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The effect of Web interface features on consumer online shopping intentions

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THE EFFECT OF WEB INTERFACE FEATURES ON CONSUMER ONLINE SHOPPING INTENTIONS

A DISSERTATION

By

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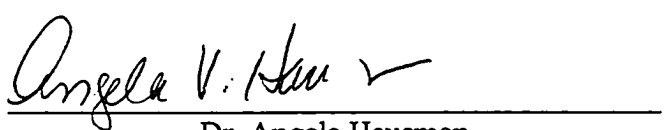
Approved as to style and content by:



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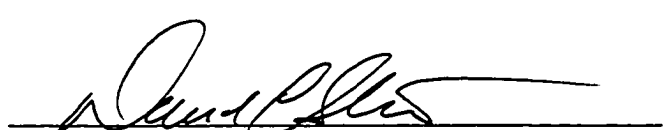

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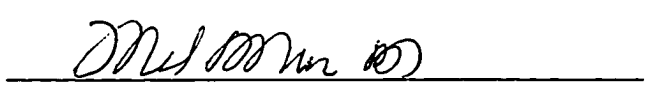

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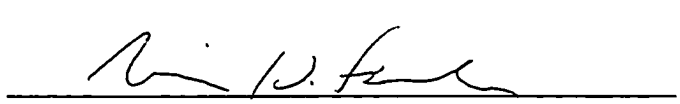

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ABSTRACT

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Amid the storm of hype over Internet adoption, it is observed that during the past years, organizations have taken considerable interest in eagerly acquiring computer hardware and software to implement electronic commerce (e-commerce) applications mostly to the detriment of human aspects of the information technology (IT) solutions (Freemantle, 2002; Lockwood & Lamp, 2000). Various Internet technologies, mostly the Web, have been implemented to offer online goods and services. Many credible estimates suggest that Internet buying and selling will account for close to $2 trillion of annual economic activity by 2004 (Citrin et al., 2003; Fry, 2000). While the promise of the Internet has become a reality many businesses cannot afford to ignore, use of this medium for communication and information has not been matched by its equivalent use for shopping (Citrin et al., 2003). Most notable are Web design problems that frustrate consumers' online exchange activities (A.T. Kearney, 2000).

This study proposes that features incorporated in the design of Web site interfaces can affect consumer online behavioral intentions to purchase and revisit. The study draws upon theories and prior studies in the fields of management, consumer behavior, management information systems, and related disciplines to address the research question

of whether and how Web site interface design features determine online consumers' perceptions, attitudes, flow experienced, and their online purchase and revisit intentions.

Using data from a sample of 266 online consumers, the "best fit" structural model was selected among three *a priori* structural models. Results of the study confirmed most of the relationships hypothesized in the research model. It was found that, indeed, different categories of interface features have different influence levels on consumers' perceptions. Whereas motivator factor was significantly related to the perceived informativeness, entertainment, and irritation; hygiene factor indicated significant relationships with only irritation. The study also found statistically significant support for the relationships between most of the perceptual variables and perceived usefulness of the site as well attitude toward the site. The role of flow experienced in determining purchase and revisit intentions received statistically significant support. Overall, the results of this study provide important insights into the online consumer experience, with implications for academic research and e-commerce systems design.

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My gratitude and sincere thanks go to members of my dissertation committee: Drs. Angela Hausman, David Sturges, Michael Minor, and Richard Fowler. Dr Hausman, as Chair of this dissertation committee, taught me how to identify and construct the building blocks of research. I am honored to have her as Chair of this dissertation and I owe my knowledge about research methods to her. Special thanks are due to Dr. Minor for his guidance and encouragements to get married to the research topic. He gave me the hope and nerves to begin the journey. I am indebted to Dr. Sturges and Dr. Fowler for their valuable comments and suggestions on issues that would have otherwise led to an unfinished dissertation. I also deeply thank Dr. Lester Rydl for his motivation and support in diverse ways to make my Ph.D. program a success.

I would like to thank my family: my daughters; Mona, and Frida, and wife; Janet, for their encouragements and understanding that my undertaking this project was paralleled with a long-distance relationship with them. Without this understanding and support, I would not be able to complete my Ph.D. study. In the same vein, I give thanks to my mother, brothers, sisters, cousins, nephews, nieces, and friends for their unrelenting support for me to achieve my educational goals.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

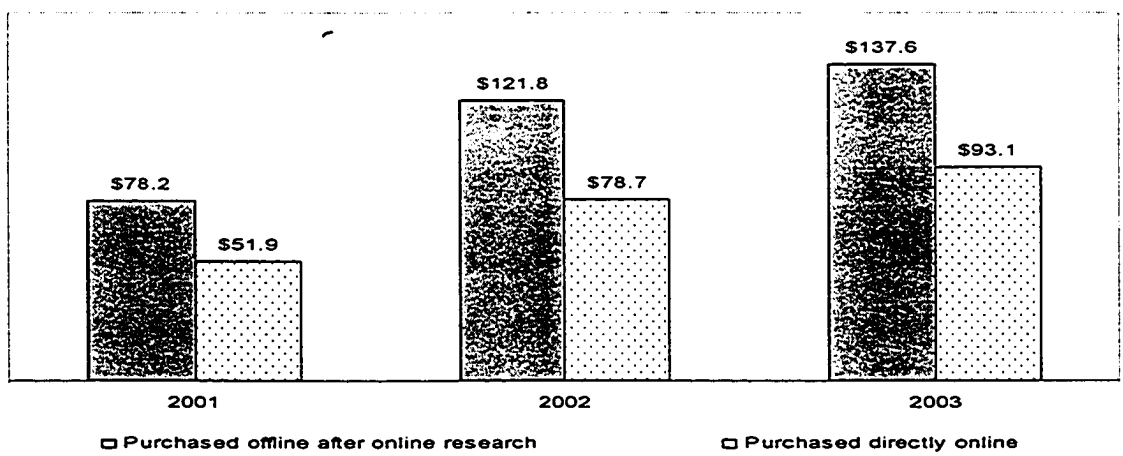
Since its conception in 1990, the World Wide Web has been pervasively adopted across almost every industry. Web-based information systems can be found in applications spanning commercial, social, educational, and entertainment domains. Among them, commercial Web sites undoubtedly have the greatest reach and economic impact (Teo, Oh, Liu, & Wei, 2003). Business-to-consumer (B2C) electronic commerce (e-commerce) markets have rapidly grown. The art of estimating how many users adopt the Web throughout the world is an inexact one at best. Internet penetration has reached 71% of Americans (UCLA Internet Project, 2003), a statistically insignificant change from 2001. According to Nielsen/NetRatings (as cited in Shop.org, 2003), more than 168 million people have Web access from either their home or workplace in the U.S. It is estimated that online users number over 605 million worldwide (CyberAtlas, 2003).

Besides the general Internet's diffusion, online shopping offered through the Internet applications is growing equally quickly. Among U.S. Internet users, 39% of individuals are making online purchases (NTIA, 2002). According to the U.S. Department of Commerce, online retail sales in the U.S. surpassed $45 billion in 2002 (Regan, 2003) and is projected to reach $52 billion in 2003, a gain of 28% over 2002. More significantly, by 2007 the Internet will influence 34% of all U.S. retail spending

(Jupiter Research 2003). The projected e-commerce growth trends worldwide are also favorable. It is expected that e-commerce will surge to US$5 trillion in 2005, up from US$354 billion in 2000 (Lever, 2001)

Compounding the increase in online spending is information from Dieringer Research Group (2003) that indicates the far-reaching impact of the Web. The firm found that Internet-influenced offline spending is 50% greater than online spending (Figure 1) – meaning that for every $1 spent online, the Internet influences $1.50 in brick-and-mortar sales. Overall, U.S. consumers spent $137.6 billion offline in the last year, after first seeking information online, and online spending totaled $93.1 billion — roughly one-third less than Internet-influenced offline spending. In addition, 25% of U.S. consumers now say that online information changed their brand perceptions during the past year (Dieringer Research Group, 2003). This confirms that the online channel is increasingly critical to marketers whether they sell directly online or not.

Figure 1. Internet-Influenced Consumer Spending in the U.S. (Billion Dollars/Year)



Source: The Deringer Research Group (2003)

Yet, it is continuously pointed out that the Internet offers efficiencies for retailers in the form of increased market access and information, decreased operating and

procurement costs. Likewise many consumers view the Internet as offering benefits such as enhanced price competition, customization of products, extended information on goods and services, increased choice of products, and greater shopping convenience (Lee, Lee, Kim, & Lee, 2003), hedonic consumption possibilities (Eroglu, Machleit, & Davis 2001), and reduced constraints of time and space (Kalakota & Whinston, 1997).

The Growth of the Web and Missed Potential

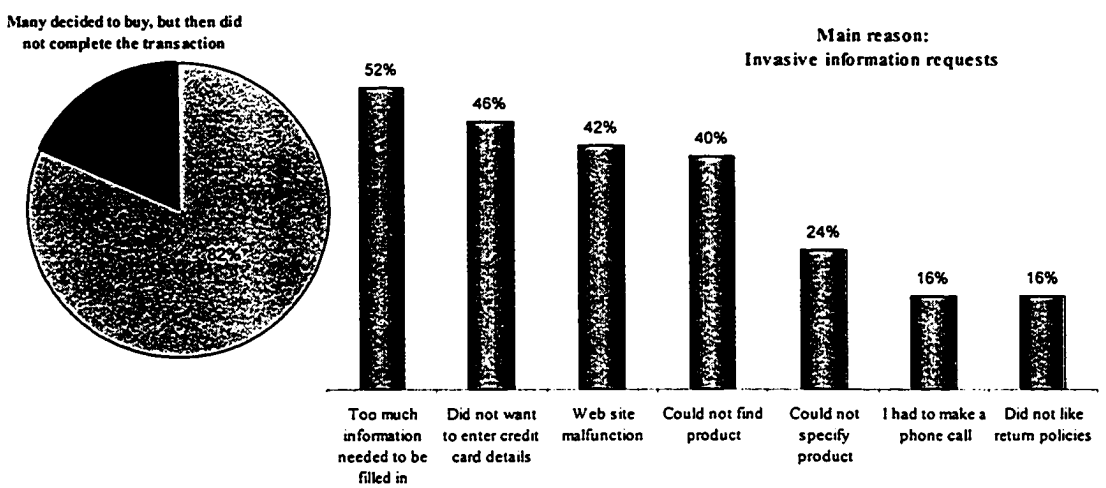
In light of increasing numbers of Internet users and projected online and online-influenced revenues, many companies are spending millions of dollars annually to develop e-commerce systems to link the online customer (e-customer) to their online business (e-business). "Numerous department stores and consumer product companies initiated online sales of their goods, and many more click-and-brick companies expanded their online business" (Yin, 2002, p.19).

However, in the process of seeking these information technology (IT) systems many business organizations have rather eagerly acquired computer hardware and software mostly to the detriment of the human aspect of the IT solution (Freemantle, 2002; Lockwood & Lamp 2000). With regards to Web site implementation, Silvermann, Bachann, and Al-Kharas (2001) noted "In the rush to open their Web site, e-commerce sites too often fail to support buyer decision-making and search, resulting in a loss of sales and customer's repeat business" (p.1). Moreover, overblown technology results in complicated Web sites and frequently creates annoying experiences that loose the potential to convert Web site visitors or surfers to shoppers. Furthermore, Nielsen (2001) highlights that about 90% of current commercial Web sites have low usability. Web sites

with low usability will lead to unsatisfied users and the sites will not grow into long-term success (Nielsen, 1999a).

In the quest to determine the effect of Web site characteristics, several studies, mostly exploratory and/or anecdotal, show that at most of today's Web sites, consumer usability issues are neglected (Forrester Research, 1999; Nielsen, 1993; 1999a; 2001; Rizzuti & Dickinson, 2000; Stanoevska-Slabeva & Schmid, 2000; Zona Research 2000). For example, a survey by A.T. Kearney (2000) reveals that, due to poor Web designs, 82% of experienced online shoppers drop out of their shopping carts without completing the transaction; the main reason being invasive information request, followed by credit card security issues and site malfunctions (see Figure 2). Similarly, a Zona Research (2000) study found that 62% of Web shoppers have given up looking for the item they wanted to buy online (and 20% had given up more than three times during a two-month period).

