questions help to identify the goals of the user when accessing the website. In addition, this information was collected with the intention of validating the appropriateness of the website goals selected within the presented taxonomy. Table 4 presents the pre-visit questions.

**Table 4. Pre-Visit Questions**

1. Have you used this website previously?
2. How often do you visit the website?
3. What is usually the main reason you visit the website?
4. What are secondary reasons that you visit the website? (check all that apply)

## **Section II. Perceptual Design Measures**

Design measures are features of a website that can be directly controlled by the website host. IS success measures, such as Information Quality and System Quality, have often been recognized as important determinants of both IS use (DeLone and McLean 1992; Seddon 1997) and satisfaction (McKinney et al. 2002). For the purposes of this research, information quality was measured on the basis of the information's relevance, understandability, reliability, adequacy, scope, and usefulness (McKinney et al. 2002). System quality was measured on the basis of the website's access, usability, entertainment, hyperlinks, navigation, and interactivity (McKinney et al. 2002). Tables 5 and 6 summarize the factors included in the information quality and system quality success measures.

The items were measured on a continuous seven-point semantic differential scale, where 1 = strongly disagree, and 7 = strongly agree. As discussed in Chapter Two, the items that comprise information quality and system quality were generated using published literature (Rai et al. 2002). The items comprising the information and system quality constructs are adopted from Rai et al. (2002); however, a different response scale was used. The Rai et al. (2002) study measured each variable on a continuous seven-point semantic differential scale from "not important at all" to "extremely important," with no descriptive indices in between. In order to maintain consistency with other measures and items used in this instrument, to improve the precision of responses for respondents, and to revalidate the items within the current research, the scale for responses was adapted from Rai et al. (2002)

**Table 5. Information Quality**

1. The website provided the precise information you needed.
2. The website provided output that is exactly what I needed.
3. The website provided sufficient information to enable you to accomplish your task.
4. The website HAD errors on it that you had to work around.
5. I am satisfied with the accuracy of the information provided on the website.
6. The output options (page customization, etc.) are sufficient for your use.
7. The website provided helpful information regarding your questions and tasks.

**Table 6. System Quality**

1. The website was user friendly?
2. The website was easy to use?
3. The website was well organized?

**Section III. Individual Perceptual Measures**

Individual perceptual measures look at website users’ perception of the website based on their satisfaction level pre- and post-task. Respondents are asked to rate their perceptions of websites after visiting the website and completing a small task based on criteria that have been identified in prior literature. Specifically they are asked to evaluate their trust level with the website, their expected performance in accomplishing the given task, and any social influences they have regarding the website. The task asked the subjects to click a link which took them to a large newspaper’s website and then find something to do for the weekend using information provided on the website.

These individual perceptual measures (performance expectancy, social influence, and trust) have been found in previous literature to be significant factors in IT adoption (Ratnasingham 1998; Belanger et al. 2002; Venkatesh et al. 2003). The goal of this research project is to integrate these measures with the IS success measures and extend them into the domain of website satisfaction. Tables 7, 8, and 9 summarize the factors included in the trust measure as well as the performance expectancy and social influence measures.

**Table 7. Trust**

1. I believe that the website will act in my best interest.
2. The website is worried about my well being, not just its own.
3. The website is truthful in its dealings with me.
4. I would characterize the website as honest.
5. The website would keep its commitments.
6. The website was competent and effective in enabling you to accomplish your task.
7. If I required help the website would do its best to help me.
8. The website performs its role very well.
9. Overall, the website allows me to be capable and proficient on a specific topic.
10. In general, the website enables me to be knowledgeable on a specific topic.
11. The website is sincere and genuine.

**Table 8. Perceived Effectiveness**

1. I would find the website to be useful.
2. Using the website enables me to accomplish my tasks more quickly.
3. Using the website would increase my productivity.
4. If I use the website, I increase my chances of accomplishing my task.

**Table 9. Social Influence**

1. People who influence my behavior think that I should use the website.
2. People who are important to me think that I should use the website.
3. I use the website because of the proportion of people around me who use the website.
4. People around me who use the website have more prestige than those who don't.

In this section of the survey, respondents were asked to identify the importance of each of these factors in determining website satisfaction. As discussed in Chapter Two, the items that comprise trust, performance expectancy, and social influences were generated using published literature (McKnight et al. 2002; Venkatesh et al. 2003). In order to maintain consistency with other measures and items used in this instrument and since the items were to be reevaluated in the current research, they were measured on a continuous seven-point Likert type scale, where 1 = not important at all and 7 = extremely important.

The trust items were adapted from scales found in McKnight et al. (2002). These items are called trusting beliefs items which were adapted from scales existing in prior literature (Johnson-George and Swap 1982; Rempel et al. 1985; Wrightsman 1991). In selecting items, it was important to capture the aspects of belief that were most relevant to a website context. Thus, integrity items captured perceptions of the website vendor's

honesty, truthfulness, sincerity, and willingness to keep commitments. The benevolence items focused on the vendor acting in the user's best interest, trying to help, and being genuinely concerned (McKnight et al. 2002). The performance expectancy and social influence scales were adapted from the Venkatesh et al. (2003) study. The performance expectancy items were aimed at capturing the users' perception of the degree to which they believe the website gave them an advantage in their performance. The social influence items were aimed at capturing the user's perception of the degree to which they believe important others around them think they should be using the website.

#### **Section IV. Outcome Measures (Dependent Variables)**

The next section of the questionnaire contains a series of items to measure the outcome criteria. The items were not identified to respondents as representing specific constructs (like satisfaction), and were randomly ordered on the questionnaire. Each outcome criterion was measured by more than two items. This section discusses the items selected for each construct.

Website satisfaction is one of the two major outcome measures (dependent variables) in this research. The McKinney et al. (2002) study used six items to measure website satisfaction and measured responses on a continuous 11-point semantic differential scale. As with the information and system quality constructs scale, this scale was changed to seven-point Likert type scales.

Behavioral intention to use a system is the other major outcome measure (dependent variable) in this research. This outcome measure has been found predominantly in the IT adoption literature (Venkatesh et al. 2003). Respondents were

asked to rate their perceptions after visiting specific websites and completing a small task based on criteria that were identified in prior literature. Specifically they were asked to evaluate their intention to return and use the website again. Table 10 summarizes the items included in the outcome measures.

**Table 10. Outcome Measures**

<b>Website Satisfaction</b>	<ol style="list-style-type: none"> <li>1. After using the website, I am... Very dissatisfied vs. Very satisfied</li> <li>2. After using this website I will... Never recommend it to my friends vs. Definitely recommend it to my friends</li> <li>3. After using this website, I will... Never use it again vs. Will definitely use it again</li> </ol>
<b>Behavioral Intention to Use</b>	<ol style="list-style-type: none"> <li>1. I intend to use the website again in the near future.</li> <li>2. I predict I would use the website again.</li> <li>3. I plan on using the website again to accomplish a similar task.</li> </ol>

In the next section of the survey, respondents were asked to evaluate the above outcome measures. As discussed in Chapter Two, the items that comprise website satisfaction and behavioral intention to use the website were generated using published literature (McKinney et al. 2002; Venkatesh et al. 2003). For the purposes of this research, the items were adapted to fit the website context.

### **Section V. General Information (Demographics)**

General demographic measures were taken as in previous IS success, IT adoption, and satisfaction studies. These included factors that have been found to influence an individual's satisfaction level, such as age, gender, and years of experience with the

Internet (McKinney et al. 2002). These factors were also included because prior IT adoption literature has recognized that the influence of performance expectancy on behavioral intention is moderated by gender and age, such that the effect is stronger for men and particularly for younger men (Venkatesh et al. 2003). In the IT adoption literature, Venkatesh et al. (2003) also found that the influence of social influence on behavioral intention was moderated by gender, age, voluntariness, and experience. Because the context of this research is voluntary in nature, the voluntariness measure is omitted in this research project.

A question was included to measure how often the individuals purchase something on the web. Ranganathan and Ganapathy (2002) measure purchasing as the number of online purchases in the last six months and provide the following choices: 1 transaction, 2-3 transactions, 4-5 transactions, 6-10 transactions, 11-20 transactions, and greater than 20 transactions. This research used similar answer choices to measure the frequency of Internet purchasing. This research also included a measure of whether the subject has access to a major credit card in order to make a purchase because prior literature has shown that the misuse of credit card information is a concern when shopping online (Keeney 1999).

A final measure was taken to establish the education level of the respondents. Jarvenpaa and Todd (1997) measure education level as a five level categorization which includes high school, 2 or fewer years of college, 4-year college degree, graduate degree, and doctorate. This research measured the respondents' education level using choices similar to those found in the Jarvenpaa and Todd (1997) study.

However, collecting information on age, gender, years of experience with the Internet, frequency of online shopping, access to a major credit card, and education level allows for further analysis if required once the research model has been built and tested. Table 11 summarizes the general demographic variables.

**Table 11. Summary of General Demographic Variables**

1. Age
2. Gender
3. Years of experience with the Internet
4. Frequency of online shopping
5. Access to a major credit card
6. Highest level of education completed

### **Pre-Test and Pilot Study**

In this dissertation, potential attributes for each factor were identified based on previous literature leading to the development of a survey instrument. The survey instrument was pre-tested to identify unclear or confusing wording, to establish the approximate amount of time required to complete the survey, and for initial analyses of the measures. Five accounting Ph.D. students were asked to evaluate a website, accomplish a given task, and then fill out a questionnaire. Preliminary information revealed that 20-30 minutes were needed to complete the entire survey, including website evaluation and task accomplishment, with most individuals able to complete it in less than 25 minutes. Following the pre-test, modifications were made to reduce concerns

with wording and to clarify instructions. All items showed variance, and respondents indicated that the wording of the survey and other face validity items were not problematic.

The pilot study was then done by posting the instrument on the Internet and allowing subjects to access it remotely at a time of their choosing. The survey was posted on the website SurveyMonkey.com, which provides the capabilities of creating and hosting the survey as well as providing limited data analysis capabilities. The pilot study was completed by 132 upper level accounting students. After the data was analyzed, all items showed variance. However, there were concerns raised over two of the scales used in the instrument: information quality and system quality. These two scales were adapted from McKinney et al. (2002), but in that study they were examined without any other variables present in the model. Respondents' comments indicated some concerns about the wording of some of the individual items, and about the reliability of the scales. As a result, the decision was made to adapt the information quality and system quality scales from Rai et al. (2002) where they had been empirically validated within the framework of the DeLone and McLean (1992) and Seddon (1997) IS success models. These two new measurement scales were then assessed by completing a second pilot study using 150 accounting students. In this second pilot study the concerns of the first were alleviated. The problems with the information quality and system quality constructs were addressed. The wording issues were also corrected and the resulting scales all showed more than adequate reliability levels (see Table 12, 13, 14 and Appendix 3). The resulting instrument included 44 questions (see Appendix 1), which

included a couple pre-visit questions and a task (see Appendix 2) for the subjects to do before completing the survey.