Figure 2. Poor Web Site Design is Costing E-Tailers



Source: A.T. Kearney (2000)

Forrester Research (2001) audited 20 major sites, finding 51% failed compliances with simple Web usability. In other words, the average site violated half of simple design principles. This shows there is great potential for online sales, which is lost, and the Web sites or electronic stores (e-stores) designed to offer the companies' products and services do not fulfill their task successfully. Rizzuti and Dickinson (2000) reported that e-tailers missed more than US$6.1 billion in lost sales, or 13% of the total world revenue in 2000.

Inarguably, companies emphasizing e-commerce attempt primarily to attract more Internet users and to entice a larger proportion of users to return frequently. Hence, in-depth understanding of consumers' Web use behavior becomes critical to both researchers and practitioners (Lee, 2000; Peterson, Balasubramanian, & Bronnenberg, 1997). In particular, given the significant growth in online retailing, the online retailer (e-tailer) needs to understand the particular reasons why consumers may prefer using a particular Web site or e-store to shop. This need is particularly relevant for the increasingly competitive online retail market, in which numerous national and regional firms compete among themselves as well as bricks-and-mortar stores within a relatively static market (Rohma, & Swaminathanb, 2002). Despite the importance of consumer behavior on this new medium, few studies have attempted to empirically address the issues of Web site design elements in relation to marketing activities. No study has yet developed a comprehensive understanding of how the Web site interface elements/features affect consumer purchase activities on the Internet. This dissertation addresses both these issues on the Web.

The Role of Role of Store Environment on Consumer Purchase Behavior

In-store environments comprise informational cues that customers receive during in-store shopping (Kotler, 1973). In-store cues include atmospherics, personnel service, product characteristics, and in-store promotion. Kotler (1973) coined the term "atmospherics" to suggest that the store atmosphere may be more important in selling a product than the product itself. Atmospheres are composed of ambient conditions, spatial layout and functionality, signs, symbols, and artifacts (Bitner, 1992).

In addition to atmospherics, the provision of product characteristics, including information on the physical compositions of the product, e.g., product quality, variety of size, color, and appearance have been found to have a positive impact on store choice. Extant research suggests these dimensions have a positive impact on consumer evaluations of services. Each dimension may affect the overall perception independently and/or through its interactions with the other dimensions (Bitner, 1992).

Traditional Store Environment.

In traditional brick-and-mortar stores, environment is a key element in differentiating retailers' in-store offerings since retailers tend to offer similar products and services at similar prices (Baker, Grewal, & Parasuraman, 1994). Recent studies have shown that at least two-thirds of consumer purchase decisions are made within the store itself (Bandyopadhyay, Wieragama, & Khuller 2000). How much they spend, what brand they choose, impulse purchases, and return intentions are largely a function of the store environment. Garton (1995) found that product attributes appear to have a significantly greater impact on buying behavior than store attributes. Similarly, marketing actions such as advertising and promotions lead to increased differentiation. For example, in-store

promotions, such as giving customers seasonal gifts, discounts, opening events, and product demonstrations may add fun and/or pleasure to shopping and have an influence on impulsive buying (Boulding, Lee, & Staelin 1994). Eroglu, Machleit, and Davis (1999) noted that given the demonstrated impact of store environment on shopper behaviors in traditional stores, such atmospheric cues are likely to play a role in the online shopping context. They developed a conceptual model which posits that "atmospheric cues of the online store, through the intervening effects of affective and cognitive states, influence the outcomes of online retail shopping in terms of approach/avoidance behaviors" (p. 177).

Online Store Environment.

An online store, or e-store, simply stated, is "a storefront in cyberspace, a place where customers can shop from their home computers and where merchants can offer merchandise and services for a fraction of the overhead required in a physical storefront" (Yesil, 1997, p.10). The e-store allows companies to offer direct sales to their customers through an electronic channel (Hoffman, Novak, & Chatterjee, 1996). Put in another way, an e-store "can be considered as a group of technological features that appeal (or not) to consumers" (Song & Zinkhan 2003, p.106). Web site design is a gestalt process that includes aesthetic judgments, artistic sensibility, creativity, and a consideration of goals and strategies. The building blocks of Web site design include user interface items such as links, colors, information access, fulfillment policy and more. Palmer & Griffith (1998) noted that an important attribute of the use of a Web site's ability to disseminate product information and e-commerce is the capability of the customer to interact with the site through certain features. These features may include text-based email inquiries,

feedback forms, and entertaining features that attempt to retain customers at the site for longer visits (Ghose & Dou, 1998). Entertaining features may include pictures, virtual reality display of products, multimedia shows, online games, and the use of cartoons and humor (Philport & Arbittier, 1997; Ghose & Dou, 1998; Huizingh, 2000). In other words, an e-store is a mix of direct selling and advertising with characteristics of both general product display and interactive involvement with customers (Ghose & Dou, 1998). A shortcoming of the e-tailing efforts is consumers' inability to touch and/or smell products during their purchase decision-making process (Citrin, Stem, Spangenberg, & Clark, 2003). Citrin et al. (2003) demonstrated that products requiring more tactile cues were less likely to be purchased over the Internet.

The User Interface.

Like any other software application, the importance of the Web site user interface has consistently been emphasized. In the online environment, it bridges the consumer with the e-tailers' products and services. In broad terms, the user interface is defined as "the aspects of a computer system or program which can be seen (or heard or otherwise perceived) by the human user, and the commands and mechanisms the user uses to control its operation and input data" (Feldman, 2003, p.3). In other words, a user interface is a set of rules, methods, and/or devices used to promote the interaction between people and machines. In the Internet environment, user interface includes such issues as navigation, site organization, searching ease, user-controlled navigation, links, cross-platform design, layout and writing style, standards, and multimedia capabilities (Chen & Wells, 2000; Nielsen, 2000). According to Griffith, Krampf, and Palmer (2001), user interface elements influence the experience of consumers interacting with the

retailer's Web site, stimulating involvement with the information presented and consequently influencing consumer responses. In other words, the importance of atmospherics, product characteristics, in-store promotions, and personnel service in online transactions shift to Web site interface features that help consumers self-navigate through the offerings of the company and encourage them to return to the site. The Web site interface can create a strong subjective impression of what a user will experience at a Web site. It conveys a look and feel appropriate to the designer's message; it also holds the navigational tools and graphic identity of a Web site. Users need an initial understanding of how Web interface features are structured and how they interrelate with each other in order to successfully navigate the site.

Common Web interface issues facing Web users can be described as either disorientating (i.e. getting lost) and/or creating cognitive overload (the overload due to making decisions such as which link to follow and which link to abandon (Payne, Bettman & Johnson, 1993). Regarding orientation, Nielson (2000) suggests that at any web page within a Web site, a user should know where they have been, where they are, and where they can go. No matter how the navigation interface is designed, the site should be built-up on a clear structure. If the site organization is confused, no good navigation support could help it. In addition to site browsing, searching ease is necessary for all shopping sites. Although some consumers find the information or product with navigation menus, sitemaps or links, most of consumers are unlikely to find the information as fast as possible and may rely on site search features. The Web, through its progress in multimedia technology and artificial intelligence now, has the capability of presenting features that may simulate real world environments. For example some sites

provide background music whiles the users browse the site. At Landsend.com a user plugs in their exact measurements (i.e., height, weight, hairstyle, body shape, eye, hair and body color, etc) and a "virtual model" is assigned to try-on his/her chosen clothing.

In summary, on the Web, the interface design elements or features must be meaningful, relevant, motivational, and supportive of the user's purchase process. In other words these elements may serve as functional (e.g., dropdown menus, buttons, radio and check boxes, hyperlinks, etc.) or symbolic (background color, visual images, company logo, information density, etc) elements that support and motivate the consumer purchase process.

Statement of the Problem

While the promise of the Internet has become a reality that most business can not afford to ignore, use of this medium for communication and information has not been match by its equivalent use for shopping (Citrin et al., 2003). In particular, many challenges in the practice of designing user-friendly e-commerce systems remain. In order to derive maximum benefits from commercial Web sites, companies and designers need to ensure that the Web interface with which the consumers interact is understandable and intuitive. This problem of poor designs results in, among others, the abandonment of electronic shopping carts, the lack of good customer services, the low conversion rate of visitors into buyers, and the proliferation of overused/inappropriate technologies in Web site designs.

Shopping Carts Abandonment and Poor Visitor Conversion Rates.

In 1999, a study by the Intermarket Group found that the average visitor/buyer conversion rate was 2.7% among leading online merchants while five percent reported rates in excess of six percent (as cited in Yin, 2002). These data remained consistent with a 2001 Business Week report that indicated an average conversion rate of 4.9 percent (Business Week, 2001). While some of these abandoned online transactions will be salvaged and converted to sales, this represents $10.9 billion in lost e-commerce revenues (Cyberatlass, 2000). One prominent reason for not buying online is poor Web design that mostly neglects customer needs. A.T. Kearney (2000) estimated that, due to customer neglect in Web site designs, one third of transactions that started online require a telephone call to complete the transaction. Ideally, online consumers would want to complete the entire purchase transaction online without having to pick up the phone or make any contact with the e-tailer to complete the transaction.

Overused Technology and Poor Customer Service.

According to many researchers (Freemantle , 2002; Lockwood & Lamp 2000; Silvermann, Bachann, & Al-Kharas 2002; Yin, 2002), e-tailers tend to emphasize the technical aspects to their e-commerce systems while ignoring customer service. As a result users continue to be a sore spot for them. Even among the 50 most popular consumer e-tail sites only average performance in customer service can be expected (Gartner Group, 2000b). In Gartner Group's (2000a) Web site survey involving pure-play[1] and mortar e-tailers[2], none of the sites achieved a rating of good or excellent – 23%

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[1] Purely Web based companies.

were average, 73% were fair, and four percent were poor. Table 1 further presents common mistakes that e-tailers made in their Web sites. Most of these listed mistakes are related to interface issues, and can be avoided at the design stage or corrected at the maintenance stage of the system if knowledge on consumer preferences is at hand.

Developing, launching, and maintaining a Web site is a significant investment for e-commerce firms. E-commerce firms typically budget $1-2 million per year for Web site setup and maintenance, while leading Web sites require annual investments nearing $8 million (Rizzuti & Dickinson, 2000). Yet, the process of designing high quality Web sites for e-commerce is still more of an art than a science. E-commerce companies still rely largely on intuition when it comes to designing their Web sites (Zhang, von Dran, Small, & Barcellos, 2000). It is clear that e-commerce companies need disciplined methods for justifying the business value of IT investments in systems design.

Most prior studies focus on the technical issues, such as encryption, security, and electronic cash, to name a few, as solutions to e-commerce implementation. These are, of course, important in e-commerce, but the human-side issues, for example, the design of customer interfaces, are also of utmost importance to the wide acceptance of e-commerce (Chau, Au, & Tam, 2000). Therefore, while it is no doubt that many see significant potential in the Web as a sales and marketing tool, much more needs to be understood about what drives commercial activity on the Web. This study examines a critical issue in site design of Web site interface features. These features, as components of the user interface, bridges the consumer with the e-tailer, thus, they have the potential to influence consumer perceptions, attitudes, interactivity, and purchase intentions.

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[2] Traditional retailer companies with Web presence.

Table 1

Common Mistakes at E-Tailers Web Sites

Requiring passwords to access services*	Lack of customer service tab*
Lack of search engines for user queries*	Lack of site map*
Lack of working channels (e.g., inability to enter the chat area)*	Lack of agent support (e.g., no support agents for online activities, slow e-mail response times)*
Lack of internationalization*	Lack of toll free telephone numbers*
Lack of coordination between click-and-brick*	Requiring software download to access Web site services*
Unwarranted animation (e.g., lots of blinking of text and graphics).‡	Errors in code that can lead to malfunction of features such as submit forms. ‡
Presence of non-functioning or dead links. ‡	Lack of clear navigational clues and structure. ‡
Heavy used of bright colors and background images. ‡	Failure of e-tailers to rigorously test site after design. ‡
Over used of splash pages‡	Outdated content. ‡
Use of browser-specific tags that require installation of plug-ins. ‡	Use of bloated graphics that take forever to display. ‡

*Source: Gartner Group (2000b)

‡Source: Adapted from Thomason (2001)

Research Purpose and Scope

According to Romano and Fjermestad (2001), the e-commerce research domain includes five areas: technology, knowledge management, business models, markets, and human factors. This study examines the human factors for B2C e-commerce and focuses on consumers' perspectives of Web sites that offer transaction features to complete the purchase process. Specifically, the study looks for evidence in support of a claim that certain system interface features' presence or absence at a commercial site may affect users' online purchase and revisit intentions. The basis is that, if purchase intentions play a central role in predicting future purchases (Koufaris, 2002), Web site perceptions, attitudes, and the extent of interactivity could be valuable constructs for predicting the

likelihood of consumer online purchase behavior. Such a finding would also suggest that any decision not to buy while visiting the Web is largely the consequence of unfavorable reactions to a site rather than a broader based lack of interest in this distribution channel.

The main objective, therefore, is to develop a model on the effect of Web site interface design features on consumer intention to shop and intention to return to the site. Our proposed model includes relevant antecedents of the two outcome variables: intention to purchase, and intention to return.

In this study, B2C refers to consumers ordering products or services and paying for them through the Internet. Also, the term e-store is an Internet shopping site defined as Web retail site in which customers can browse, evaluate, order, and purchase a product or service. In other words, e-stores are online versions of physical retail stores where all or key transactions and their relevant activities take place in online cyberspaces. Thus, the use of the terms e-store, online store, cyberstore, or simply Web site, are synonymous in this study, referring to a commercial Web site. The reader will be notified if the use of the term has a different connotation other than in reference to a commercial Web site.

Research Questions

The main concern of the study is to determine how e-tailers create Web sites that: 1) make the users feel comfortable using the Web site 2) are fun to use 3) entice the consumers to spend more time at their site and revisit and 4) increase the likelihood of a purchase. An understanding to these behaviors might become evident with an investigation of the design of an e-store's interface features and the antecedent factors of online shopping behavior. To achieve this objective, the study will develop and test a

comprehensive model of Web site interface characteristics and outcomes that specifically address the following questions:

Research Question 1: Can e-store interface features be classified into meaningful and manageable categories?

This question is proposed because the possibility exists the innumerable Web interface features may only be referred to in technical terms such as navigation features, resolution of images, image sizes in bytes, color depth of screens, hierarchical/organic page layouts, dynamic versus static page content, Web crawlers/search engines, etc. The resolution to this question rests on the establishment of discriminant validity and inter-rater reliability between a theoretically guided classification category scheme of the features.

Research Question 2: What are the relevant perceptual variables of an e-store?

Consumer perceptions are varied and may result from consumer fulfillment of needs such as cognitive, affective, social, or personal needs (Katz, Gurevitch, & Haas (1973). This question is addressed through extant literature review to identify the salient beliefs/perceptions of online consumers about e-stores.

Research Question 3: How do the Web interface features shape consumer perceptions and how do they impact consumers' attitudes and online shopping patronage intentions?

This question addresses the fundamental basis of this research study. Abundant literature suggests that traditional stores' environment affects consumer perceptions of the store and consequently their patronage intentions (Kotler, 1973; Bitner, 1992; Boulding, Lee, & Staelin 1994). So far, few studies have attempted to answer this question in the online environment (e.g., Spiller & Lohse, 1998; Liang & Lai, 2001;

Koufaris, 2002;). More rigorous studies are needed in this respect. This question is addressed by testing hypotheses relating interface features, salient consumer online perceptions, attitudes, and site patronage intentions.

Importance of Research

Given the poor levels of Web usability (A.T. Kearney, 2000; Nielsen, 1999b, 2000, 2001), Keeker (1997) describes a need for research into improving Web usability from a consumer's point of view. Benbunan-Fich (2001) pointed out that the academic literature has not given much attention to evaluating the usability of commercial Web sites. Recently, Rande Price, the Vice President of Market Research, AOL, Inc. noted, "As the online population increases its use of Internet applications, it's critical to have direct access to research and analysis that effectively track Internet surfing behavior across all digital media" (cited in Nielsen/NetRatings, 2003).

It is obvious that despite the growing interest towards Web site implementations, little is understood about the outcomes of Web design features and their contribution towards Web users' online behavior. Following the recommendations of many researchers (e.g., Lohse & Spiller, 1998), this study suggests that to be most useful to businesses, models explaining Web site patronage must identify in more detail the specific aspects of the site design features that lead a Web site to be accepted by consumers. This greater clarity of detail is important since it be discovered empirically that some aspects are more important than others in determining consumer behavior.

Such an endeavor is important from a practical business sense because without a finer grained measure than previously developed constructs (e.g., "ease of use" or "usefulness," of a technology application), Web designers might not know what changes

to make in a Web site that affect consumer perceptions. Therefore, this study considers it critical to identify not only the Web site interface features, but also the specific perceptions/beliefs and attitudes important to predicting consumer Web site patronage. If certain design features are shown to be relevant to consumer perceptions of product presentation of the site, much like advertising, then these features can be emphasized in Web design. In fact, we are reminded of the very principle that consumers' cognitive assessments are crucial in assessing the value of a commercial message just as in advertising (Ducoffe, 1996).

E-commerce companies are dependent upon people visiting their site, purchasing their products, and more importantly, revisit as repeat customers. Practical guidelines can be developed to create e-stores that "communicate the most informative claims" a business is "capable of delivering" (p.31) from the value perspectives of consumers (Ducoffe, 1996). In addition, taking into consideration various browser incapabilities, human disabilities, and wireless devices that have limited Web browsing capabilities, determining what features are important as maintenance or motivating factors of a Web site will enable Web designers to better cater to a broad range of users. For instance, while the needs of wireless devices are being addressed quite rapidly, in sharp contrast, designers ignore the needs of various human disabilities (Milliman, 2002).

The academic contribution of the study is its extension of existing models that attempt to explain online shopping behavior. Existing studies in e-commerce have examined the direct link between e-store features and e-store traffic and sales (e.g., Lohse & Spiller, 1998). There have also been studies in marketing exploring the link between advertisement attributes (e.g., interruption, animation, humor, and image maps) and

online consumer attitude (Coyle & Thorson, 2001; Sutherland & Middleton, 1983; Xia & Sudharshan, 2002). The proposed study expands the scope of research in this stream of studies to connect some unexplored elements of Web design features with mediating variables of consumer perceptions, and attitudes in the e-store environment. Thus, in addition to theory validation, this study also advocates a framework that uses system interface features and consumer perceptions as the criterion in shaping consumer's attitudes and online purchase and revisit intentions.

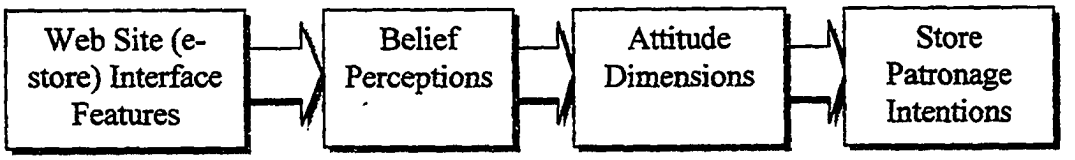
Considering that an e-commerce application is both an information system (IS) and a marketing channel, this study draws from a variety of disciplines including marketing and MIS literature, as well as conducting exploratory research to arrive at the research model. As Vrechopoulos, Pramataris, and Doukidis (1999) note, the new business conditions governing this environment should alert researchers toward the production of new frameworks and theoretical guidelines addressing the needs and peculiarities of "electronic markets".

Summary and Study Overview

This study develops a model designed to explore Web interface design features as a predictor of online purchasing intentions. The argument is that interface features may be the most important criterion elements leading to purchase via beliefs and attitudes (See Figure 3). Past studies have established that user beliefs and attitudes are important because they contribute to user's intention to use a system (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989) while users' intentions to use a system is suggested to be the best predictor of actual system use according to Davis' (1989) Technology Acceptance Model (TAM).

As a theoretical overview, the primary intention in this research is to use validated behavioral theories as base line models and to incorporate additional variables that have the potential to impact online purchase behavior. The theoretical linkages of the proposed model are presented in Figure 3 below. These causal relationships among beliefs, attitudes, intentions (beliefs → attitudes → intentions) chain is based on Fishbein and Ajzen's (1975; 1995) Theory of Reasoned Action (TRA). Many studies have enumerated such aspects, with much overlapping among them (e.g., the theory of planned behavior, and the technology acceptance model).

Figure 3. Theoretical relationships to be examined.



The study is organized in the following manner. In this Chapter the study's background on Internet growth and the missed potential in developing acceptable and usable online storefronts are presented. The chapter also discussed the role of the store environment in both the traditional and online setting. In addition, the problem statement, study purpose, research questions, and the potential contribution to academia and industry are presented.

The next chapter (Chapter 2) covers a review of literature in the fields of E-commerce, Marketing, MIS, and related disciplines with respect to interface features that influence human computer interactions in the online environment, and consumer attitudes toward store atmospherics. In Chapter 3, the theory foundations that provide the bases for this study's theoretical framework in which linkage between design features and

purchase intentions are established. *A priori* research models and hypotheses are developed in this regards. Although direct effects hypotheses are evaluated in this study, it is also an assumption that online purchasing behavior and attitude formation are complex processes and can be affected by a myriad of factors. Therefore, besides the variables of the *a priori* models, the study examines the effects of relevant control variables.

In Chapter 4 the methodology covering research design, sampling, instrument development and data collection is laid out. Chapter 5 presents data analysis and results, and Chapter 6 discusses the implications and contributions of the research, and presents limitations and recommendations for future research.

CHAPTER II

LITERATURE REVIEW

The phenomenal growth and use of the Internet during the last decade has provided fertile ground for research activities. Unlike traditional information systems (such as decision support systems or information retrieval systems), e-commerce systems bear the characteristics of both an information system and a marketing channel. Building on the platform of the Internet and computers, an e-commerce system is a service provided by computer servers on the network and accessed by users via Internet browsers. Meanwhile, an e-commerce system also serves as a marketing channel where product information can be displayed and exchanges can be performed. Therefore, to meet the goal of this study, a multidisciplinary approach is taken. In this chapter, the literature from IS on IT adoption and acceptance, consumer purchase behavior in marketing studies, and e-commerce systems together with human-computer interaction (HCI) studies, is reviewed.

Information Systems Literature on Web Adoption and Use

Information Systems (IS) researchers have made significant efforts in building theories to examine and predict determining factors on IT acceptance. Existing models of IT acceptance have their foundations in several diverse theories, most noticeably the Technology Acceptance Model (TAM) (Davis, 1989) which expands on the theory of

Reasoned Action (TRA)[3] (Fishbein & Ajzen, 1995). Both TRA and TAM attempt to explain acceptance and use of an IT using individuals' beliefs, attitudes, intentions, and actual use behavior. Among these theories, TAM seems the most widely accepted among IS researchers due to the richness of recent empirical support for the model (Agarwal & Prasad, 1998).

According to the TRA model, beliefs influence attitudes, which lead to intentions, and direct behaviors. TAM adapts this belief-attitude-intention-behavior relationship to explain IT user acceptance. TAM predicts that user acceptance is based on two specific behavioral beliefs: perceived ease of use (PEOU) and perceived usefulness (PU), which determine an individual's behavior intention (BI) to use an information technology.

While TAM has been used to explain IT adoption across a number of applications, an investigation of the literature reveals that certain inconsistencies exist, but are rarely dealt with and not clearly answered. Findings from most studies, for instance, suggest that perceived usefulness (PU) is consistently found to be a significant determinant of attitude (e.g., Gefen & Straub, 2000; Moon & Kim, 2001), but findings related to perceive ease of use (PEOU) are mixed. Whereas Venkatesh and Davis (1996) found that PEOU significantly impacted self-reported intentions to use e-mail and gopher

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[3] The basic proposition of TRA is that in order to predict a behavior B (such as using a technology to complete a task), one must try to measure an individual's intent to behave, or BI (such as intent to adopt a technology), itself a function of attitudes and attitudes in turn are a function of beliefs about and assessments of perceived benefits/risks of acting in a certain way, such as beliefs about the advantages or disadvantages of using a new technological innovation.

systems, numerous other studies (e.g., Gefen & Straub 1997; Karahanna, & Straub, 1999) have found that PEOU doesn't impact actual use. These contradictory results may be attributed to the varying impacts of task-related characteristics. For example, while most TAM studies have investigated the adoption and use of individual software packages, or microcomputers in general, the Web is a multi-functional technology. In addition, the effect of PEOU disappears as the users of the technology application become familiar with it. In the online shopping context, most users are already familiar with Web browsers and Web site use, thus we expect that the impact of PEOU will be minimal.

Despite the popularity of TAM, few studies have investigated TAM as a model to explain the use of the Web in the context of online shopping (e.g., Atkinson & Kydd, 1997; Fenech, 1998; Teo, Lim, & Lai, 1999). These studies, while acknowledging the applicability of TAM to the Web, have proposed other perceptual variables besides TAM's PU and PEOU. For instance, playfuness (Atkinson & Kydd, 1997) and perceived enjoyment (Teo, Lim, & Lai, 1999) have been added to TAM to help explain user Web behavior.