## **Chapter Four**

### **Data Analysis**

The survey instrument used for this research was created with a combination of scales and items that have been used in prior literature, as discussed in the literature review presented in Chapter Two. This chapter presents a thorough description of the data analysis for this research. The detailed discussion of the results and their implications is presented in Chapter Five. Chapter Six then summarizes the contributions of this study and its limitations, and proposes recommendations for future research.

This chapter is organized as follows. The first section provides a descriptive analysis of the data followed by the scale analysis. The following section provides an overview of structural equation modeling (SEM) techniques. The final section presents the model building results and testing of the hypotheses with structural equation modeling (SEM) techniques.

#### **Descriptive Analyses of the Data**

##### **Information Specific Search Website**

This part of the research was done with the intention of targeting experienced users of a website whose primary purpose is that of searching for specific pieces of information. This website goal is most often times tied to the traditional search engine website (i.e. Yahoo.com, Google.com, etc.). Users often times visit this particular type of

website with the purpose of searching for information and then using hyperlinks provided in the search results to be redirected to another website for further information on the topic of interest.

The website which was chosen for analysis is one of the most popular search engine websites that exists presently. This website was chosen because of its overall fit into the information specific search category within the taxonomy presented in Chapter Two. Of those surveyed, 94.2% reported that their primary purpose for using the website was to search for information on a particular topic. This indicates that the placement of this website into the information specific search was accurate.

The website was also chosen because the student population sampled was very familiar with this site. The overwhelming majority of the subjects stated that they used the Google website at least several times per week. Of the subjects surveyed, 95.2% reported using the website at least once a month.

There were a total of 102 usable survey responses in the information specific search group. The sample was comprised of upper level undergraduate accounting information systems students. This sample seems very appropriate for the website being evaluated as these are experienced Internet users, with 89.2% of respondents having accessed the Internet for over 5 years. Of those surveyed, 86.7% reported having shopped online several times in the past year with 43.6% reporting that they shopped online at least once a month. Most (90.1%) had access to a major credit card. There were slightly more males (52%) than females (48%) in the sample, and 76.5% of the respondents were between the ages of 18-20

## **Online Community Website**

An online community website was researched in order to target experienced users of a website whose primary purpose is to provide a site that allows users to gather and share information on a certain topic or area of interest and that acts as a forum for people with similar interests (Belanger et al. forthcoming). This type of website is most often used by users with a specific common interest to collect and disseminate information on that one particular topic area or a closely related area. The website chosen for this dissertation was one comprised of school teachers who all taught a specific topic area to students of varying ages and levels.

There were a total of 1837 usable surveys in the online community category. The sample was comprised of science teachers from around the world who are active users of the online community website. This website provides them with a forum to post and collect information regarding curriculum, upcoming conferences, current research, etc. The sample seems very appropriate for the website being evaluated as 42.3% access the target website at least once a month, with 35.2% stating that they visit the website several times a month. Forty-six percent of the subjects responded that their primary purpose for visiting the website was to collect professional information, and 40.9% of the subjects responded that they primarily visited for the purpose of searching for information relating to a particular topic area. The respondents were also very experienced Internet users with 93.2% of respondents having accessed the Internet for over 5 years. Thirty-nine percent of the subjects stated that they had shopped online several times in the past year, with 95% having access to a major credit card. Of those surveyed, 66.6% were over the age of

40, 61.6% had a masters degree, and 12.3% had a doctoral degree. There were considerably more females (71.4%) than males (28.6%) in the sample.

### **Scale Analysis**

After the survey was administered and data collection was complete it was submitted to tests of validity and reliability. These analyses were performed by combining the data from the two website categories that were evaluated (information specific search and online community).

#### **Construct Validity**

Measuring only Cronbach's alpha may lead to artificially overestimated numbers if the items are very redundant. An additional assessment of scales is therefore needed to ensure their unidimensionality, or construct validity. Confirmatory factor analysis was used for this purpose. If a construct shows high validity, or unidimensionality, all items measuring that construct should load on that one factor in the analysis. Data were entered in Excel spreadsheets, cleaned and brought into SPSS for analysis.

#### **Unidimensionality and Convergent Validity**

Unidimensionality is a necessary condition for reliability and convergent validity (Ahire et al. 1997). As a result, the unidimensionality of a scale should be assessed before evaluating its reliability (Gerbing and Anderson 1988). To assess

unidimensionality using confirmatory factor analysis (CFA), a measurement model is specified for each scale. Each scale item is included as an observed variable of the latent construct. If the measurement model exhibits good fit, unidimensionality is evident. Following these steps, a series of measurement models were evaluated, with individual measurement models for each of the constructs included in the research model. Two fit indices, the goodness-of-fit index (GFI) and the root mean square residual (RMR) are used to evaluate the fit of each measurement model. A GFI exceeding 0.90 is generally considered to indicate a good fit of the model (Ravichandran and Rai 2000). A RMR of less than 0.09 generally indicates an acceptable fit of the model (Ahire et al. 1996). The GFI and RMR for each scale are provided in Table 11. As can be seen from Table 11, the GFI and RMR for all scales are in the acceptable range, indicating evidence of unidimensionality.

The extent to which varying approaches to construct measurement yields similar results is known as convergent validity. An approach that is commonly used in establishing convergent validity is to view different scale items as representing different approaches to the measurement of a construct (Ahire et al. 1996). Using this approach, the fit of a measurement model corresponding to the scale can be compared to the fit of a null measurement model by using the Bentler-Bonnet coefficient delta. The Bentler-Bonnet coefficient delta is the model chi-square for the given model minus model chi-square for the null model, this difference divided by model chi-square for the null model. The Bentler-Bonnet coefficient delta should be greater than 0.90 to be considered a good fit, indicating convergent validity; conversely values less than 0.90 indicate a poor fit (Ahire et al. 1996). Table 12 shows the delta value for each scale. In all cases, the delta

value exceeds the recommended criteria of 0.90, establishing the convergent validity of the scales.

**Table 12. Scale Unidimensionality and Convergent Validity**

<b>Scale</b>	<b>Items</b>	<b>GFI</b>	<b>RMR</b>	<b>Delta</b>
IQ	4	0.875	0.089	0.934
SQ	3	0.867	0.092	0.930
PE	4	0.999	0.002	0.999
SI	4	0.937	0.185	0.937
WS	3	0.960	0.165	0.968
BI	3	0.959	0.164	0.967

### **Reliability**

To assess the internal consistency of the scales included in the measurement instrument, Cronbach’s statistic alpha was computed for each scale. Nunnally (1978) suggests that a value of 0.70 or higher is an acceptable level of reliability. The level of alpha is influenced by the number of items in the scale (the larger the better), and the redundancy of the items. Table 13 represents the internal reliability of the scales used in this research. The reliability for all three of the scales (perceptual design measures, individual perceptual measures, and outcome measures) used in this study were well above the acceptable level of 0.70.

**Table 13. Reliability Analysis**

	Number of Scale Items	Cronbach's Alpha
<b>Perceptual Design Measures</b>	<b>10</b>	
• Information Quality	7	.915
• System Quality	3	.931
<b>Indiv. Perceptual Measures</b>	<b>19</b>	
• Perceived Effectiveness	4	.937
• Social Influence	4	.859
• Trust	11	.940
<b>Outcome Measures</b>	<b>6</b>	
• Satisfaction	3	.909
• Behavioral Intention	3	.902

### **Discriminant Validity**

Discriminant validity was assessed following the method suggested by Venkatraman (1989). This method involves a series of analyses. Each analysis considers the measurement model for pairs of factors. For each pair of factors, two models are compared. One model constrains the covariance between the two factors at one, while the other model leaves this covariance unconstrained. The constrained model is equivalent to considering the two factors to be, in fact, one factor. The unconstrained model considers the two factors to be separate. A chi-square statistic is computed for each model. If the difference between these chi-squares is significant with one degree of freedom, the unconstrained model displays superior fit to the constrained model. This

can be interpreted to indicate that the two factors under consideration are separate, which demonstrates discriminant validity (Ahire et al. 1996).

Seven latent variables, representing seven factors, are included in this dissertation. Constructing all possible pairs of factors results in twenty-one comparisons. The results of these comparisons are shown in Table 14. In all cases, the unconstrained model is superior to the constrained model (at  $p < 0.05$ ), which establishes the discriminant validity of the measurement scales.

**Table 14. Discriminant Validity Tests**

<b>Factors</b>	<b>Chi-square Unconstrained</b>	<b>Chi-Square Constrained</b>	<b>Chi-Square Difference</b>	<b>Significance</b>
SQ – IQ	2518.281	2730.1	211.819	< .001
SQ – Trust	5625.393	5631.204	5.811	< .025
SQ – SI	954.247	967.766	13.519	< .001
SQ - PE	404.634	538.685	134.051	< .001
SQ - WS	414.434	487.139	72.705	< .001
SQ - BI	441.491	461.031	19.54	< .001
IQ – Trust	8942.673	8947.113	4.440	< .05
IQ - SI	2934.061	2953.061	18.915	< .001
IQ - PE	2536.878	2649.174	112.296	< .001
IQ – WS	2472.020	2515.718	43.698	< .001
IQ – BI	2570.844	2581.553	10.709	.001
Trust – SI	5302.128	5334.261	32.133	< .001
Trust – PE	6278.199	6319.984	41.785	< .001
Trust – WS	5280.763	5289.463	8.700	.003
Trust – BI	5056.198	5060.466	4.268	< .05
SI – PE	1036.302	1040.338	4.360	< .05
SI – WS	958.407	969.480	11.073	.001
SI – BI	1068.623	1094.750	26.127	< .001
PE – WS	466.223	614.374	148.151	< .001
PE – BI	771.037	872.976	101.939	< .001
WS – BI	971.897	1136.357	164.46	< .001

## Structural Equation Modeling

Structural equation modeling (SEM) is a comprehensive approach to testing hypotheses about relations among observed and latent variables (Hoyle 1995), and can be used for either predictive applications or theory testing. The statistical approach incorporates path analysis, factor analysis, and linear regression into a theoretical causal model for analysis of latent constructs and measurable variables, allowing simultaneous estimation of both measurement and structural sub-models (Anderson and Gerbing 1988). Using SEM, a researcher can test a theoretical model with measures of latent constructs and their direct and indirect effects on other variables and factors through an analysis of the covariance structure of the data.

### Two Step Approach

Anderson and Gerbing (1988) detail a two-step approach for applying structural equation modeling. Within SEM there are two models:

1. a measurement model where measured observations are linked to a construct or concept and
2. a structural model that describes causal relationships between these concepts.

Anderson and Gerbing (1988) suggest analysis of the two models separately: “We contend that there is much to gain in theory testing and the assessment of construct validity from separate estimation (and re-specification) of the measurement model for nomological validity of convergent and discriminant validity and, if necessary, re-specify

the model to ensure this validity”. While measures may be removed, if it is possible, at least four measures of a construct should be maintained for assessment (Anderson and Gerbing 1988). When this is not practical or possible (i.e. a one or two measurement indicator for a construct), the measures utilized should have an estimate of error variances. Anderson and Gerbing (1988) suggest cross-validating measures by using an additional sample from the population to which the researcher wishes to generalize in the analysis.