Another IS stream of research examining technology adoption has employed technology innovation/diffusion models to forecast Internet adoption with the emphasis on predicting the ultimate level of penetration. The theory of diffusion of innovations (Rogers, 1995) considers how a new idea, or adoption of a new behavior, spreads throughout the market over time. Rogers divides people according to how they respond to innovations – from early adopters to laggards. According to others (e.g., Wilson, Dobrovolny, & Lowry 1998), this approach is more descriptive than explanatory and does not provide deep insights into complex adoption processes. Wilson et al. (1998)

further argue that such a descriptive approach tends to ignore the value and cultural implications of people. Seeking to provide such explanations, Rogers (1995) proposed that the observed diffusion process may be affected by attributes of the innovations being adopted. Rogers, through synthesis of several previous studies on adoption behaviors, found that *relative advantage* and *compatibility* (which appear to be similar to TAM's *usefulness* and *ease of use* in content) are among the key factors, in addition to *complexity*, *result demonstrability*, *visibility*, and *trialability* that influence the rate of diffusion of an innovation.

In an attempt to investigate the impact of social and cultural factors of IT adoption, a number of IS studies have employed Triandis' (1980) framework. Triandis proposes a theoretical network relating attitude and behavior to a number of constructs, including culture and biological factors. According to this framework, the probability of performing a given behavior is determined by a number of factors, i.e.: (1) the habit of performing the behavior, (2) facilitating conditions, and (3) intention. In his model, behavioral intention is determined by social factors, affect, and the perceived consequences of performing the behavior. The Triandis model has been successfully used in a number of technology adoption studies. For example, Cheung, Chang and Lai (2000), in using the Triandis framework proposed that the first determinant of Internet/Web use is affect, which is the direct emotional response to the thought of a behavior and is referred to as the "feelings of joy, elation, or pleasure, or depression, disgust, displeasure, or hate associated by an individual with a particular act" (Triandis 1980, p.107). However, existing findings relating affect to usage in information systems are mixed. Whereas Pare and Elam (1995), studying the adoption of the personal

computer (PC), concluded that anxiety (a negative affect) has a negative relationship on usage, other studies have not found any significant relationship between affect and usage (Thompson, Higgins, & Howell, 1994).

The above theories have also been explicitly or implicitly used in several IS studies that examine the acceptance and use of the Internet /Web technologies. The literature indicates that in most of the studies the original IT adoption models have been modified and/or expanded to include key variables believed to be relevance in the adoption of Internet/Web technology. For instance, several research findings suggest download time, appeal of graphics, format, trust, user satisfaction, and content of the Web page (e.g., Gefen & Straub, 2000; Gefen, Karahanna & Straub 2003; Jarvenpaa & Todd, 1997) influence users' online behaviors. Stevenson, Bruner, and Kumar (2000) found a positive relationship between Web page background and the overall commercial effectiveness of the Web page. Site navigation has also been found to influence users' perceptions of an effective Web site, with poor navigating acting as a source of frustration for many Web users (Georgia Tech GVU, 1998).

Research of Online Behavior and E-Commerce

A 2003 UCLA Center for Communications Policy Internet Report indicates that new users and very experienced users cite varying reasons why they originally went online. For new users, by far the most-cited reason was being given free Internet access, followed by e-mail, the ability to get information quickly, and work. For very experienced users, the reason they cite most often for originally using the Internet six or more years ago was the ability to get information quickly, followed by work needs, e-mail, and school needs (UCLA, 2003). The same survey found 25% of users said that the

Internet is a very important or extremely important source of entertainment, up from 21.1% in 2001, and about the same as in 2000 (24.9%). However, the survey reported some declines in online shopping behavior compared to surveys of previous years.

Li, Kuo, and Russell (1999) found that consumers shopped online for reasons other than obtaining products, such as role-playing, diversion from the routine of daily life, self-satisfaction, learning about new trends, physical activity, sensory stimulation, social experiences outside the home, communication with others having a similar interest, peer group attraction, status and authority, and the pleasure of bargaining. Liao and Cheung's (2001) study indicated that absence of features pertaining to transaction security, price, and shopping experience had a negative impact on willingness to purchase on the Internet. On the contrary, vendor quality, IT education and training, and level of consumer Internet usage are positively related to willingness to purchase on the Internet. According to A.T. Kearney (2000) consumers are more likely to buy higher ticket items such as cars, insurance and loan services from click-and-brick retailers who have a physical presence than from pure click e-tailers. The reverse is true with low ticket items such as CDs, books and tickets.

Researchers have also attempted to understand Internet shoppers in terms of demographic and individual differences with very different results. Bellman, Lohse, and Johnson (1999), using Wharton Virtual Test Market (WVTM)[4] data, explored the role of demographics (age, income, and education) and lifestyles on the decision to purchase.

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[4]The Wharton Virtual Test Market (WVTM) is a consumer panel designed to represent the universe of World Wide Web users. A panel is a research tool that tracks over time the attitudes and behavior of a group of participants, selected to be representative of a study population.

Their results show that the higher a person's income, education, and age, the more likely he/she is to buy online. However the authors caution that demographic variables alone explain a very low percentage of variance in the purchase decision. In line with this finding is Donthu and Garcia's (1999) study demonstrating that revealed that the Internet shopper is different from general Internet user: "The Internet shopper is older and makes more money than the typical Internet user" (Donthu & Garcia, 1999, p. 52). Other demographic variables, such as gender and marital status, impact on Internet use have received mixed results. While Gefen and Straub (1997) found that the perceptions of women regarding cultural effects and perceived usefulness of e-commerce are different from men, yet, Fram and Grady (1997) reported males and females did not differ in their intention to participate in e-commerce. Females indicated the Internet was a more vibrant shopping environment but shopping for fashion merchandise via the Internet was difficult (Fram & Grady, 1997). On the contrary, gender had no effect on online behavioral intention in a study that investigated the impact of cognitive absorption on user perceptions (Agarwal & Karahanna, 2000). Similarly, Bhatnagar, Misra, and Rao (2000) studied how demographic variables may moderate perceptions of the convenience the Web provides and the choice of the channel to make a purchase. They reported that marital status had no effect on perceptions of convenience in choosing to shop via the Internet versus a retail store. Their results were also mixed on gender.

In addition to demographic variables, individual level characteristics such as personal innovativeness, confidence in decision-making, and the impact of social factors have been explored with mixed results (Limayen, Khalifa, & Frini, 2000). Motivated by these findings, most of the frameworks for individual behavior do incorporate

environmental factors, such as social norms in TAM. For instance, Limayem Khalifa, and Frini (2000) included social norms (defined as the media, family, and friends) in their model, and found that whereas media and family significantly affect the intention to shop online, friends did not. Recently, O'Cass and Fenech (2003) argued that, in addition to TAM constructs, other key consumer characteristics such as opinion leadership, impulsiveness, Web shopping compatibility, Internet self-efficacy, perceived Web security, and shopping orientation can be used to explain the adoption of Web retailing by Internet users.

Similar to this line of research, studies in the advertising and mass media communications literature have applied uses and gratifications (U&G) theory which has been quite fruitful in understanding consumers' motivations and concerns for using various media such as radio, TV, and electronic bulletins (Eighmey & McCord, 1998). For instance, U&G research suggests that providing higher entertainment value is likely to lead to an advantage for media users and to motivate them to use the media more often (Eighmey & McCord, 1998). In general, U&G research has demonstrated that the value of media entertainment lies in its ability to fulfill users' needs for escapism, hedonistic pleasure, aesthetic enjoyment, or emotional release (McQuail, 1984).

Within the Internet environment researchers have done work linking the Web site environment to the users' feelings and attitudes toward the site. Jarvenpaa and Todd's (1997) study is one of the first efforts in capturing consumer feelings and reactions to Web shopping. The researchers found that information about company policies, product returns, pricing, delivery times, guarantees and on-line assistance were found to be salient interface features that impacted consumer's perceptions about customer service.

Additionally, an important finding was that consumers view the Web as a source of value added services that can't be easily offered through traditional retail channels. Thus, the authors proposed that Web stores need to: (1) provide adequate product variety supported by product and service descriptions; (2) facilitate goal directed shopping; (3) present company policies; (4) and streamline the ordering process. They suggest that further research endeavors can be segmented based on the dominant set of variables that are studied in investigating purchase behavior in the context of the Web. van Name and Catchings (1998) reported Web site organization, server performance, product data, a search option, and shopping carts all contribute to a positive Web shopping experience. Eighmey and McCord (1998), Chen and Wells (1999), and Ducoffe (1995, 1996) demonstrated that within the Web environment information/relevance, entertainment/amusement, playfulness, usefulness, and organization/irritation are primary benefits and costs consumers derive from a commercial message or Web advertising, and were shown to be significant predictors of consumer perceptions of advertising value. In a study of attitude toward Web sites, Chen and Wells (1999) corroborate Ducoffe's (1996) findings by reporting that 54% of variance in attitude toward a Web site is explained by entertainment, informativeness, and organization factors.

While most studies of online behavior have focused on consumer frequency of Internet use, demographics, and attitude formations, a few studies have investigated the extent of interactivity while online. For example, Hoffman and Novak (1996) introduced the concept of flow (Csikszentmihalyi, 1997), which describes the extent a user is engrossed in Web activities. Hoffman and Novak argue that an online shopping environment can bring about a state of flow, which in turn leads to more exploratory

browsing behaviors, an essential characteristic of experiential shopping behaviors. Indeed, some researchers view flow as central to human-computer interactions and have empirically assessed the capacity of flow to explain the use of computer systems (Ghani, Supnick & Rooney, 1991; Ghani & Desphande, 1994; Koufaris 2002; Lotz, Eastlick, & Shim 2000; Webster, Trevino, & Ryan, 1993). With respect to experiencing flow online, Novak, Hoffman and Yung (2000) suggest that the prerequisites are similar to those for experiencing flow offline. According to Novak et al. (2000), flow on the Web is multidimensional, and is determined by (1) high levels of skill, and control; (2) high levels of challenge and arousal; and (3) focused attention; and (4) is enhanced by interactivity.

Recently, Koufaris (2002) incorporated the flow construct into the TAM model in an integrated theoretical framework of online consumer behavior. He examined how emotional and cognitive responses to visiting a Web-based store for the first time can influence online consumers' intention to return and their likelihood to make unplanned purchases. While his results were inconclusive with unplanned purchases, he demonstrated that flow has a significant impact on the Web consumer. However, in an earlier study it was found that flow was rarely achieved at business Web sites (Ha & James, 1998). In a content analysis of the interactive features of 110 business sites, Ha and James (1998) found a discrepancy between the capabilities of the Web and the actual implementation of interactive features online. Most of the business sites contained hyperlinks within the same site (an average of 12.2), but they did not integrate links directing users to relevant information from third-party sources (averaging less than 1 per site). Only a third of the sites allowed for consumer feedback (via e-mail, direct orders,

on-line surveys, or toll-free numbers). Overall, Ha and James (1998) conclude that the interactivity in business sites was quite low.

Research on Store Atmospherics

Prior research in environmental psychology (Mehrabian & Russell, 1974) and retailing (Donovan & Rossiter, 1982) suggest that environmental stimuli impact consumers' emotional states, which then result in approach or avoidance behaviors toward the store.

This early effort was followed by a number of empirical and theoretical studies. On the conceptual side, Baker (1986) presented a typology that grouped the elements of store environment into three categories: social factors (people in the store, e.g., customers and employees), design factors (visual cues such as layout, color, clutter, cleanliness), and ambient factors (non-visual cues such as smells, sounds, and lighting effects). Bitner's (1992) subsequent work on the impact of physical surroundings on the social element (i.e., customers and employees) presented a conceptual model that focused on the atmospheric qualities of service organizations. Like Baker, she also identified three groups of environmental cues, albeit with a slightly different categorization.

Empirical work in consumer behavior has examined specific atmospheric cues and their effects on shopper responses. For example, researchers have focused on cues such as music (Hui, Dube, & Chebat, 1997), lighting (Golden & Zimmerman, 1986), color (Belizzi, Crowley, & Hasty, 1983), and scent (Spangenberg, Crowley, & Henderson, 1996). Recent studies (e.g., Turley & Milliman, 2000) continue to examine the effect of the environment of shopping behavior. D'Astous (2000) investigated various aspects of a retail environment that might irritate or produce negative emotions of

consumers' shopping experience. He tested the effect of ambient factors (e.g., background features), store design factors (e.g., layout of merchandise, traffic patterns), and social factors (i.e., people in the environment), on consumer irritation. He found the degree of irritation depended on the environmental variables present and was moderated by a shopper's age and gender. It is also an established fact that changes in layout can affect the sales of a store (Frank & Massy, 1970). Overall, these studies found that atmospheric cues (e.g., Belizzi et al., 1983; D'Astous 2000; Golden, & Zimmerman, 1986; Hui, Dube, & Chebat, 1997; Spangenberg et al., 1996; Turley & Milliman, 2000), layout and displays (Frank & Massy, 1970), and crowding (Harrell & Hutt, 1976) play a significant role in shaping shopper responses and behaviors within the retail and service environment.

On the Web, the issue of atmospherics shifts to the Web interface features. Westland and Au (1998) compared the impact of various interface designs, including catalog search, product bundling, and virtual reality interface design storefronts on money spent, time spent, and the number of products purchased. The authors found no differences except that subjects faced with e-stores that presented virtual reality environments spent more time on the Web site suggesting, perhaps, usability problems or other gratifications are sort within such environments. Lohse and Spiller (1998) conducted a study to predict e-store traffic (visits per month) and sales (dollar sales per month) as a function of interface design features. From 28 different stores, the authors evaluated 32 interface features using stepwise regression and found that nineteen of the 32 features had no impact on predicting store traffic or sales, suggesting perhaps that these features were for site maintenance (or hygiene) purposes rather than motivators.

These included virtually all of the traditional display-oriented screen design issues: choice of background colors or patterns, availability of help screens, consistency of selecting new pages from the top, side or bottom, homogeneity of product listings, the number of buttons on the home page, use of icon-only, icon plus text or text-only for buttons, and the depth of navigation (number of clicks) to an item. The remaining 13 features were identified as predictor variables suggesting perhaps their motivational nature. The variables in their study determining Web site traffic explained about 89% of the variance, and the variables determining sales explained about 87% of the variance. The authors concluded that a user interface that facilitates browsing product lists is more important for generating sales than a fancier storefront.

Fogg et al. (2001) conducted a study that surveyed over 1,400 participants and found that interface features that negatively affected the credibility of a commercial site include sites that 1) make it hard to distinguish ads from content, 2) automatically pop up a new window with ads, 3) have one or more ads on each page, and 4) require a paid subscription to gain access. Zhang et al. (1999, 2000), provided a conceptual framework that distinguishes between Web site design features that satisfy users from those features that dissatisfy users. Liang and Lai (2001), who study the quality of store design and analyze consumer choices, find that design quality significantly affects consumer choice of electronic stores. Classifying design factors as motivators, hygiene, or media richness factors, their research shows that three hygiene factors were among the top five desirable features, that motivators are the key to creating competitive advantage, and that media richness factors are not as important as suggested.

E-Commerce and Virtual Environment Studies

In advertising research, it has been found that if an ad can elicit more attention from the consumer, it would be more likely to generate a more favorable attitude toward the ad (Aad). The ad response model (MacKenzie, et al., 1986) assumes that a favorable attitude toward the ad induces a favorable attitude toward the brand directly or indirectly via brand cognition and finally leads to purchase intention or behavior (purchase intention).

It is believed that as the computing power increases, and as broadband services are adopted, a more realistic presentation of the media will give the user a better experience of the information. With the new possibilities such 3D graphics and animation, color complexity, and with artificial intelligence, the viewers attention to the Web sites will increase and these virtual environments will also be perceived as more interesting. In fact, the importance of user interface design may shift to a user environment design. Studies comparing different virtual environment have suggested that consumer preferences and expectations differ across various media.

Generally, research in this direction suggests that providing richer media with a more real environment has a positive influence on user involvement with the content presented. In sum, traditional models of consumer buying processes may be substantially affected by the characteristics and peculiarities of the new virtual environment (Lilien, Kotler, & Moorthy, 1992).

Human-Computer Interaction and Web Site Usability Studies

"Human-computer interaction (HCI) is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with

the study of major phenomena surrounding them" (Hewett et al., 1992, p.6). HCI studies on the Web focus on the usability of Web sites. Research in this area includes conceptual discussions of what should be evaluated and how it should be done (Instone, 1997; Nielsen, 1993).

Unfortunately, usability studies that have attempted to examine Web features have only examined isolated features. For example, the effects of Frequently Asked Questions (FAQ), feedback forms and search engines in improving usability of Web sites were previously reported (Ghose & Dou, 1998; Lohse & Spiller, 1999; Palmer, 2002). However, there is no systematic study that examines the usability in a comprehensive manner where features are organized along theoretical constructs.

Several researchers recommend applying the traditional software usability criteria (Nielsen, 1993; Shneiderman, 1998) to the Web environment (Instone 1997; Leviand & Conrad, 1996); other studies develop criteria specifically for the Web. What is common among most of these Web evaluation studies is a checklist of heuristics for Web site evaluation with few or unknown theoretical bases and unclear empirical data support. Among the few who use theoretical frameworks for Web site evaluations are Small's (1998) use of motivation frameworks as a base for developing WebMAC (Web Motivational Assessment Checklist); Chin, Diehl, and Norman's (1988) instrument, Questionnaire for User Interaction Satisfaction (QUIS), which assess users' subjective satisfaction with specific aspects of the human-computer interface; Barnes and Vidgen (2000) used quality function deployment (QFD) as framework to developed WEBQual instrument for assessing web-site quality. Yet another WebQual, perhaps the most empirically grounded of the scales that focus specifically on the Web site interface, was

developed by Loiacono, Watson, and Goodhue (2002). This scale contain 12 dimensions of Web site quality: informational fit-to-task, interactivity, trust, response time, ease of understanding, intuitive operations, visual appeal, innovativeness, flow/emotional appeal, consistent image, online completeness and better than alternative channels. They found a significant correlation of the composite WebQual measure with intentions to purchase and intention to revisit the site. However, use of inexperienced student subjects in this study makes these results questionable. Similarly, Parasuraman (2000) suggested a multiple-item scale, the technology readiness index (TRI), to measure the readiness of customers to embrace and interact with technology, especially computer/Internet-based technology. Despite their contribution and importance, these instruments take a holistic approach to the sites, and do not specify specific Web features that Web designers can clearly understand.

Summary and Literature Gap

The literature review illustrates that academic research in IS, Consumer behavior, E-commerce, HCI, and related Web studies have identified a number of dimensions that consumers use in judging Web sites. These include (1) design (e.g., organization, quality of structure, appearance, and aesthetic); (2) content (e.g., information, content quality, and specific content); (3) entertainment (e.g., friendliness and playfulness); (4) ease of use and usefulness (e.g., navigation and usability); (5) reliability; (6) interactivity (e.g., communication and understanding individual); (7) security; (8) privacy. This study acknowledges that, although they make important contributions to a growing body of knowledge, a comprehensive theoretical framework based on which assumptions and hypothesis about Web design interface features which embody the listed dimensions can

be tested in the context of consumer Web patronage intentions is missing. The belief in this study is that the most important stage is to determine the interface features that directly impact these perceptual dimensions of consumers. After all, it is through the interface that the consumer interacts with the e-tailer.

In contemporary usability studies, few are based on either theoretical frameworks or empirical evidence (Small, 1998; Wilkinson, Bennett, & Oliver, 1997). Most studies provide some guidance for designers based mostly on heuristics or rules of thumb. Those that have dealt with Web design features are mostly narrow in their investigation of single or limited number of features and mostly measure direct impacts on various dependent variables (e.g., switching, attrition, customer satisfaction, customer loyalty, etc.) without consideration of any intervening perceptions or beliefs. There is a lack of research on how key issues such as how different Web store environmental cues shape consumers' value perceptions and how those perceptions, in turn, influence store patronage intentions. Baecker, Grudin, Buxton, and Greenberg (1995) point out this view in the following quotation:

> "Many empirical studies of interactive computer use have no theoretical orientation. Data is collected, but no underlying model or theory of the process exists to be confirmed or refuted. Such a theory would be very useful because with many design decisions there are too many alternative proposals to test by trial and error. A strong theory or performance model could reduce the set of plausible alternatives to a manageable number for testing" (p.573).

This study responds to this call by attempting to develop a theoretical framework linking interface design features with consumer buying behaviors. One major objective of the study is to organize the uncoordinated seemingly infinite list of design features into meaningful categories and evaluate their impact on user perceptions of the Web site.

In order to achieve this goal, this study applies Herzberg's (1966; 1968) motivation-hygiene theory (two-factor theory), as have with past researchers (e.g., Zhang et al., 1999; 2000; Liang & Lai 2001), to the Web environment because it provides a parsimonious and easy to understand process of classifying known Web site features. Its major advantages over several other models originating in marketing and IS fields, are that Herzberg's theory provides easy to identify dimensions of satisfaction/dissatisfaction and an explanation for the transition of Web interface features to different perceptual designations. The use of this approach also eliminates the debate over the applicability of Web quality instruments such as SERVQUAL (Parasuraman et al., 1988) in marketing studies, and WEBMac (Small, 1998) or WebQual (Barnes & Vidgen, 2000) in the IS and E-Commerce contexts and the methodological weaknesses and complexity of such instruments. In addition, this approach is most important because it identifies those features that fulfill basic needs and those that make the Web sites' products or services the market leaders.

CHAPTER III

THEORETICAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

This Chapter reviews the theoretical frameworks that are found to be relevant to this study and develops *a priori* structural models with corresponding hypotheses. A central tenet of this research is that a consumer's experience with Web interface features model his/her patronage behavior intentions. The review of the literature reveals that three theoretical frameworks provide relevance to this perspective – the Technology Acceptance Model (TAM), the theory of Uses and Gratifications (U&G), and Herzberg's two-factor theory.

First, the study draws from Herzberg's (1966; 1968) two-factor theory and proposes that Web interface design features can be organized around hygiene and motivator factors (cf. Liang & Lai 2001; Zhang et al., 1999, 2000). These interface factors impact consumer belief perceptions constructed out of their gratification needs. Second, the theory of uses and gratifications lends support to select factors of user gratifications in the hypermedia environment. Third, as illustrated in TAM, user perceptions affect attitudes developed toward the site, which in turn affect behavioral intentions. Finally, the literature stresses the importance of flow in the interactive hypermedia. Therefore, this study draws on the concept of flow to help explain online behavioral intentions. These theoretical frameworks that this work builds on are discussed next.

Herzberg's Two-Factor Theory

Motivational need theories postulate that human behavior is stimulated and directed by various psychological needs. Herzberg's (1966; 1968) two-factor theory is one of the most publicized and researched of the need theories. The importance of Herzberg and his colleagues' (Herzberg, Mausner, & Snyderman, 1959) research is the conceptualization of satisfaction and dissatisfaction as two distinct constructs rather than two values of the same dimension. This theory describes the factors of a job that promote satisfaction and those that promote dissatisfaction (Frase, 1989; Hackman & Oldham, 1975; Herzberg, 1966).

Using data gathered through a methodological approach designed to evaluate critical workplace incidents reported by mid-level, white-collar professionals, Herzberg and his colleagues posited that motivation is a combination of factors that coalesce into attitudes which, in turn, are made evident in and can be measured by their effects. Thus, motivation manifests itself in the factors → attitudes → effects complex implicit in the professionals' self-reports. In other words, to describe motivation in reverse, the effects that can be observed in the workplace emerge as a consequence of attitudes which result themselves from various factors. Thus, motivational factors are concerned with the content of the job itself. Herzberg and his colleagues report that when these factors are not present, no employee dissatisfaction results. However, when they are present, they generate good feelings (satisfaction) and act as motivators. These include: (1) achievement, (2) recognition, (3) responsibility, (4) work itself, (5) advancement, and (6) personal growth and development. Maslow's esteem and self-actualization needs correspond to Herzberg's motivational factors.

In contrast, Herzberg's data suggest that attending to extrinsic factors – what Herzberg call "hygiene factors" – only serves to remove impediments to positive job attitudes (p. 113). Thus, while improving the hygiene factors associated with extrinsic work conditions does increase the probability that workers will be satisfied and failure to attend to these factors will, in all probability, lead to greater dissatisfaction, Herzberg assert that hygiene factors only "satisfy needs, prevent dissatisfaction, and poor job performance but do not motivate" (p. 115). For Herzberg, the implication is clear: "There seems to be good evidence that when workers are forced to seek satisfaction only through hygiene, they must either strike or giving up their motivations" (p. xvii). Herzberg and colleagues (1959) reported eight hygiene factors: (1) salary, (2) work conditions, (3) job security, (4) status, (5) fringe benefits, (6) company policies, (7) quality of technical supervision, and (8) quality of interpersonal relations among peers, supervisors and subordinates. These hygiene factors are similar to Maslow's physiological needs, safety and security needs, and belongingness needs.