For the structural model, Anderson and Gerbing (1988) contend that the estimation method for fit will be driven by the research objective. Theory testing should employ a full-information estimation approach (such as maximum likelihood or generalized least squares) (Bentler 1983; Joreskog 1978), and predictive applications should employ a partial least squares estimation approach (Wold 1982). The full-information approach would use a common factor model and the partial least squares estimation approach would use a principle-component model (Harman 1976).

### **Measures of Fit**

Fit indices provide a relative sense of the fit of the model studied. Although referred to as “goodness-of-fit,” they often are a measure of non-fit. Each index has various strengths and weaknesses, and therefore most researchers report multiple indices for contemplation. The most common fit measures include the chi-square with degrees of freedom and a p-value, the root mean square error of approximation (RMSEA), the standardized root mean square residual (SRMR), the non-normed fit index (NNFI), and the comparative fit index (CFI). Often, the goodness of fit (GFI) is also included.

One note about accessing fit indices is that fit indices are relative to progress in the field: Although there are rules of thumb for acceptance of model fit (e.g., that CFI should be at least .90), Bollen (1989) observes that these cut-offs are arbitrary. A more salient criterion may be simply to compare the fit of one's model to the fit of other, prior models of the same phenomenon. For example, a CFI of .85 may represent progress in a field where the best prior model had a fit of .70.

### **Chi-Square**

Although often referred to as a test statistic, in SEM chi-square is more of an assessment of fit, measuring the distance between the sample covariance matrix and the fitted covariance matrix (Joreskog 1993) – a small chi-square represents a good fit and a large chi-square a bad fit. The corresponding p-value acts in opposite fashion to what is traditionally desired. A p-value greater than the alpha (normally 0.05) represents a non-significant p-value but a significant fit. “In effect, a non-significant chi-square value is desired, and one attempts to infer the validity of the hypothesis of no difference between model and data” (Bentler and Bonett 1980). The ration of chi-square to degrees of freedom, given a large sample size approaching infinity, corresponds to a z-score of 1.96. A model with a proper fit should be less than 1.96, although many researchers use 2.0 or 2.5 with some going as high as 5 (Bollen 1989).

The drawback with chi-square as a fit measure is its relation to sample size. The chi-square value can be made small by reducing the sample size. While the standard rule is to have at least 200 in a sample, there is no specified cut-off for a large sample in the research. McDonald and Marsh (1990) describe that as the sample size increases, each

model in a nested sequence will successively be rejected by the asymptotic chi square test at any fixed level of significance. Since the model merely approximates a population, a large sample will cause any model to be rejected in that the chi-square measures the distance between the previously mentioned matrices. Too large of a sample thus generates (unless the model nearly exactly replicates the population) too large of a chi-square value. In the case of a large sample size, it is suggested that it would be best to look to other fit indices.

### **Root Mean Square Error of Approximation**

Root mean square error of approximation (RMSEA) (Steiger 1990) is a measure of discrepancy per degree of freedom. A value less than 0.05 is indicative of a good fit and less than 0.08 is considered to be a marginal fit.

### **Standardized Root Mean Residual**

The standardized root mean squared residual (SRMR) is a measure of overall model fit, but not the quality of the model (Joreskog and Sorbom 2001). Measuring the average of the fitted residual from standardized variables, a good value will be less than 0.05 (the smaller the better).

### **Comparative Fit Index**

Comparative Fit Index (CFI) provides a measure between 0 and 1 where any number over 0.90 is considered to be good. Based on non-central chi square distribution, this measure is often the index of choice in that it compensates for the squaring of the

distances by rescaling and performing a transformation of the parameter. This simply eliminates some of the “badness-of-fit” for non-central distributions, although with sample sizes less than 250, it tends to over-reject the tested model (Hoyle 1995). This measure is basically equivalent to the RNI yet does not exceed 1.0 (Hoyle 1995). CFI is the preferred fit index when analyzing large sample sizes (Hoyle 1995).

CFI compares the existing model fit with a null model which assumes the latent variables in the model are uncorrelated (the "independence model"). That is, it compares the covariance matrix predicted by the model to the observed covariance matrix, and compares the null model (covariance matrix of 0's) with the observed covariance matrix, to gauge the percent of lack of fit which is accounted for by going from the null model to the researcher's SEM model. Note that to the extent that the observed covariance matrix has entries approaching 0's, there will be no non-zero correlation to explain and CFI loses its relevance. CFI is similar in meaning to NFI (see below) but penalizes for sample size. CFI varies from 0 to 1. CFI close to 1 indicates a very good fit. CFI is also used in testing modifier variables (those which create a heteroscedastic relation between an independent and a dependent, such that the relationship varies by class of the modifier). By convention, CFI should be equal to or greater than .90 to accept the model, indicating that 90% of the covariation in the data can be reproduced by the given model.

### **Goodness-of-fit Index (GFI)**

Goodness-of-Fit (GFI) is a fit index with values between 0 and 1 with a relative good fit for values greater than 0.90. A large sample size pushes GFI up. Though analogies are made to R-square, GFI cannot be interpreted as percent of error explained

by the model. Rather it is the percent of observed covariances explained by the covariances implied by the model (Joreskog and Sorbom 1988). That is,  $R^2$  in multiple regression deals with error variance, whereas GFI deals with error in reproducing the variance-covariance matrix. As GFI often runs high compared to other fit models, some suggest using .95 as the cutoff. By convention, GFI should be equal to or greater than .90 to accept the model. Unfortunately, it too is a function of sample size, and while still used, follows CFI in preference.

### **Non-normed Fit Index (NNFI)**

Non-normed Fit Index (NNFI), which is also known as the Tucker Lewis Index (TLI) is similar to NFI, but penalizes for model complexity. NNFI is not guaranteed to vary from 0 to 1. It is one of the fit indexes that is less affected by sample size. A negative NNFI indicates that the chi-square/df ratio for the null model is less than the ratio for the given model, which might occur if one's given model has very few degrees of freedom and if correlations are low.

For smaller sample sizes, the non-normed fit index (NNFI) should be considered (Joreskog and Sorbom 1988). The NNFI was developed by Bentler and Bonett (1980) as an improvement to their NFI, the NNFI is a measure of fit designed for small sample sizes. With a potential value from 0 to 1, a good value is greater than 0.90. By convention, NNFI values below .90 indicate a need to re-specify the model. Some authors have used the more liberal cutoff of .80 since TLI tends to run lower than GFI.

### **Other Reportable Items**

Other reportable items to consider are a path analysis, the sample size, either the correlation matrix with standard deviations or the covariance matrix, and the software used to perform the analysis. The path analysis explicitly shows the model and the direction of the effects. Given that many of the fit indices are dependent upon N, the sample size reporting is imperative. Lastly, although the concepts are applied similarly, differences do arise between various software packages – a simple note describing which statistical package and version was used can be quite beneficial when either replicating or analyzing experiments.

### **Results**

This section describes the results of the tests performed and the model building steps taken for each outcome criterion in both the information specific search and online community website categories. The detailed discussion of these results and their implications is presented in Chapter Five. The research hypotheses presented in Chapter Three were tested with F-tests via structural equation modeling (SEM) techniques with the statistical package AMOS. Each criterion variable was included as a dependent variable, and main effects were included as independent variables.

### **Fit Indices for Information Specific Search Website**

This section presents the structural equation modeling techniques performed to build and test the models of website satisfaction for the information specific search

website category, as described in Chapters Two and Three. A summary of the fit indices used in this analysis is presented in Table 15.

**TABLE 15. Fit Indices for Information Specific Search Website**

<b>Fit Measure</b>	<b>Default Model</b>
Goodness-of-Fit (GFI)	0.635
Tucker-Lewis Index (TLI)	0.844
Comparative Fit Index (CFI)	0.857
Incremental Fit Index (IFI)	0.859

The reported goodness-of-fit index (GFI) of 0.635 falls well below the suggested value of 0.90 to be considered a good fit (Hoyle 1995). However, the drawback with the goodness-of-fit index is its relation with sample size. The larger the sample size, the harder it becomes to produce a “good-fitting” model. The Comparative Fit Index is often times the preferred fit index to report when structural equation modeling (SEM) techniques are employed. This data collection reports a CFI of 0.857 which is considered to be a moderately good fit for the model (Hoyle 1995). The Incremental Fit Index (IFI) for this data collection was 0.859 which is considered to be a moderately good fit for the model (Hoyle 1995). The Tucker-Lewis Index (TLI) for this data had a value of 0.844, which would represent a marginally good fit for the model. The Tucker-Lewis Index is most appropriate to use when working with small sample sizes (Hoyle 1995). Therefore,

for this particular category ,it would be the fit index of choice because the sample size is below 200.

The results for each hypothesis presented in Chapter Three for the information specific search category is presented in Table 16. All of the null hypotheses (H1, H2, H3, H4, H5 and H6) could be rejected. That means that information quality, system quality, and perceived effectiveness were significant predictors of website satisfaction and that website satisfaction was found to be a significant predictor of behavioral intention in the information specific search category. As hypothesized, social influence and trust were not found to be significant predictors of website satisfaction in the information specific search category.

**Table 16. Results for Research Hypotheses (Information Specific Search)**

<b>Dependent Variable</b>	<b>Independent Variable</b>	<b>P-Value</b>	<b>Hypothesis Supported?</b>
Website Satisfaction	Information Quality	0.072 **	Yes
	System Quality	0.080 **	Yes
	Perceived Effectiveness	0.047 *	Yes
	Social Influence	0.110	Yes
	Trust	0.232	Yes
Behavioral Intention	Website Satisfaction	0.000 *	Yes

**\* Significant at the 0.05 alpha level**

**\*\* Significant at the .10 alpha level**

All of the research hypotheses in the information specific search category were supported: Information quality was shown to be a significant predictor (p-value = 0.072) of website satisfaction at the 0.10 level. System quality in this category was also significant (p-value = 0.080) at the 0.10 level. Perceived effectiveness was found to be significant (p-value = 0.047) at the 0.05. Social influence was significant (p-value = 0.110) at the 0.10 level. The trust construct was not found to be significant (p-value = 0.232). The behavioral intention construct was found to be a significant predictor (p-value = 0.000).

### **Fit Indices for Online Community Website**

This section presents the structural equation modeling techniques performed to build and test the models of website satisfaction for the online community website category, as described in Chapters Two and Three. A summary of the fit indices used in this analysis for the proposed model of website satisfaction in the online community category is presented in Table 17.