Since its development, Herzberg's theory has been used many disciplines including marketing (e.g., Rosenberg & Czepiel, 1984) as well as information systems (e.g., Zhang et al., 1999; 2000; Liang & Lai, 2001) to identify and distinguish factors that lead to customer or user satisfaction or dissatisfaction. For example, in discussing conceptual issues related to consumer satisfaction, Rosenberg and Czepiel (1984) proposed that consumer satisfaction and dissatisfaction should be considered as parallel evaluative scales as earlier proposed by Herzberg. Gill (1996) suggested that user satisfaction with a system could be enhanced through intrinsic motivational factors similar to those identified by Herzberg. Among them are the increased sense of user

control, more task variety, less task routine, and providing capabilities to move task performance to higher levels. Recently, McLean, Smits and Tanner (1996) employed Herzberg's theory to analyze the importance of salary to IS graduates over a four year period. They found that initially, salary is ranked highly; but as time passes, other factors tend to crowd out salary in importance. It loses its role as a motivator; and, as Herzberg suggests, becomes a hygiene factor.

This study also employs Herzberg's two-factor theory with the belief that the underlying goals of creating a motivating Web site are similar to those for creating a motivating workplace: to provide the conditions and environment that maximize user (employee) satisfaction and allow them to focus on and achieve high task performance. Furthermore, if we exchange the consumer for employee, service/good for the job, sale for motivation, the analogy becomes even more striking. If consumer desired service/good is not present, dissatisfaction is created. If it is present, satisfaction is not necessarily guaranteed. If present, the quality of the service and the effort to be expended in the purchase process are soon evoked into expectations, thus potentially creating dissatisfaction if unmet. In addition, Chen and Wells (2000) pointed out that compared with traditional retailing, the Internet offers surfers more abundant choices and more convenient exits from one e-tailer to another; therefore, there are reasons to believe that online satisfaction and dissatisfaction are not equal and opposite – that the facets of dissatisfaction are not necessarily the obverse of the facets of satisfaction. A two-factor model, therefore, might bring new light to understanding online consumer behavior.

The ramifications of such a classification are significant. In today's Internet technology, together with the decreasing cost of computer hardware resources, an

uncountable list of features at a Web site is possible. Unfortunately, a proliferating list of evaluation criteria for Web sites provides little guidance to Web designers as to the relative value of features. Herzberg's two-factor theory could provide a theoretical framework for systematically distinguishing those Web features that supply the functional underpinning of a Web site – the hygiene features – from those that entice users to stay with the Web site and contribute to their satisfaction – the motivational features. The designer's role is to remove dissatisfiers, that is, provide hygiene factors sufficient to meet basic needs and then use motivators to meet higher-level needs and propel consumers toward repeat online purchases and satisfaction.

For example, providing a motivator in the Web environment, such as an appropriate use of humor (e.g., a cartoon), as a design feature may add fun to the shopping process and may motivate the customer to shop and return in the future. Similarly, providing a good search engine may motivate a user because it helps the customer find the desired merchandise easily. Furthermore, the ability of shoppers to "sample" merchandise through features such as product demos can also be considered as high motivators. For example, Mothermall.com provides shoppers the opportunity to assess their motion picture videos by viewing movie trailers. Similarly, Amazon.com and Borders.com allow shoppers to see excerpts from the book as does CDNow.com, which offers the chance to play a part of the music. On the other hand, providing good security and allowing for return of goods may be two examples of hygiene factors.

Previous researchers in e-commerce have employed Herzberg's hygiene-motivational theory in a similar fashion to classify Web interface features. For example, Zhang et al. (1999) classified 13 Web site features as primarily hygiene in nature and 14

features as primarily motivational. Seventeen features were perceived to be both motivational and hygienic in nature. Liang and Lai (2001) added a third factor, media richness[5], which they assumed to be different from hygiene or motivator factors, in their classification of design features. Using Engel, Kollat and Blackwell's 1982 (as cited in Liang & Lai, 2001) consumer choice model as a guide, Liang and Lai listed the design features deemed functionally relevant in supporting customer needs through the stages of the customer buying process. The identified features were then classified as hygiene, motivator, or media richness factors. Their results indicated that motivator and hygiene factors do have an effect on consumer purchase decisions whereas media richness factors showed the least impact on consumer decisions. This study adopts the Zhang et al. (1999) classification method by considering two categories of design features – hygiene, and motivator. The basis for this view is that the third factor of media richness proposed by Liang and Lai (2001), though important, may actually reflect a hygiene or motivator factor. As a speculation, providing, for example, features such as chat rooms, price comparison, voice over IP (VoIP), substitute suggestion, online broadcasting, and special effects (categorized as media richness in Liang and Lai's study) could be classified as a motivator or hygiene factor.

This study differs from the Zhang et al. (2000) study in that theirs is conceptual, and therefore this study may serve as an empirical validation to their classification method. The current study also extends beyond their proposition that hygiene and

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[5] Liang and Lai (2001) defined the media richness factor as those features that add more information channels or richness in information presentation during the transaction.

motivators will directly impact user satisfaction treated as the outcome variable. This study proposed that hygiene and motivator factors influence user beliefs about the site.

Hygiene Factors.

Herzberg found that hygiene factors tend to meet employees' basic physiological, safety, and social needs. Such factors are extrinsic to the job itself and include company policies, supervision, working conditions, salary and so on. If not adequately provided, they contribute to extreme dissatisfaction with work life.

Within the Web environment, hygiene factors are those whose presence make a Web site functional and serviceable, and whose absence causes user dissatisfaction (Liang & Lai, 2001; Zhang et al., 1999, 2000; Zhang & von Dran, 2000;). Some of the categories of hygiene factors are: Privacy and Security, Technical Aspect, Navigation, Impartiality, and Information Content. In their study, Liang anf Lai (2001) further discovered that the most important Web site quality factors ranked by e-commerce consumers were hygiene factors.

As Zhang et al. (1999) point out, some features may fall into both categories of motivator and hygiene, just as some of the factors in Herzberg's study can be considered both hygiene and motivator factors, depending on the individuals and situations. For example, a user who relies on a search engine versus one who relies on navigating through the Web pages to find desired information may evaluate the search engine feature differently. Whereas the latter user may see the search engine as a motivating feature designed to help find information quickly, the former user may view it more of a hygiene feature whose absence or malfunction will result in his/her dissatisfaction with the site. Similar to Zhang et al. (1999), this study proposes that some specific features can

be categorized as core hygiene or core motivator features which are features that will be perceived strongly as either hygiene of motivator by majority of consumers.

Motivator Factors.

Motivator factors are those that add value to the Web site by contributing to user satisfaction (Liang & Lai 2001; Zhang et al., 1999, 2000; Zhang & von Dran 2000). Zhang et al. (2000) identified five categories of motivation factors on the Web comprising enjoyment, cognitive outcome, user empowerment, credibility, visual appearance, and organization of information content. The presence of motivators will enhance satisfaction with the Web site, while their absence will leave users feeling neutral, but not dissatisfied or bothered as long as the fundamentals or hygiene factors are in place.

Before hypotheses are developed with respect to the impact of hygiene and motivator factors on consumer perceptions of the site, it is imperative to discuss the next theoretical framework – uses and gratifications theory – which will lend support to identifying pertinent consumer beliefs about their choice of the Web for online shopping.

Uses and Gratifications Theory and Online Shopping

Communication theorists have used uses and gratifications (U&G) theory in an attempt to explain how individuals use mass media to satisfy their needs (Infante, Rancer, & Womack, 1997). Rafaeli (1986) has put the basic questions underlying uses and gratification theory as: "Why people are engaged in this particular mediated communication or another, and what they get from it" (p. 112).

The use of media, which can take one of multiple roles such as entertainment, relaxation, information, influence, etc., is influenced by the social role and psychological predisposition of the individual actor (Katz, Gurevitch & Haas, 1973). Underlying this are the assumptions that audiences are active and goal-directed, audiences are empowered to link need with gratification choice, and that the media compete with other sources of need satisfaction. Katz et al. (1973) acknowledge that gratification can be obtained from one of three sources, media content, exposure to media per se, and/or social context.

In summary, U&G approaches posit that individuals use particular forms of mass communication to meet specific needs. If these needs are gratified, it is likely that audience members will repeat the experience. The theory distinguishes between categories of audience needs such as cognitive needs, affective or hedonic needs, personal integrative needs, and social integrative needs (see Katz et al., 1973 for details).

In the Web environment, most of these needs can be achieved. For example, since: 1) the Web was created under the spirit of information sharing, early emphases was on cognitive needs. Vast amounts of information about commercial products and services are found on the Web, 2) hundreds of sites are devoted to art, music, theater, and other entertainment resources, thus, hedonic needs are also well represented on the Web. The Web user who is looking for escapism can surf through these pages and undoubtedly find whatever type of entertainment s/he needs. There are many pages that are devoted to fantasy type games and worlds that invite the Web user to become a part of the fantasy through surfing through their pages. Sites such as the Playboy and Penthouse site provide ample diversion for the Web user. Another way that some Web users are able to release tension is by surfing. In other words, just finding out what new and interesting sites there

are on the Web, similar to window shopping in traditional offline shopping. According to the Georgia Tech GVU (1998) study, 61% of Web users use the Web for entertainment, and 51% use it for wasting time. Game playing, music downloading, and chat room conversation results from a desire to fill affective, emotional, or entertainment needs, though some of this interaction is also fueled by social needs.

Recently, a growing body of literature employs uses and gratifications approach to study the Web (e.g., Chen & Wells, 1999; Eighmey & McCord, 1998; Korgaonkar & Wolin, 1999). Similarly, the literature examines motivations and satisfaction of Web use, which is related to uses and gratifications Web research (i.e., Eighmey, 1997). In Eighmey's (1997) profiling of user responses to commercial Web sites, it was found that entertainment value, amount of information and its accessibility, and approach used in site presentation (measured as irritation) account for over 50% of the variance in user perceptions of Web site effectiveness. The current study will adopt the three perceptual antecedents (i.e. informativeness, entertainment, and irritation) as key perceptual variables that can be influenced Web interface features. While Ducoffe's (1995, 1996) studies treat these factors as independent variables, the current study treats them as mediating variables that link the delivery of system design features (hygiene and motivators) with visitor attitudes and behavioral intentions.

Informativeness.

A Web site is informative if it is able to "inform consumers of product alternatives so that purchases yielding the greatest possible satisfaction can be made" (Ducoffe, 1996, p.22). Consumers consider information a major benefit of being exposed to advertising or any type of commercial messages (Ducoffe, 1996). Information is

considered one of the need-satisfying functions derived from media communications, according to the extended uses and gratifications theory (McQuail, 1984; Ducoffe, 1995, 1996). Consumers in the online environment value information just as in traditional advertising. A Jupiter Research study reported that 42% of consumers are most interested in finding detailed specifications on auto-related Web sites, while 23% value side-by-side comparisons (Saliba, 2001). Forty percent of Web surfers are more likely to revisit Web sites that are informative, fast loading, and customizable than those that offer rich media (Vectec, 2001).

Eighmey (1997) finds that Web site users benefit from information that adds value in and of itself. He reports in a pilot study that users of Web sites derive similar benefits to those reported in uses and gratifications studies using television commercials. This study, therefore, hypothesizes that:

H1: Perceived informativeness of the site is

a) positively influenced by motivator factors.

b) positively influenced by hygiene factors.

Entertainment.

Entertainment has been studied in the mass communication field. Mendelsohn (1966), who proposed mass entertainment theory, argues that average people need the relaxation and harmless escapism that television entertainment offers. According to his theory, television and other mass media perform a vital social function in terms of relaxing and entertaining other people. Given that the Internet is a new media affecting our society, perception of entertainment on the Internet is one of the factors affecting the Web site quality (Song & Zinkhan, 2003). A Web site's entertainment value is expected

to be an important source of value for consumers through its ability to enhance the experience of visitors to the site (Ducoffe 1996).

Likable or pleasant advertising like Web sites is considered to impact attitude positively (Ducoffe, 1996; Mitchell & Olson, 1981). Uses and gratifications research indicated that the entertainment value of a commercial exchange lies in its ability to fulfill the audiences' needs for escapism, diversion, aesthetic enjoyment, or emotional release (Ducoffe, 1996; McQuail, 1984). A 2001 Jupiter Research survey found that 36% of respondents said they engage in entertainment activities, like viewing videos, listening to audio, playing fantasy games, and visiting movie or sports sites. In the same survey, animated banner ads and ads that feature sweepstakes or contests would catch the attention of 24% and 21% visitors respectively (Vectec, 2001). They closely follow ads that are informative and those that are content/channel related. The entertainment benefit can also be derived from simply a good execution of a Web site to which visitors are attracted.