**Table 17. Fit Indices for Online Community Website**

<b>Fit Measure</b>	<b>Default Model</b>
Goodness-of-Fit (GFI)	0.654
Tucker-Lewis Index (TLI)	0.829
Comparative Fit Index (CFI)	0.844
Incremental Fit Index (IFI)	0.844

The reported goodness-of-fit index (GFI) of 0.654 falls well below the suggested value of 0.90 for a good fitting model (Hoyle 1995). However, the drawback with the goodness-of-fit index (GFI) is its relation with sample size. The larger the sample size, the harder it becomes to produce a “good-fitting” model. This fact definitely plays a role in the data collection for this category. The sample size of the data collected is a large sample size, well above the ideal 200-250 sample size preferred for SEM techniques to be employed (Hoyle 1995). The Tucker-Lewis Index (TLI) for this data had a value of 0.829 which would be considered a marginally good fit of the model; however, the Tucker-Lewis Index is most appropriate when working with a small sample size (Hoyle 1995). The comparative fit index (CFI) is often the fit index of choice when structural equation modeling (SEM) techniques are employed, specifically when dealing with large sample sizes. This data collection reports a CFI of 0.844, which shows a moderately good fit of the model. The Incremental Fit Index (IFI) should be equal to or greater than .90 to accept the model, although there are authors who have used 0.80 as an acceptable level.

The results for each hypothesis in the online community category is presented in Table 18. In this category only three of the null hypotheses could be rejected, meaning that information quality, perceived effectiveness, social influence, and trust were all found to be significant predictors of website satisfaction. Website satisfaction was also found to a significant predictor of behavioral intention. System quality was not found to significantly predict website satisfaction in this category. A more detailed analysis of the results is discussed below.

**Table 18. Results for Research Hypotheses (Online Community)**

<b>Dependent Variable</b>	<b>Independent Variable</b>	<b>P-Value</b>	<b>Hypothesis Supported?</b>
Website Satisfaction	Information Quality	0.003 *	Yes
	System Quality	0.171	No
	Perceived Effectiveness	0.000 *	Yes
	Social Influence	0.000 *	No
	Trust	0.030 *	No
Behavioral Intention	Website Satisfaction	0.000 *	Yes

**\* Significant at the 0.05 alpha level**

**\*\* Significant at the .10 alpha level**

As discussed above only three of the research hypotheses were supported in the online community category: information quality, perceived effectiveness, and behavioral intention. Information quality was found to be a significant predictor (P-value = 0.003) of website satisfaction at the 0.05 level of significance and the research hypothesis (H1) was supported. Perceived effectiveness was also found to be a significant predictor (P-value = 0.000) at the 0.05 level of significance and the research hypothesis (H3) was supported. The behavioral intention construct was also found to be a significant predictor (P-value = 0.000) at the 0.05 level of significance and the research hypothesis (H6) was supported. However, there were also three research hypotheses that were not supported: system quality, social influence, and trust. System quality was not found to be significant (P-value = 0.171) and the research hypothesis (H2) was not supported. Social Influence in this category was found to be a significant predictor (P-value = 0.000) of website satisfaction at the 0.05 level of significance, but, the research hypothesis was not supported (H4). Trust in this category was also found to be a significant predictor (P-

value = 0.030) at the 0.05 level of significance, however, the research hypothesis (H5) was not supported.

## **Chapter Five**

### **Discussion**

This chapter provides a detailed discussion of the research results and their implications. This study investigated the determinants of website satisfaction in specific categories based on user goals as measured by perceptual design measures (information quality and system quality), individual perceptual measures (perceived effectiveness, social influence, and trust), and outcome measures (website satisfaction and behavioral intention). The five variables which were hypothesized to predict the outcome measures were information quality, system quality, perceived effectiveness, social influence, and trust. There are no empirical studies to date which have attempted to empirically measure these variables' concurrent impacts on outcomes in the various contexts of the websites being evaluated. Specifically, two types of websites were evaluated in this dissertation: an information specific search website (search engine), and an online community website. This dissertation was therefore oriented towards a model building approach in which the potential linkages between the variables and outcome criteria were investigated. Once the research model was investigated for each website context, the results of each were evaluated to identify any differences. As was stated in the research proposition in Chapter One, there are discrepancies between the two categories of websites.

## **Significant Findings**

The findings of this dissertation support the research proposition presented in Chapter One: the independent variables significantly predicting website satisfaction differ depending upon the context of the website being evaluated. These outcome criteria are discussed separately in this section, before overall implications of the research are presented. The limitations of the study are discussed in Chapter Six along with contributions and recommendations for future research.

### **Information Quality**

In this dissertation, information quality was included in the model as a perceptual design measure, which was an independent variable. It was hypothesized to be a significant predictor of website satisfaction in each website category that was evaluated. Previous literature has shown information quality to be a significant predictor of both IS success and satisfaction. It was therefore imperative to include information quality as an independent variable in this dissertation.

As an independent variable, information quality showed similar results in the two contexts of websites that were evaluated. As expected from the discussion in Chapter Two, information quality was found to be a significant predictor of website satisfaction in both contexts evaluated (information specific search and online community); however, the levels of significance varied. For the information specific search website, information quality was found to be a significant predictor of website satisfaction at the 0.10 significance level ( $p\text{-value} = 0.072$ ). However, in the online community website, the

information quality construct was found to be significant at the 0.05 significance level (p-value = 0.003). The results indicate that the quality of information provided by the website of an organization plays a vital role in satisfying the end user of the website.

From the perception of the users, the quality of the information provided on the website refers to its relevance, timeliness, understandability, scope, accuracy, and helpfulness in accomplishing their task. The fact that users found the quality of information to be significant in both of the scenarios evaluated highlights the need for website owners to ensure that 1) the overall relevance of information provided is acceptable, 2) the information is current, 3) the information is accurate, dependable, and consistent throughout the website, 4) the information is at an acceptable level of detail and scope (depth and breadth), and 5) the information is outputted in a usable format.

Information quality is a factor that can be directly controlled by the website owner. The website owner is able to update information in a timely fashion in order to ensure its currency. The website owner is also able to check the accuracy of the information that is displayed as well as ensuring that it is consistent on all pages within the website. Conflicting information on different pages undermines the accuracy of the website because undoubtedly somewhere it is incorrect. Finally, it is the responsibility of the website owner to ensure that information is displayed in a usable format, otherwise it is useless.

To summarize, the website satisfaction model presented in this dissertation shows that the information quality construct is significant in each category of website that was evaluated. From the perspective of the user, the quality of information presented by the

website is imperative to accomplishing overall satisfaction with the website, regardless of the context being evaluated.

### **System Quality**

In this dissertation, system quality was also included in the model as a perceptual design measure, which was an independent variable. It was hypothesized to be a significant predictor of website satisfaction in each website category that was evaluated. Because system quality, like information quality, has been shown to be a significant predictor of both IS success and satisfaction in previous literature, it was included as an independent variable in this dissertation. The system quality construct included factors such as user friendliness, accessibility, navigation, organization, and ease of use.

As an independent variable, system quality showed different results in the two contexts of websites that were evaluated. In the information specific search website, system quality was found to be a significant predictor of website satisfaction at the 0.10 significance level ( $p\text{-value} = 0.080$ ). This highlights the need for an easy-to-use website when searching for information. These results are not surprising since a user who can not use a website at all can not use it to find information. Intuitively, it makes sense that an easy-to-use searching function would lead to satisfaction in a scenario where the users' goal is to search for a specific piece of information.

However, in the online community website, system quality was not shown to be a significant predictor ( $p\text{-value} = 0.171$ ) of website satisfaction. These results indicate that perhaps users, in this particular scenario, put more value on the quality of the information being provided, the usefulness of the website, and their peers also using the site, as

opposed to the overall usability of the website. In an online community context, it appears that users are more willing to accept difficulties with usage in exchange for the presence of other factors.

These mixed results found in this dissertation are contradictory to the findings of prior theoretical and empirical research. DeLone and McLean (1992), Seddon (1997), McKinney et al. (2002), and Rai et al. (2002) all had stated or found that system quality was a significant factor in satisfaction and overall system success. However, the findings of this dissertation highlight the need for further research in varying systems contexts. In previous research, the findings were isolated to mandatory usage contexts and e-commerce settings. This dissertation has focused on voluntary contexts in various website settings.

To summarize, these research findings highlight the fact that satisfaction from the perspective of the user are dependent on goal and context. This dissertation has shown that in the information specific search context, system quality is a significant predictor of website satisfaction; however, in the context of an online community it is not.

### **Perceived Effectiveness**

In this dissertation, perceived effectiveness was included in the model as an individual perceptual measure, which was also an independent variable. As previously discussed, it was hypothesized to be a significant predictor of website satisfaction in each website category that was evaluated. Perceived effectiveness has been shown to be a significant predictor of intention to use a system in previous IT adoption literature. It was therefore imperative to include it as an independent variable in this dissertation.

As an independent variable, perceived effectiveness showed similar results in the two contexts of websites that were evaluated. In both contexts evaluated (information specific search and online community), perceived effectiveness was found to be a significant predictor of website satisfaction. In the information specific search website, perceived effectiveness was found to be a significant predictor of website satisfaction at the 0.05 significance level ( $p$ -value = 0.047). Similarly, in the online community website, the perceived effectiveness construct was also found to be significant at the 0.05 significance level ( $p$ -value = 0.000). The results indicate that the perceived effectiveness plays a vital role in satisfying the end user of the website. This finding is not surprising due to the fact that the perceived usefulness construct has been found to be a significant predictor of satisfaction in prior IS success (DeLone and McLean 1992; Seddon 1997; Rai et al. 2002) and IT adoption (Venkatesh 2003) literature. The results found in this dissertation underscore the point that goal accomplishment is imperative in leading to users' overall satisfaction with a website. If the stated task could not be accomplished, undoubtedly satisfaction will not be accomplished.

To summarize, perceived effectiveness was selected as an individual perceptual measure due to its subjective nature and its vital role in accomplishing a desired task. Regardless of who is evaluating the website, the desired task must be accomplished in order for the visit to be considered successful. If the purpose for visiting the website is not accomplished, reuse will not occur.

## **Social Influence**

Like perceived effectiveness, social influence was included in this research as an independent variable because it has been widely discussed in the IT adoption literature. IT adoption literature focuses on intention to use and reuse a system, in this case a website. Again, there have been no empirical studies that have measured the impact of social influence in predicting satisfaction outside of a mandatory system setting or an e-commerce context in a voluntary setting. As previously discussed, it was hypothesized that social influence would not be a significant predictor of website satisfaction in both categories of websites that were evaluated.

As an independent variable, social influence exhibited different results in the two contexts of websites that were evaluated in this study. In the online community context, social influence was found to be a significant predictor of website satisfaction at the 0.05 significance level ( $p$ -value = 0.030). However, for the information specific search website, social influence was not found to be a significant predictor of website satisfaction ( $p$ -value = 0.110). The results indicate that the significance of social influence in satisfying the end user of the website is context dependent. The significance of social influence is very evident in the context of the online community where the perception of a user's peers plays an important role in satisfaction and reuse. This is due to the fact that online communities are settings where users gather and share information on a certain topic or area of interest and which act as forums for people with similar interests. It is intuitive to think that the more people with common interests who use the website, the more people would be satisfied with and reuse the website. However, based on the results obtained in this study, there is no evidence to suggest that social influence

is a significant predictor of website satisfaction in the information specific search category.