According to Eighmey (1997), the successful delivery of a Web site is done through an effective intersection of information and entertainment. His study finds that entertainment value is a significant factor distinguishing highest-rated and lowest-rated Web sites. Hence, hypothesized relationships are:

H2: Perceived entertainment of the site is

a) positively associated with motivator factors.

b) positively associated with hygiene factors.

Similar to informativeness, entertainment value is specific to the individual (Koufaris, 2002). Though one individual might find the initial entrance screen of Coca-

Cola Web site entertaining, another person could find it annoying. Thus a visitor's attitude and behavioral intentions will correlate with such perceived entertainment.

Irritation.

From the marketer's point of view, irritation is an unintended outcome of a Web site (Koufaris, 2002). It can be caused by tactics employed by advertisers that "annoy, offend, insult, or are overly manipulative" (Ducoffe, 1996, p.23), or visitor feelings of confusion, distraction, and messiness due to the way a Web site is presented and features incorporated (Chen and Wells, 1999). In the traditional media, an irritating commercial is one that provokes and causes displeasure and momentary impatience (Aaker & Bruzzone, 1985). D'Astous (2000) investigated various aspects of a retail environment that might irritate and produce negative emotions that would affect the perception of a shopping experience and found the degree of irritation depended on the environmental variables present.

In the Web context, irritation may arise from the negative feelings about the organization of a presentation, a feature of the site, or the visitor's frustration with a design feature. People are often irritated by intrusive television commercials. Intrusive means of information delivery trigger viewer irritation. Twenty-three percent of survey respondents find interstitials[6] so annoying that they will consider never returning to that site (Jupiter Research, 1999). Ducoffe (1995, 1996) finds a significant and negative correlation (-.52) between irritation and advertising value in traditional media and .57 in

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[6] Interstitials are ads that play between pages on a Web site, much like a magazine ad is placed between pages of a magazine. There are several different takes on the interstitial model: some play in the main browser window, while others play in new, smaller windows; some are pre-cached, while others stream ad content as it plays.

Web advertising. Chen and Wells (1999) find a positive (.44) correlation between "organization" and attitude toward a site, where "organization" is measured through the following adjectives: not messy, not cumbersome, not confusing, not irritating. Here "organization" could be seen as nearly the opposite of "irritation." Another frequent source of irritation when visiting a Web site is the time it takes to download pages, especially graphics, and the need to download plug-ins to view certain pages. Sonic sites that require registration before viewing certain content parts may also trigger irritation. This study, therefore, hypothesizes that:

H3: Perceived irritation of the site is

a) negatively associated with motivator factors.

b) negatively associated with hygiene factors.

Technology Acceptance Model (TAM)

The technology acceptance model (TAM) (Davis, 1989; Davis et al., 1989) is employed in this study as a framework in the examination of consumer online shopping intentions based on perceptions developed of the e-store's interface features. As discussed in Chapter 2, TAM draws upon and modifies Fishbein and Ajzen's (1975; 1995) theory of reasoned action (TRA). TAM attempts to explain and predict technology acceptance behaviors. Whereas TRA does not specify which beliefs might be pertinent for technology use behaviors, TAM postulates that two variables – perceived usefulness and perceived ease of use – have great relevance to attitude and eventual technology system use. Davis (1989) defines perceived usefulness (PU) as "the degree to which a person believes that using a particular system would enhance his or her job performance" (p. 985). Perceived ease of use (PEOU) is "the degree to which a person believes that

using a particular system would be free of effort" (p. 985). TAM indicates that perceived usefulness and ease of use will influence an individual's intention to use an information technology. By design, TAM is parsimonious and generic to user technology acceptance decision-making (Hu, Clark, & Ma, 2003). Davis et al. (1989) compared TRA to TAM and found that both theories did a reasonable job of predicting behavioral intentions, but argued that in terms of costs in data collection TAM was clearly easier to use and involved less cost because of availability of a standard instrument that Davis developed.

In spite of its popularity and considerable empirical support, it has been criticized for its parsimony. Venkatesh and Davis (2000) also pointed out the need for a better understanding of key technology acceptance determinants. To address these constraints, several model extension efforts have been attempted. Some incorporated key determinants or antecedents to the perceptual dimensions (Venkatesh, 2000). Others expanded TAM by including constructs from other theories or models (Taylor & Todd, 1995a). At the same time, the analysis of individual technology acceptance has proceeded along several dimensions, including target users (Chau, 1996; Nelson, 1990; Lucus & Spitler, 2000), implementation context (Hu, Chau, Sheng & Tam, 1999), and technology attributes (Chang & Cheung, 2001; Moon & Kim, 2001; Moore & Benbasat, 1991). The collective results suggest that an individual's decision to accept a technology is likely to be affected by multiple key factors or considerations pertinent to the technology, the user, and the organizational context (Hu et al, 2002).

As previously mentioned in Chapter 2, inconsistent findings have been reported by previous research in relation to the role of PU and PEOU. While PU has been consistently found to be a significant predictor in the adoption or use of technology

applications, studies on the importance PEOU have shown mixed results (Gefen & Straub, 2000). Trying to resolve these disparate results, Hu, Chau and Sheng (2001) observed that PEOU might be over emphasized when an individual has limited knowledge about or experience with the technology, but its importance will become less significant as the user continues to use and depend on the technology.

In light of these findings, this study, while using TAM as a framework for the proposed model, excludes PEOU's impact on consumer attitudes toward an e-store, while adding other beliefs that may arise from user or consumer gratification needs which the literature highlights to be of relevance in the Web environment. The perceived usefulness construct is discussed further in the next section.

Perceived Usefulness.

Perceived Usefulness (PU) is defined as the degree to which a person believes that using a system or an application would enhance his or her job performance (Davis, 1989). Specifically, in the TAM framework, perceived ease of use and usefulness have been investigated as variables influenced by external variables such as objective design characteristics of a system. Given that ability to transact is relevant in usefulness dimension, Web site features might improve consumers' transaction process. That is, well-constructed site with features such as convenient order procedure, fast delivery, and good customer support will make transaction process easy and the site perceived useful.

In the context of online shopping, research results have broadly supported the link between the usefulness of a technology application (in this case, interface design features of the Web site) and the attitude toward the site (Chen, Gillenson, & Sherrell, 2002; Moon & Kim, 2001). Some studies have shown that perceived usefulness is positively

related to intention to return, but perceived ease of use is not (Koufaris, 2002). Such studies suggest that the effect of perceived ease-of-use, the second belief construct in TAM, might disappear as users gain experience with using an application. In this respect, the assumption is that perceived ease-of-use will not be on importance in this study because online buyers are assumed to be users that are already familiar with the Web.

System features have been considered as the antecedents of system usefulness (Song & Zinkham, 2003). Many system features such as menus, icons, and touch screen are specifically intended to enhance usability, a component of usefulness. We, therefore, hypothesize that:

H4: Perceived usefulness of the site is

a) positively associated with motivator factors.

b) positively associated with hygiene factors.

Attitude toward the site.

As illustrated in TAM, attitude mediates the effects of belief variables on shopping intentions. Several theoretical perspectives about formation and consequences of attitude offer foundation for this argument. In TRA, attitude is defined as an individual's positive or negative feelings about performing the target behavior (Fishbein & Ajzen, 1975). In TAM, attitude is viewed as a learned implicit response towards a concept or object (i.e., use of technology). Chen and Well's (1999) definition of attitude best fits this study. Chen and Wells (1999) proposed that attitude toward the site indicates the Web users' "predispositions to respond favorably or unfavorably to Web content in natural exposure situations" (p.20).Chen and Wells (1999) developed and tested a scale assessing a surfer's general favorability toward Web sites through a 6-item scale,

incorporating various perspectives that reflect a visitor's positive or negative impressions of a site. A Web site that is high in perceived informativeness, entertainment, and organization (low on irritation) is likely to be appreciated by the site visitor and hence would likely receive a favorable attitude toward the site evaluation, a finding that has been validated by Ducoffe (1996) and Chen and Wells (1999).

Chen and Wells (1999) find a positive (.51) correlation between entertainment and attitude toward a site.

Ducoffe (1995, 1996) finds a significant positive (.65) correlation between informativeness and advertising value in traditional media and (.73) correlation in Web advertising. Chen and Wells (1999) find a positive correlation of .68 between informativeness and attitude toward a site. Based on the preceding evidence from the literature and theory discussions, this study hypothesizes the following:

H5: Attitude the toward site is

a) positively associated with perceived informativeness.

b) positively associated with perceived entertainment.

c) negatively associated with perceived irritation.

d) positively associated with perceived usefulness.

The Concept of Flow

Precisely defining flow and its contributing factors has been difficult for HCI researchers (Finneran & Zhang, 2002), as evident from the various constructs included in major models and the discrepancy of their placement within the models. Hoffman and Novak (1996) propose that flow on the Web is a cognitive stage, experienced during online navigation. According to Hoffman and Novak, flow online is determined by: 1)

high levels of skills and control; 2) high levels of challenge and arousal; 3) focused attention; and 4) interactivity and telepresence. This cognitive state has been characterized as an "optimal experience" that is "intrinsically enjoyable" (Csikszentmihalyi, 1997). Flow comprises the "complete involvement of the actor with his activity" (Mannell, Zuzanek, & Larsen cited in Novak et al., 2000), and is "experienced by people who are deeply involved in some event, object or activity...they are completely and totally immersed in it... Indeed, time may seem to stand still and nothing else seems to matter while engaged in the consumption event" (Lutz & Guiry cited in Novak et al., 2000, p.28). The applicability of flow in IT adoption and use has been investigated by previous researchers (e.g. Ghani, Supnick, & Rooney, 1991; Trevino & Webster 1992; Webster, Trevino & Ryan, 1993) who noted that flow is a useful construct that may help explain human-computer interactions.

With specific reference to the Web, Hoffman and Novak (1996) proposed that creating a compelling commercial Web site depends on facilitating a state of flow for its consumers, and suggest that an important objective for online marketers is to provide for these "flow opportunities" (Hoffman & Novak, 1996, p. 66). Dholokia and Bagozzi (1999) emphasize that the construct is important to online marketers because it underlies what makes for compelling online experience. As such, it has implications for commercial Web site design, online advertising, market segmentation, and Internet marketing strategies (Novak et al., 2000).

In the online environment consumers who achieve flow on the Web and perceive the online experience to be compelling are so acutely involved in the act of online navigation that thoughts and perceptions not relevant to navigation are screened out, and

the consumer focuses entirely on the interaction (Novak et al., 2000). Concentration on the navigation experience is so intense that there is little attention left to consider anything else and consequently, other events occurring in the consumer's surrounding physical environment lose significance. Self-consciousness disappears, the consumer's sense of time becomes distorted, and the state of mind arising as a result of achieving flow on the Web is extremely gratifying.

It is important to note that this study is concerned with the consumer's perceptions gathered of a Web site in terms of gratification needs such as informativeness, entertainment, and usefulness, and thus, the pursuance of these needs online may result in the experience of flow. Indeed, the Web is a major resource for information seeking, problem solving, and entertainment. For example, today a Web browser can provide features to read and send e-mail, retrieve and post in newsgroups, download and upload files, thus solving a communication problem. But the Web also facilitates creation or playing of games, broadcast or receive broadcasting, listen to audio clips or create audio clips, create movies or watch video clips, and chat with friends or converse verbally via Internet telephony. That is, the activities in the Web environment can no longer be defined as merely 'navigating via hyperlink', 'surfing on the Net', or 'searching for information' (Chen, Wigand & Nilan, 1999). According to the flow theory, if these pre-conditions do not exist, it is unlikely that a Web user would experience flow in that Web activity. Therefore, the belief in this study is that consumers in the online environment who are deeply engrossed in a site that is entertaining, informative, or perceived useful in any other gratification sense may experience flow. They are so acutely involved in the act of online activities that thoughts and perceptions not relevant

to navigation are screened out, and the consumer focuses entirely on the interaction. Concentration on the navigation experience is so intense there is little attention left to consider anything else; consequently, other events occurring in the consumer's surrounding physical environment lose significance. On the contrary, if the site is found irritating, a user may simply browse to other sites or leave the Web entirely, with no impact on flow. Therefore, this study argues in the following hypotheses that:

H6: When flow is experienced it is,

a) positively associated with perceived informativeness.

b) positively associated with perceived entertainment.

c) negatively associated with perceived irritation.

d) positively associated with perceived usefulness.

e) positively associated with attitude toward the site.