## **Trust**

In this dissertation, trust was included as an independent variable in the research model. As previously discussed, trust was hypothesized to not be a significant predictor of website satisfaction in the two website categories that were evaluated. Unlike the other variables selected for inclusion in the research model, results in prior IS literature have been inconclusive about trust as a significant predictor of satisfaction and intention to use a system. It was therefore imperative to include it as an independent variable in this dissertation in order to determine in which contexts trust is significant and which it is not.

As an independent variable, trust showed different results in the two contexts of websites that were evaluated. In the online community website context, trust was found to be a significant predictor of website satisfaction at the 0.05 significance level (p-value = 0.030). This highlights the need for a website environment where users have confidence in the organization hosting the website. The users of the tested website undoubtedly trust the organization and as a result trust its website. This is a credit to the organization ability to extend users' trust into the realm of the Internet. It also highlights the fact that in this type of setting, users' "trusting belief" is necessary for satisfaction.

In the information specific search setting, however, website trust was not shown to be a significant predictor (p-value = 0.232) of website satisfaction. These results indicate that users in this particular scenario put more value on the quality of the

information being provided, the usefulness of the website, their peers' use of the site, and the website's overall usability. In this context, it is apparent that users' trust of the website is not necessary for their satisfaction.

The mixed results found in this dissertation are not surprising due to the scattered nature of the results found in prior IS literature. However, this further proves the need for further research in varying systems contexts. In previous research, the findings were isolated to mandatory usage contexts and e-commerce settings. This dissertation has focused on voluntary contexts in various website settings. It will be interesting to see results when this research is extended to the remaining categories of website user goals that were presented in Chapter One.

To summarize, these research findings highlight the fact that satisfaction from the perspective of the user is goal and context specific. This dissertation has shown that in the online community context, system quality is a significant predictor of website satisfaction; however, in the context of an information specific search website, it is not significant.

### **Website Satisfaction**

In this dissertation, website satisfaction was an outcome measure as well as a dependent variable. User satisfaction is presently the most discussed outcome in the IS success and website satisfaction literature. It was therefore imperative to include it in this study. The items used to measure satisfaction were adapted from previous IS success and website satisfaction research, which typically took the form of measuring a subject's overall perception of the system or website. However, none of the independent variables

from the present study had been investigated as determinants of website satisfaction in the different contexts of websites presently on the Internet. To date, the vast majority of the research done in the area of satisfaction has been done in an e-commerce context.

In this dissertation, website satisfaction was not only a dependent variable, but also an independent variable. As a dependent variable, website satisfaction was found to be dependent upon different factors for each context of website that was being evaluated. In the information specific search context, website satisfaction was found to be dependent upon three factors in the model: system quality, perceived effectiveness, and social influence. However, in the online community context, website satisfaction was found to be dependent upon four factors in the research model: information quality, perceived effectiveness, social influence, and trust. This validates the proposition made in Chapter One that website satisfaction is goal and context dependent, demonstrating that there will be different determinants of satisfaction depending upon what type of website is being evaluated. Website satisfaction is goal as well as context specific. These findings highlight the fact that there is not just one model that is able to fully capture the determinants of success in multiple contexts of websites presently on the Internet from the user perspective. The website satisfaction model presented in Chapter One is a starting point for evaluation of the many contexts of websites. As is indicated by the results presented in Chapter Four of this dissertation, it is necessary to fully evaluate each category of website goal in order to create multiple models of success which are context dependent. As suggested by DeLone and McLean (1992), IS success models are case specific, and appropriate measures need to be included on a case-by-case basis in order to paint an accurate picture.

## **Behavioral Intention**

As with findings in previous satisfaction literature (Szymanski and Hise 2000; McKinney et al. 2002), the findings in this study indicate that satisfaction is a prerequisite to reuse. This is not to say that other factors do not play a role, but that the underlying determinant is that the user must be satisfied in order for them to return. The findings of this dissertation highlight the fact that, regardless of the context being studied, satisfaction is the ultimate determinant of reuse intentions from the perspective of the user. In each category of website goal evaluated in this research, website satisfaction was found to be a significant predictor of intention to reuse the individual website. In both the information specific search website and the online community website, significant paths were identified between website satisfaction and intention to reuse ( $p\text{-value} = 0.00$ ). This path was one of the most significant paths identified in the research model in both contexts.

## **Implications**

Given the nature of the research question and the varying contexts investigated, this study was conducted using a survey methodology. This dissertation was conducted by having real “users” of websites assess their overall satisfaction with the website after completing a task. The websites chosen were selected from different categories of website user goals within the taxonomy presented in Chapter One. This section discusses the implications of the findings as they relate to existing research in the field, as well as

implications for practitioners interested in assessing user satisfaction of websites and determining overall success.

### **Perceptual Design Measures**

This research clearly demonstrates that, according to “real” website users, design features have significant impacts on website satisfaction. However, the effects of these design features differed depending upon which type of website was evaluated. In the information specific search website, both information quality and system quality had significant effects on overall satisfaction. In contrast, only the quality of information had a significant effect on overall satisfaction with the online community website. System quality was not found to have significant effects on overall website satisfaction. This has clear implications for research and practice.

The results obtained for these perceptual design measures are not surprising due to the nature of the tasks assigned to subjects before completing the survey used in this dissertation. The tasks assigned were geared towards allowing users to interact with the website and required them to acquire specific pieces of information regarding a particular topic.

The implications of these findings are twofold. For website hosts it is imperative to ensure that the content of their website meets the needs of their users first and foremost. From the perspective of the user, their need for information on a particular topic took them to the website. If users are not able access the information they desire their interaction with the website will undoubtedly be classified as unsuccessful and they

will leave unsatisfied. The same is true if the information is present, but the website is unusable.

One thing that becomes inherently clear from the results obtained in this dissertation is that researchers have to start looking at websites in a different light. Specifically, they need to classify the websites that are being studied. This dissertation provides a taxonomy to do so, but others could be developed. In doing so, it is important to keep in mind that could vary, depending on the classification being used. This dissertation took a look at the user perspective and how design measures were affected by this. It was clearly shown in this dissertation that the significance of specific design measures of a website affected users' overall satisfaction and ultimately their intention to reuse the website. Therefore, when analyzing satisfaction and overall success from the users' perspective, it is important to understand their goals of interaction with the website.

For practitioners, it is imperative to understand the goals of those who use the website most frequently. The findings of this dissertation show that depending upon the goal of the user, their determinants of satisfaction will vary. Thus, by better understanding the goals of the user it allows for the website to be designed accordingly. These perceptual design features are features that the owner of the website has the most direct control over. The website owner is able to control the quality of the system which works "behind" the webpage and the usability of that webpage, a virtual facade for the organization. As the findings of this research clearly demonstrate, website owners must understand the goals of their users in interacting with their website.

## **Individual Perceptual Measures**

As was the case with perceptual design measures, this research clearly demonstrates that individual perceptual measures significantly predicted website satisfaction and overall website success. The perception of specific qualities of a website had significant impacts on predicting satisfaction. However, the significance of these individual perceptual measures differed depending upon which type of website was evaluated. In the information specific search website, only perceived effectiveness had a significant effect on overall satisfaction. However, in the online community website all three perceptual measures, perceived effectiveness, social influence, and trust had a significant effect on overall satisfaction with the website. This has clear implications for research and practice.

The results obtained for the individual perceptual measures are particularly interesting due to the vast differences exhibited between the two categories evaluated. The differences between categories of websites are more pronounced in the individual perceptual measures than in the other categories of measures (perceptual design measures and outcome measures) which were evaluated. The results obtained highlight a couple of key characteristics between categories of websites. In the information specific search website it highlights to practitioners the need for an effective website, which accomplishes the goals of the users above anything else. In this category it has been shown that the most important feature of the website, in the eyes of the user, is to be able accomplish their goal of searching for information. Given the nature of the survey and the task assigned, this finding is not incredibly surprising. Subjects were asked to simply find information on a particular topic and if they were indeed able to it was considered to

be a successful visit and the user left satisfied. In the case of the online community website, the findings were not as simplistic as whether their goal was accomplished or not. With the online community website other factors were found to be significant in addition to the effectiveness of the website. Trust and social influence were also found to be significant determinants of satisfaction. This is most likely due to the fact that in an online community website users are looking to interact with other users with common interests. In this case, it was other science teachers. It is evident that users are looking for a website that allows them to interact with others that are deemed influential and others that they can trust. This online community website serves as a forum for science teachers to interact with others in their field who share their professional expertise and other members who they trust to get additional information from. The online community website exhibits a richer more dynamic foundation for which website users can interact. Successfulness for the online community requires more than producing a piece of desired information to the user. There is the element of professionalism and trust in addition to achieving a desired goal.

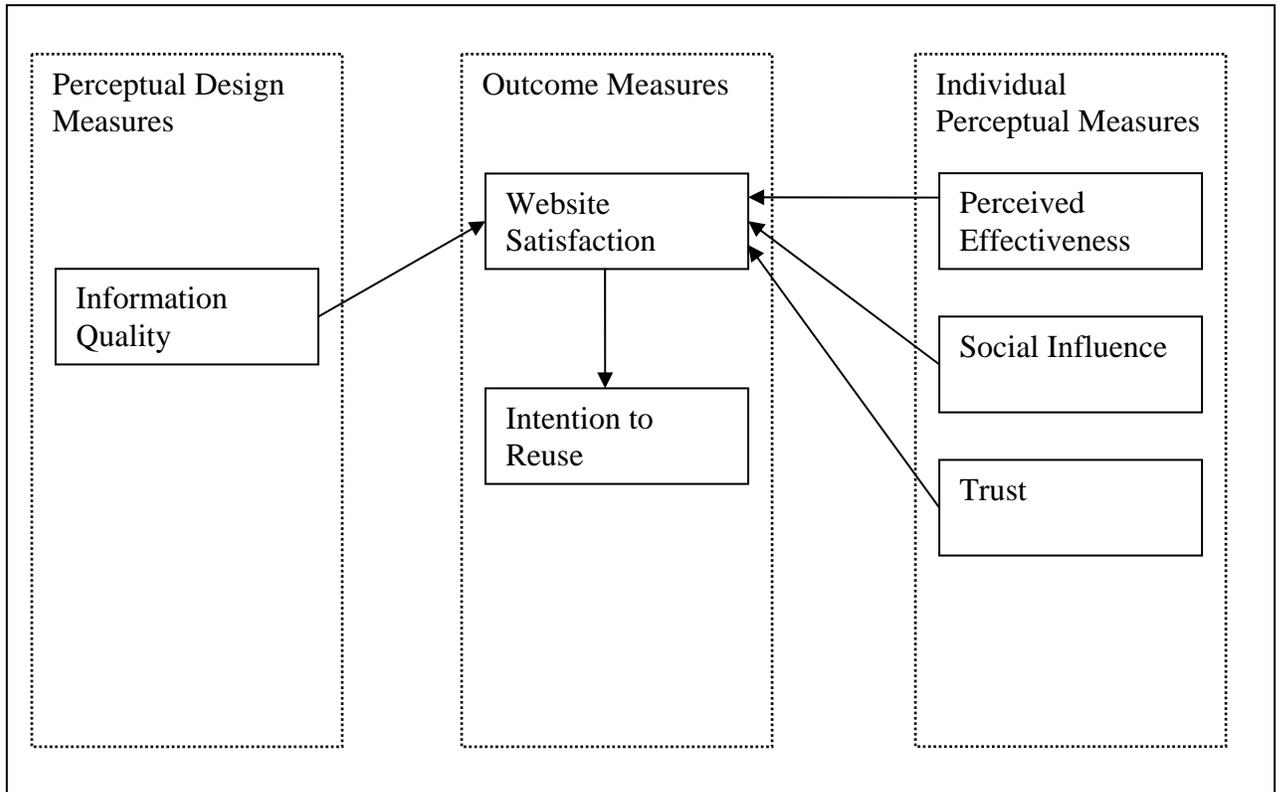
Researchers must further investigate the impacts of these individual perceptual measures in a more diverse array of settings than has been studied previously in the existing IS literature base. To date, research in this area has been confined to mandatory usage contexts where the user has no other option but to use the system being supplied by the organization. In voluntary usage contexts, research has so far focused solely on e-commerce settings. This dissertation highlights the need for researchers to further investigate these perceptual measures in a more diverse array of contexts.

For practitioners, it is imperative to understand how users' perceptions of a website differ depending upon what they are trying to accomplish (their objective of visiting the website) by interacting with the website. Ultimately, these steps are necessary in order to design a website that satisfies its user base and leads to the intention to reuse.

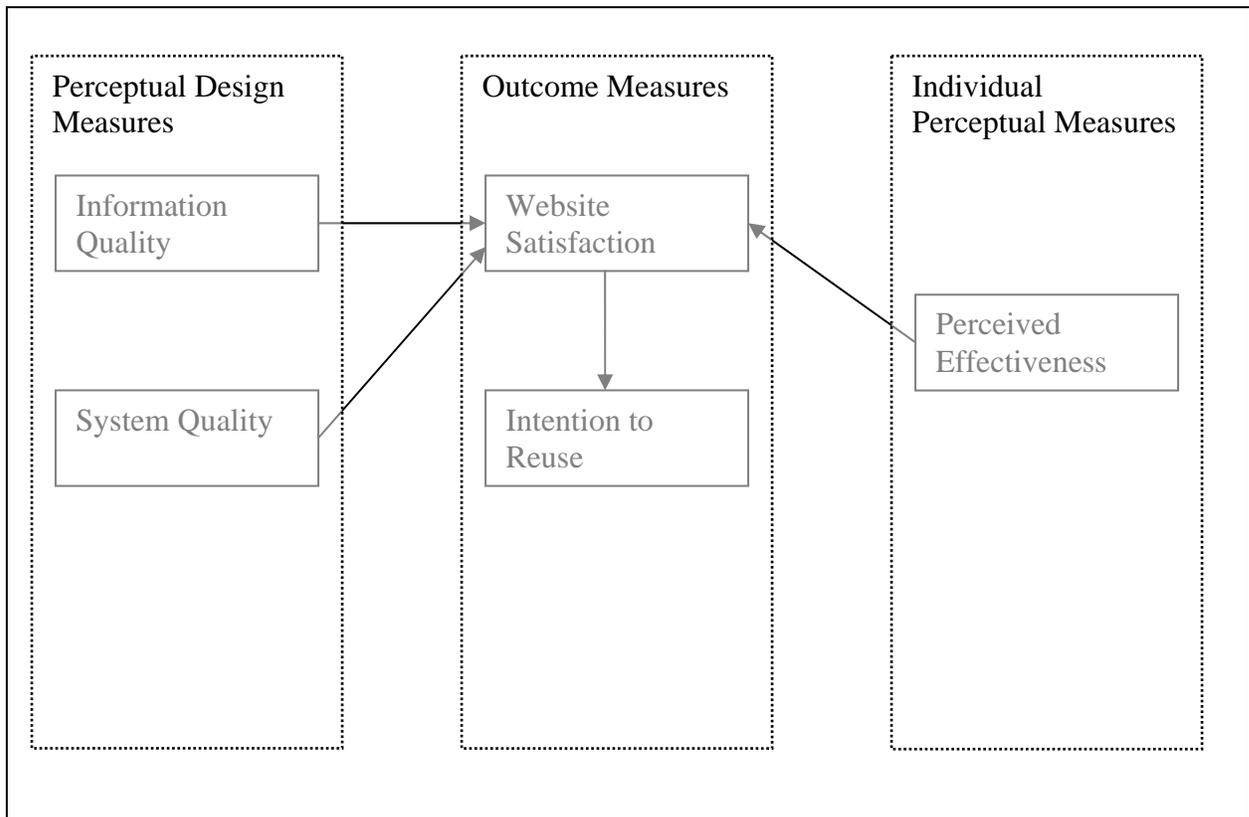
### **Website Satisfaction as a Theoretical Foundation**

The basic premise of this dissertation was that the determinants of satisfaction and overall success would differ depending upon the goal of the user when interacting with a website. The research hypotheses suggested that up to five variables would predict overall satisfaction with an individual website, depending upon the context of the website. The research model presented in Chapter One was re-specified to reflect the findings of this study, both contexts are shown below. As discussed in this chapter, these variables were found to be significant in one context and not found to be significant in the other. The resulting research models are presented in Figure 5 (Online Community) and Figure 6 (Information Specific Search).

**Figure 5. Revised Research Model for Online Community Website**



**Figure 6. Revised Research Model for Information Specific Search Website**



All of the research hypotheses were supported by the data in the information specific search website category. However, this was not the case in the online community website category. In the online community website, information quality, perceived effectiveness, social influence, and trust were found to have significant direct effects on website satisfaction. In the information specific search website, information quality, system quality, and perceived effectiveness were found to have significant direct effects on website satisfaction. Website satisfaction was found to significantly predict

behavioral intention in both contexts. Multiple websites within a single category should be investigated in future studies in order to validate the findings of this dissertation.

## **Chapter Six**

### **Conclusion**

This research investigated the determinants of website satisfaction from the end users' perspective, as measured by information quality, system quality, perceived effectiveness, social influence, and trust. Specifically this research investigated the effects of these variables on the outcome measure satisfaction in varying contexts of websites. The findings of this dissertation indicate that determinants of website satisfaction are in fact context dependent; different variables are found to be significant depending upon the type of website being evaluated. Success from the perspective of the website user is context dependent.

### **Contributions**

This research provides many contributions to the field of information systems, both in the results that have been obtained as well as the approach taken and methodologies used. This study was conducted with experienced "real" users of actual websites falling into two different categories of user website goals based on the taxonomy presented in Chapter One. This research should make results generalizable to other organizations' websites, within the limits defined in this study.

## **Information Systems Research**

### **Information System Success**

This research was conducted in part by taking existing empirically validated measures from the IS success literature (DeLone and McLean 1992; Seddon 1997; Rai et al. 2002) and applying them in a website satisfaction domain. Additionally, these existing measures were applied to a broader sample, using actual users of varying types of websites. The results of the study indicate that the existing IS success measures which have been in use for over a decade do not hold true when applied to a broader array of website contexts. In fact, depending upon the context of the website to which the measures are being applied, differing measures exhibit significance, resulting in varying determinants of overall satisfaction with the website. It has often been suggested that the overall quality of the information presented and the ease of use of the system have been significant determinants of user satisfaction (DeLone and McLean 1992; Seddon 1997; Rai et al. 2002). Yet, this is one of the first research projects to empirically measure these IS success variables within various types of voluntary usage websites (using “real” users) according to the taxonomy presented in Chapter One. The methodology used to evaluate these varying types of websites can be used by other researchers as well as practitioners interested in evaluating the successfulness of individual websites.

### **Information Technology Adoption**

This research also took existing empirically validated measures from the IT adoption literature (Venkatesh et al. 2003) and applied them in the domain of website

satisfaction. As was the case with the IS success measures, these existing measures were applied to a broader sample of respondents, using actual experienced users of the various websites being evaluated. The results of this study indicate that the IT adoption measures hold true when applied to a broader array of contexts than had been previously investigated. Prior literature had only investigated these variables in mandatory usage contexts (Venkatesh et al. 2002). However, these variables did not hold true in all of the contexts tested in this research project. In the prior literature base, it is suggested that the perceived usefulness of a system and the social influence of others are significant predictors of use. Yet, this is one of the first research projects to both empirically validate these IT adoption variables in a voluntary usage context and test them across various types of websites according to the taxonomy presented in Chapter One. The methodology used to evaluate these varying types of websites can be used by other researchers as well as by practitioners interested in evaluating the successfulness of individual websites from the perspective of the user. For practitioners, the user perspective is essential for determining satisfaction and gauging the overall success of the website.

### **Limitations of the Study**

Choices have to be made in social science research that often lead to limitations of the study. It is important, however, to look at these limitations in light of how these choices allowed the field to progress. To control for validity and precision as much as

possible, the instrument used in this dissertation was built largely with measures from previous studies, was piloted twice, and was subjected to reliability, unidimensionality, and validity measures. Nevertheless, some limitations do exist within this study, and they are discussed in this section. While there seems to be a large number of such limitations, many of them result from the practical realism of field research.

### **Number of Websites Tested**

For the purposes of this research, websites were classified according to the goals the users wish to accomplish. In order to investigate any similarities and/or differences between the websites the findings were compared. While valid results were produced from testing these two categories, there was only one website evaluated by users within each category. Researchers should attempt to validate the findings of this study by testing multiple websites within each category. For example, in the online community category, two or three websites classified as online community websites should be evaluated and then compared against each other in order to validate the findings of this dissertation.

### **Sample Size**

The sample sizes were unequal for the two websites that were evaluated. Although structural equation modeling techniques were employed to control for the effects of differences in sample sizes between website categories, it would be useful to get the same breadth of responses from subjects in the two website categories that were evaluated. This would increase confidence in the results that were obtained. It is

recommended to conduct a follow up study in which new data of approximately equal sample sizes from each category would be collected.

### **Self-Report**

The data for this study was collected by having respondents fill out a survey. There is therefore a limitation of self-report biases of respondents. In particular, obtaining perceived measures for the outcomes is subject to the respondents' perceptions of their satisfaction with the website being evaluated.

Another issue related to self-report is that all measures of success for this dissertation were perceived measures. It is difficult in this type of research to find objective measures which would be comparable among organizations (website owners). The subjective measures employed in this dissertation are thus the only alternative available. Nevertheless, obtaining such objective and comparable measures would clearly add value to the conclusions of this and similar research.

### **Lack of Control**

Another limit of the survey was the lack of control over the subjects while taking the survey. As previously discussed in Chapter Three, this survey was distributed via e-mail to potential subjects. The subjects were able click on the link provided to them in the e-mail which directed them to the survey posted on the Internet. Once the users accessed the survey, it was up to them to complete the survey at their own pace in their home, office, or wherever they chose to complete it. While the time that each respondent spent on completing the survey could be monitored, the respondents could not be

monitored directly. It would undoubtedly be beneficial to administer the survey to respondents in a controlled environment where they could be directly monitored. In a controlled environment, any doubt as to whether the subjects were completing the survey as instructed could be eliminated.

### **Statistical Software**

The statistical software package used for the structural equation modeling techniques employed in this data analysis was AMOS 4.0. AMOS 4.0, like other statistical software, has its own set of assumptions. Each software package “produces similar though not identical results” (Monge and Eisneberg 1987 p. 330). While it is beyond the scope of this dissertation to discuss the advantages, disadvantages, and limitations of each package, it must be noted that collecting new data and replicating the study using other software would minimize these concerns, as well as concerns from the other limitations discussed in this section.

### **Fit Indices**

While overall the fit of the model was considered to be moderately good, the Goodness of Fit Index (GFI) was poor. The specific fit indices of interest (Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI)) were within acceptable levels for a moderately good fit of the model (0.80 threshold) (Hoyle 1995). However, the goodness of fit index in both website categories fell well below acceptable levels (Information Specific Search = 0.635 and Online Community 0.654). Future research should address these concerns.

## **Recommendations for Future Research**

As this research project progressed, more questions of interest were generated than can be discussed in this dissertation. Addressing some of these questions as well as some of the limitations cited above form the basis of a research program. This section includes some ideas for future research using the additional data collected in this dissertation and data to be collected from future studies.

### **Research Framework**

Chapter One presented an overall research framework, which included the decision to study select IS success and IT adoption measures as well as trust. There are many other variables in the framework which could have been investigated. In particular, users' expectations could have been included. For example, users with low expectations of the website before taking the survey may have been more easily satisfied by the website's ability to help them to accomplish their assigned task. The impacts of expectations could be investigated in future research.

### **Multiple Websites within each Category**

As was discussed previously in the limitations section of this chapter, only one website per category was evaluated in determining satisfaction criteria. In order to validate the findings of this research project, multiple websites within each category must be evaluated. The evaluation of multiple websites within each category would provide generalizability of the results beyond the single website that was evaluated in this

dissertation. A study could be conducted by replicating the present research for multiple websites within each category.

### **Evaluation of all Categories**

An obvious extension to this dissertation is the completion of the remaining categories of websites within the taxonomy presented in Chapter One. By filling out the taxonomy, a more complete picture of website satisfaction from the user perspective can be created. Once all of the categories within the taxonomy are evaluated with multiple websites, results can be compared and a more complete research model can be constructed. Similar website categories can be merged and a re-specified taxonomy of user goals can be created.

### **Investigation of the Organizational Perspective**

In order to investigate a more holistic view of success, it is necessary to consider success from the perspective of the organization hosting the website. As demonstrated in this research project, satisfaction is the determining factor of success from the user perspective. However, the key to accomplishing success from the organizational perspective remains unclear. In the future, researchers should investigate the goals and objectives set forth by the website owner and then investigate how those mesh with the goals of the user. This investigation into the duality of goals is the key to evaluating the success of a website as a whole. Taking the perspective of both the end user and the website host will paint a clearer picture for both researchers and practitioners alike.

## **Time Series Studies**

It would also be of great interest to investigate how users' perceptions of a website change over time. Perhaps the factors that were found to be significant in this study will change over time. Do users' perceptions mature through their continued use of a website? What would the effect be on users' satisfaction if the website was redesigned? These are interesting questions that researchers should address in future studies.

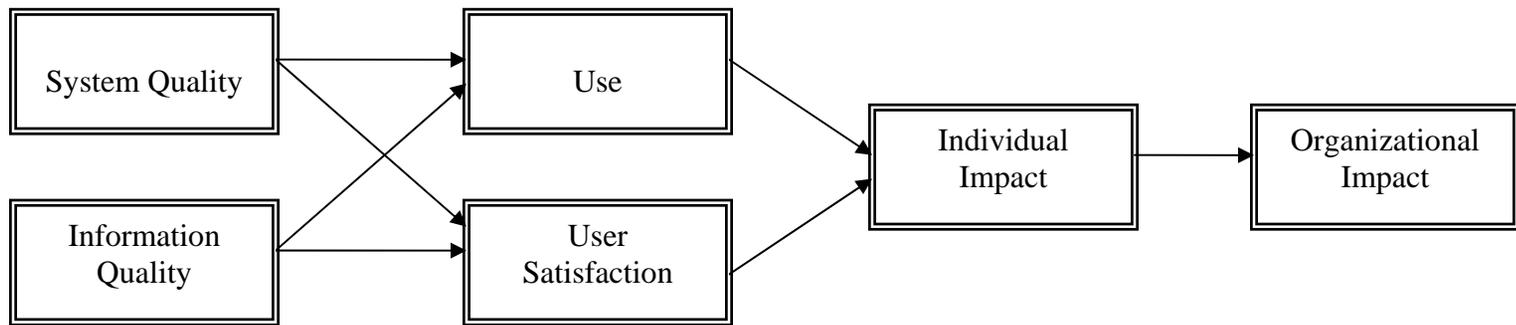
## **Concluding Comments**

Acknowledging the limitations of this study, this research has still made several significant contributions to the field of information systems research. This dissertation is a first step towards understanding experienced website users' determinants of satisfaction and overall success. In particular, it has shown that website users' evaluation of satisfaction and overall successfulness is dependent upon the context of the website being evaluated and that determinants of satisfaction are goal specific. It also serves as a foundation for further exploration into a broader, more diverse array of the website contexts presently on the Internet.

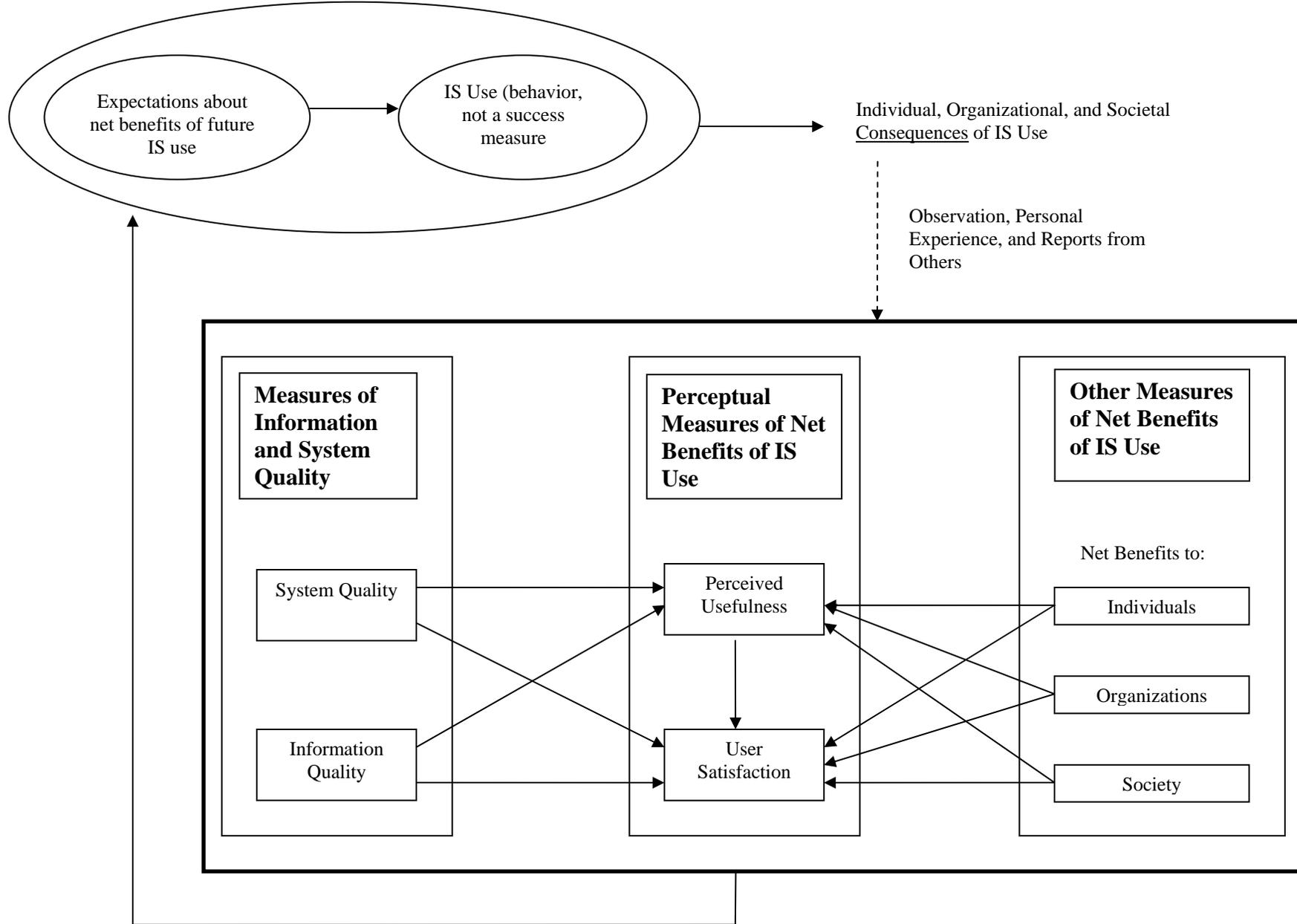
This dissertation serves as a building block towards a greater understanding of overall website success from the organizational perspective by assessing their users' goals and objectives for the website. It is imperative for an organization to understand their users' goals in order to design their website accordingly. The analysis of these two

competing perspectives will ultimately lead to the convergence of organizational and user goals and paint a clearer picture of success.

**Figure 1. DeLone and McLean (1992) Model of IS Success**  
Source: Information Systems Research, 1992, (3:1), pp. 60-95.

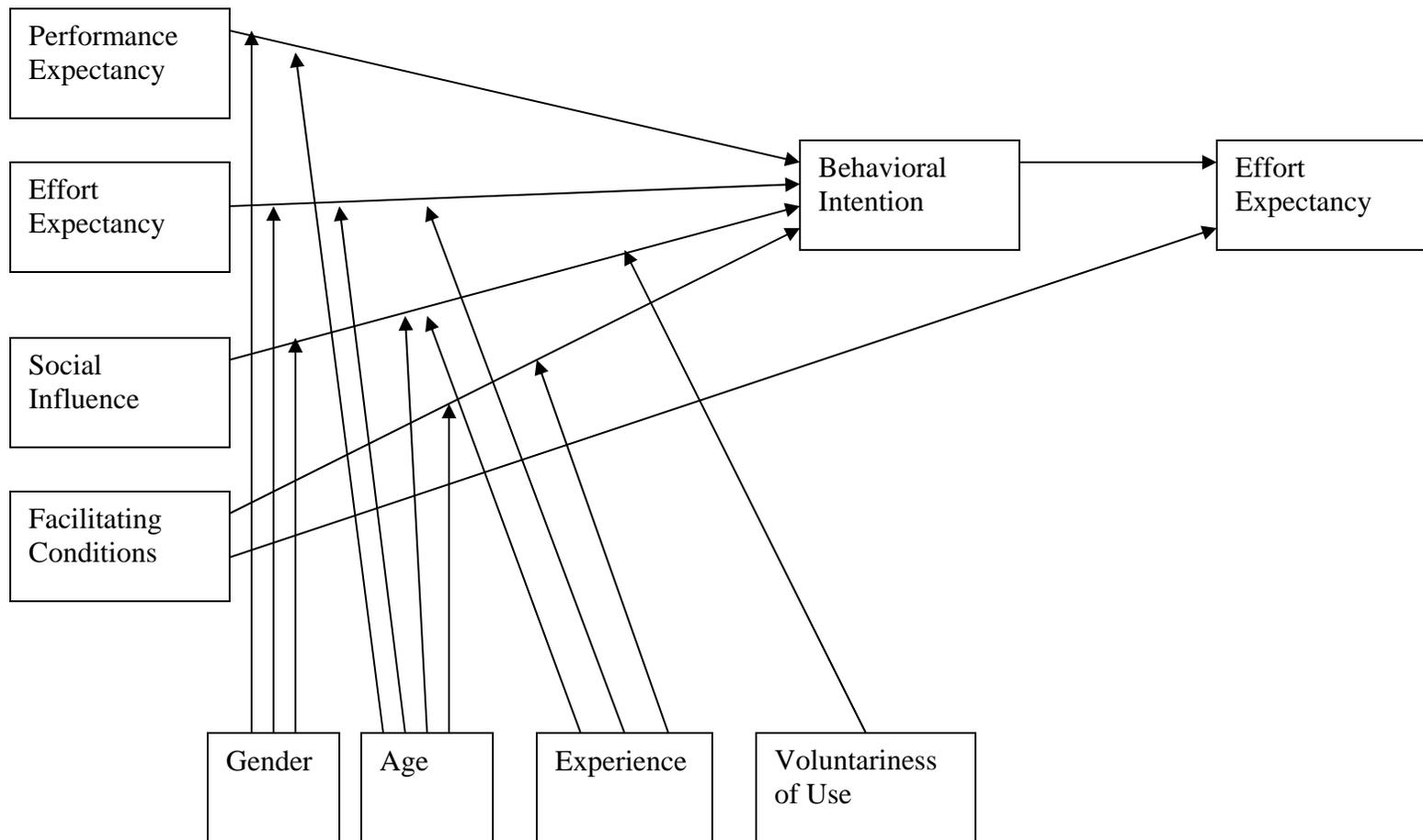


**Partial behavioral model of IS Use**



**Key:**  
 Rectangular boxes IS Success model  
 Rounded Boxes Partial behavioral model of IS Use  
 Solid-line arrows Independent (necessary and sufficient) causality  
 Dotted-line arrow Influence (not casual, since observer's goals are unknown)

**Figure 2. Seddon (1997) Model of IS Success**  
 Source: Information Systems Research, 1997, (8:3), pp. 240-253.



**Figure 3. Venkatesh et al. (2003) IT Adoption Model**  
 Source: *MIS Quarterly*, 2003, (27:3), pp. 425-478.

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## **Appendices**

## Appendix 1. Website Satisfaction Survey (generic version)

### Introduction

The objective of this research is to investigate website satisfaction. We appreciate your participation in this study. It is voluntary. There is no personally identifiable information on the questionnaire. **Note:** You will be asked for your e-mail address at the end to ensure you are entered for the drawing; however, this data is not kept with your survey responses. Drawing entry is optional.

All answers to this survey will be kept secure and in strict confidence. Only summary measures and conclusions will be reported in this research. No data or opinions will be associated with specific individuals.

### Pre-Task Questions

1. How often do you visit the website?
  - Never
  - Once a month
  - Several times a month
  - Once a week
  - Several times a week
  - Everyday
  
2. What is usually the main reason you visit the website? (check one only)
  - Calendar of current events
  - Information search
  - Professional Information
  - Shopping
  - Other
  
3. What are secondary reasons you visit the website? (check as many as apply)
  - Calendar of current events
  - Information search
  - Professional Information
  - Shopping
  - Other

### Task (see Appendix 2)

Subjects were directed to the target website and asked to complete a task. Once completing the task they were directed back to the survey to evaluate the website.

## Perceptual Design Measures

4. The website provided the precise information you needed.

1 = Strongly disagree

2

3

4

5

6

7 = Strongly agree

5. The website provided output that is exactly what I needed.

1 = Strongly disagree

2

3

4

5

6

7 = Strongly agree

6. The website was user friendly.

1 = Strongly disagree

2

3

4

5

6

7 = Strongly agree

7. The website provided sufficient information to enable you to accomplish your task.

1 = Strongly disagree

2

3

4

5

6

7 = Strongly agree

8. The website HAD errors on it that you had to work around.

1 = Strongly disagree

2

3

4

5

6

7 = Strongly agree

9. The website was easy to use.  
1 = Strongly disagree  
2  
3  
4  
5  
6  
7 = Strongly agree
10. I am satisfied with the accuracy of the information provided on the website.  
1 = Strongly disagree  
2  
3  
4  
5  
6  
7 = Strongly agree
11. The output options (page customization, etc.) are sufficient for your use.  
1 = Strongly disagree  
2  
3  
4  
5  
6  
7 = Strongly agree
12. The website was well organized.  
1 = Strongly disagree  
2  
3  
4  
5  
6  
7 = Strongly agree
13. The website provided helpful information regarding your questions and tasks.  
1 = Strongly disagree  
2  
3  
4  
5  
6  
7 = Strongly agree

## Individual Perceptual Measures

14. The website was competent and effective in enabling you to accomplish your task.

1 = Strongly disagree

2

3

4

5

6

7 = Strongly agree

15. People who influence my behavior think that I should use the website.

1 = Strongly disagree

2

3

4

5

6

7 = Strongly agree

16. I find the website to be useful.

1 = Strongly disagree

2

3

4

5

6

7 = Strongly agree

17. The website is truthful in its dealings with me.

1 = Strongly disagree

2

3

4

5

6

7 = Strongly agree

18. The website will act in my best interest.

1 = Strongly disagree

2

3

4

5

6

7 = Strongly agree

19. Using the website enabled you to accomplish your task more quickly.

1 = Strongly disagree

2

3

4

5

6

7 = Strongly agree

20. If I required help the website would do its best to help me.

1 = Strongly disagree

2

3

4

5

6

7 = Strongly agree

21. People who are important to me think that I should use the website.

1 = Strongly disagree

2

3

4

5

6

7 = Strongly agree

22. The website performs its role very well.

1 = Strongly disagree

2

3

4

5

6

7 = Strongly agree

23. Using the website increases my productivity.

1 = Strongly disagree

2

3

4

5

6

7 = Strongly agree

24. I would characterize the website as honest.

1 = Strongly disagree

2

3

4

5

6

7 = Strongly agree

25. The website is worried about my well being, not just its own.

1 = Strongly disagree

2

3

4

5

6

7 = Strongly agree

26. Overall, the website allows me to be capable and proficient on a specific topic.

1 = Strongly disagree

2

3

4

5

6

7 = Strongly agree

27. The website would keep its commitments.

1 = Strongly disagree

2

3

4

5

6

7 = Strongly agree

28. If I use the website, I will increase my chances of accomplishing my task.

1 = Strongly disagree

2

3

4

5

6

7 = Strongly agree

29. In general, the website enables me to be knowledgeable on a specific topic.  
1 = Strongly disagree  
2  
3  
4  
5  
6  
7 = Strongly agree
30. I use the website because of the number of people around me who use the website.  
1 = Strongly disagree  
2  
3  
4  
5  
6  
7 = Strongly agree
31. The website is sincere and genuine.  
1 = Strongly disagree  
2  
3  
4  
5  
6  
7 = Strongly agree
32. People around me who use the website have more prestige than those who don't.  
1 = Strongly disagree  
2  
3  
4  
5  
6  
7 = Strongly agree

## Outcome Measures

33. After using the website, I am .....

1 = Very dissatisfied

2

3

4

5

6

7 = Very satisfied

34. I intend to use the website again in the near future.

1 = Strongly disagree

2

3

4

5

6

7 = Strongly agree

35. After using the website I .....

1 = Will never recommend it to my peers

2

3

4

5

6

7 = Will definitely recommend it to my peers

36. I plan on using the website again to accomplish a similar task.

1 = Strongly disagree

2

3

4

5

6

7 = Strongly agree

37. After using the website, I .....

1 = Will never use it again

2

3

4

5

6

7 = Will definitely use it again

38. I predict I would use the website again.

1 = Strongly disagree

2

3

4

5

6

7 = Strongly agree

### Demographics

39. What is your gender?

Male

Female

40. What is your age?

18 – 20

21 - 24

25 - 30

31 - 35

36 – 40

40 +

41. What is your education level?

Some high school

High school

Some college

2-year college degree

4-year college degree

Masters

Doctorate

42. How many years have you been accessing the Internet?

Less than a year

1-2 years

3-5 years

Over 5 years

43. How often do you use the Internet to make purchases?

- Never
- Once a year
- Several times a year
- Once a month
- Several times a month
- Once a week
- Several times a week
- Everyday

44. Do you have access to a major credit card that could be used to make purchases?

- Yes
- No

## Appendix 2. Tasks

### Online Community

Before continuing to answer the survey, please do the following exercise.

When you have completed the task, close the ABC.org window and return to this survey.

Exercise:

1. Go to the website (link below)
2. Explore the website and look for information on new topic areas to integrate into the curriculum for your 4th grade science class.
3. Click here to start browsing ([ABC.org](#))

### Information Specific Search

Before continuing to answer the survey, please do the following exercise.

When you have completed the task, close the XYZ.com window and return to this survey.

Exercise:

1. Go to the XYZ website (link below)
2. Look for information on student loan consolidation, specifically look for information regarding interest rates
3. Click here to start browsing ([XYZ.com](#))

### Appendix 3. Component Correlation Matrix

<b>Component</b>	<b>IQ</b>	<b>SQ</b>	<b>PE</b>	<b>SI</b>	<b>TRUST</b>	<b>WS</b>	<b>BI</b>
<b>IQ</b>	1.000						
<b>SQ</b>	0.553	1.000					
<b>PE</b>	0.683	0.596	1.000				
<b>SI</b>	0.214	0.212	0.166	1.000			
<b>TRUST</b>	0.396	0.382	0.359	0.342	1.000		
<b>WS</b>	0.688	0.556	0.658	0.394	0.451	1.000	
<b>BI</b>	0.413	0.321	0.362	-0.020	0.070	0.240	1.000