Hoffman and Novak (1996) provided, but did not empirically test, a conceptual model of flow that details its antecedents and consequences. They proposed that flow is essential in understanding consumer behavior in online environments such as the Web.

Online Behavioral Intentions

Attitude theories suggest that people who hold positive attitudes toward one behavior will be more likely to display that behavior. For instance, in social psychology the TRA demonstrates the causal relationship between attitude and behavioral intentions (Fishbein & Ajzen, 1995). According to TRA, a person's behavior is determined by his/her behavioral intentions, which in turn is determined by a person's attitude concerning such a behavior. Additionally, in IS literature, a person's intention to revisit a site is seen as a result of his/her attitude toward using a technology that a person intends

to use again in the future (Koufaris 2002; Koufaris & Hampton-Sosa, 2002). In the online environment, Song and Zinkhan (2003) identified behavioral intentions as: repeat purchases; repeat visits to the Web site; recommendation of Web site to others; and positive remarks or comments about the Web site. This study focused on the most commonly referred to online behavioral intentions – intention to purchase and intention to return – as these relate more to an e-store and have been corroborated in several studies. The two behavioral intentions considered in this study are discussed next.

Intention to Return.

Repurchase rates and amounts are a critical driver of future profits (Hof, 2000), but repeat rates are often disappointingly low. Ensuring that customers return is one of the primary goals of almost all companies and the same applies for Web-based companies. Benefits of repeat customers are multiple. Customer satisfaction is a major contributor to repeat business, and repeat business is the key to low cost high profitability Web sites. The longer customers are retained by a company the more profitable they become due to increased purchases, reduced operating costs, referrals, price premiums, and reduced customer acquisition costs (Reichheld & Sasser, 1990). According to International Marketing Center (IMC), an Internet marketing company, some ways in which Web sites can increase customer satisfaction include 1) increased responsiveness, 2) feeling of community or common interest 3) feelings of personalized service or attention, and 4) 24/7 communication (IMC of California, 2002). With Web site features, IMC suggests that features that contribute to increased customer satisfaction include FAQs, call back features, VoIP, on line chat, video chat, chat rooms, and e-zines. Amazon.com's book-selling operation is now profitable, and repeat purchases comprise

over 70% of its sales (Hof 2000). Repeat buyers account for over half of online sales, with 53% of revenue in 2001, up from 40% in 2000 (BCG, 2002).

Nonetheless, customer loyalty is a challenge to Web-based companies. For example, in a survey by yahoostore.com, a store-hosting service company, over 85% of stores received fewer than 10% of their orders from repeat customers (Anonymous, 1998). As one industry figure noted, Internet marketers might spend $45 to acquire a customer who generally spends $35 and never comes back (Bulkeley & Carlton 2000).

Clearly, understanding why customers return to a web store after their first visit is important. For a Web site, the interface features that help shape consumers' beliefs and attitude toward the site, formed after his/her initial visit, provide the incentive for his/her return to the site in the future. This exploration behavior may have additional influences on her/his intention to return. Such an intention may be affected by the perceived informativeness of the site, the enjoyment experienced by the visitor, the usefulness of the site, or the usefulness of a particular feature of the site. This study adopts this measure as an important indicator of the overall effectiveness of a site.

Lotz, Eastlick, and Shim (2000) studied the similarities and differences between mall entertainment seekers and mall shoppers and found that an individual mood state (cf. state of flow) determined by skills, challenge, freedom of choice, and intrinsic and extrinsic motives, influenced their choice over entertainment participation versus shopping participation. Koufaris and Hampton-Sosa (2002) examined the impact of consumer experience and attitudes on intention to return and unplanned purchases on-line. They also examined how certain consumer and Web site factors influence the on-line consumer experience. Their study finds that dimensions of flow – perceived control,

and shopping enjoyment – can increase the intention of new Web customers to return, but seemingly do not influence repeat customers to return. Specifically, this study hypothesizes that:

H7. Intention to return to the Web site is

a) positively related to attitude toward the Web site.

b) positively related to extent of flow experienced at the site.

Intention to Purchase.

Ultimately, marketers are interested in outcomes, and the ultimate outcome is purchase (Novak & Hoffman, 1997). As Stephen Klein of I/Pro noted, "One hundred thousand people going to a site is worth something, but a site that only five people visit can be worth more if they are the right five people" (Murphy, 1996, p.38).

Existing consumer research has shown much evidence in the relationship between brand attitude and purchase intentions (Brown & Stayman, 1992). Recent studies examining Web site quality have demonstrated that users' Web site satisfaction is directly related to purchase intention (Chaudhuri & Ray, 2003). While intention to revisit a site is more narrowly focused on the Internet medium, intention to purchase is applicable to both traditional media and the Internet. Based on such evidence of purchase intention as a significant predictor of purchase behavior (Fishbein & Ajzen 1975; 1995; Davis, 1989; Devis et al., 1989), this research treats intention to purchase as another effectiveness measure of a Web site, and hypothesizes that:

H8. Intention to return to the Web site is

a) positively related to attitude toward the Web site.

b) positively related to extent of flow experienced at the site.

A Priori Structural Models

The hypotheses presented above represent a structural model referred here as *a priori* structural model 1 (Figure 4). Following the literature and theoretical frameworks, two other *a priori* structural models (Figures 5 and 6) are developed. All the three models have theoretical bases and attempt to uncover interface design factors – hygiene and motivators – contributing to perceived informativeness, entertainment, irritation, and usefulness (perceptual dimension), which in turn explain visitor or consumer attitude toward the site and flow experienced at the site (attitude and interactive dimensions). The attitude and interactive dimensions directly impacts intention to revisit, and intention to purchase products or services presented at the site.

The three proposed *a priori* models differ in the interrelationships among the constructs as suggested by the literature. Whereas *a priori* Model 1 (Figure 4) suggests a direct relationship between all four belief constructs (entertainment, informativeness, usefulness, and irritation) and attitudinal and interactive dimensions (attitude toward site and flow), Model 2 (Figure 5) suggests that usefulness mediates the interaction between entertainment, informativeness and attitude/interactive dimensions. Model 3 (Figure 6) also differs in presenting flow to mediate the interaction between attitude toward the site and purchase intentions.

A Priori Structural Model 2

Previous sections have discussed the developments that led to *a priori* Model 1. In this section the justifications for alternative structural models are presented. First, the role of perceived site usefulness (PU) is always a major concern (Venkatesh & Davis, 1996). According to Davis (1993), though lack of human friendliness can hinder user

acceptance, perceived usefulness is not primarily about design choices – it's about cognitive understanding and retention: "No amount of ease of use can compensate for a system that doesn't do a useful task" (p. 479). As discussed in Chapter 2, PU has consistently been found to predict IT adoption across many IT applications. This implies PU plays a central role as a belief construct. Lederer and Maupin (2000) demonstrate that information quality predicts usefulness for revisited sites. Wu and Fam (1999) investigated perceived usefulness as multidimensional construct comprising information, entertainment, and interactivity. In addition, in TAM, PEOU is proposed to predict PU (Davis, 1989). Therefore, recognizing this central role and importance of PU, *a priori* Model 2 proposes that PU is a criterion variable of perceived informativeness, entertainment, and irritation (Figure 5).

A Priori Structural Model 3

It does appear that in the case of commercial Web sites, if a Web site is well liked (positive attitudes), some visitors to the Web site may be more receptive to the Web site's features and contents, including its product offerings and, therefore, are likely to experience the state of flow while at the site. This proposition is supported by studies conducted by Stevenson, Bruner and Kumar (2000). Studies by the latter researchers provide evidence to suggest that the more a Web site is liked, the more positive the influence on its patronage. Similarly, the literature shows that flow is positively related to expected future computer interactions (Webster et al., 1993). This suggests that flow is directly positively related to future visits to the web site. Indeed Rice's (1997) survey of 87 Web sites found that an enjoyable visit (a dimension of flow) was a key determinant of whether a customer would return to the site. Furthermore, whereas perceived

usefulness has been found to strongly influence the intention of Web usage (behavioral intention), attitude did not (Wu & Fam, 1999). Therefore, *a priori* structural mode 3 proposes that flow experienced at the Web site mediates attitudes toward the site and behavioral intentions to purchase and revisit (Figure 6).

As discussed earlier, the hypotheses presented in the preceding sections relate to *a priori* model 1. The hypotheses related to *a priori* models 2 and 3 are depicted in Figures 5 and 6. The direction of influence between constructs and the sign of the relationship are indicated by the arrows and positive/negative symbols respectively.

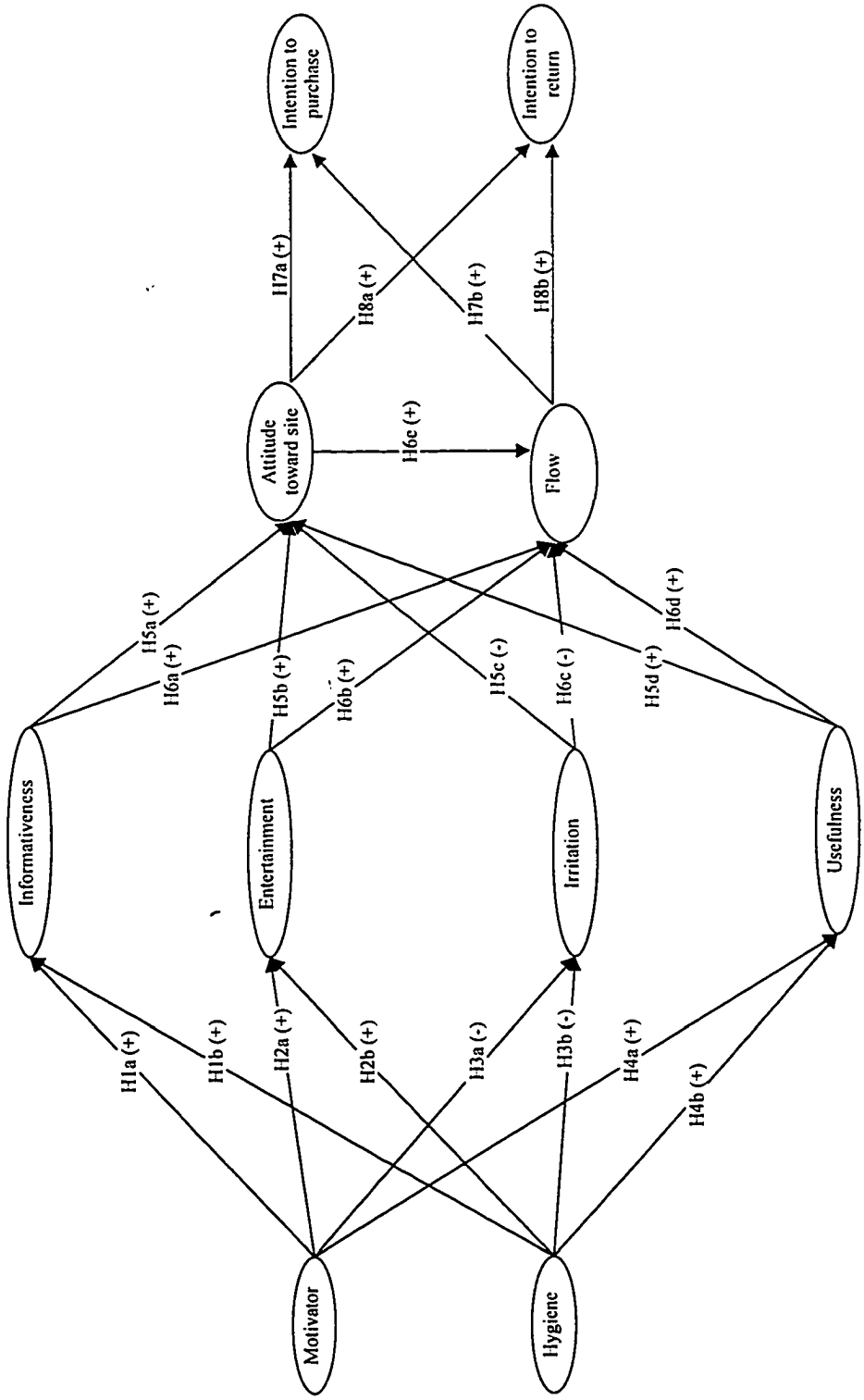


Figure 4. A Priori Structural Model 1

Figure 5. A Priori Structural Model 2

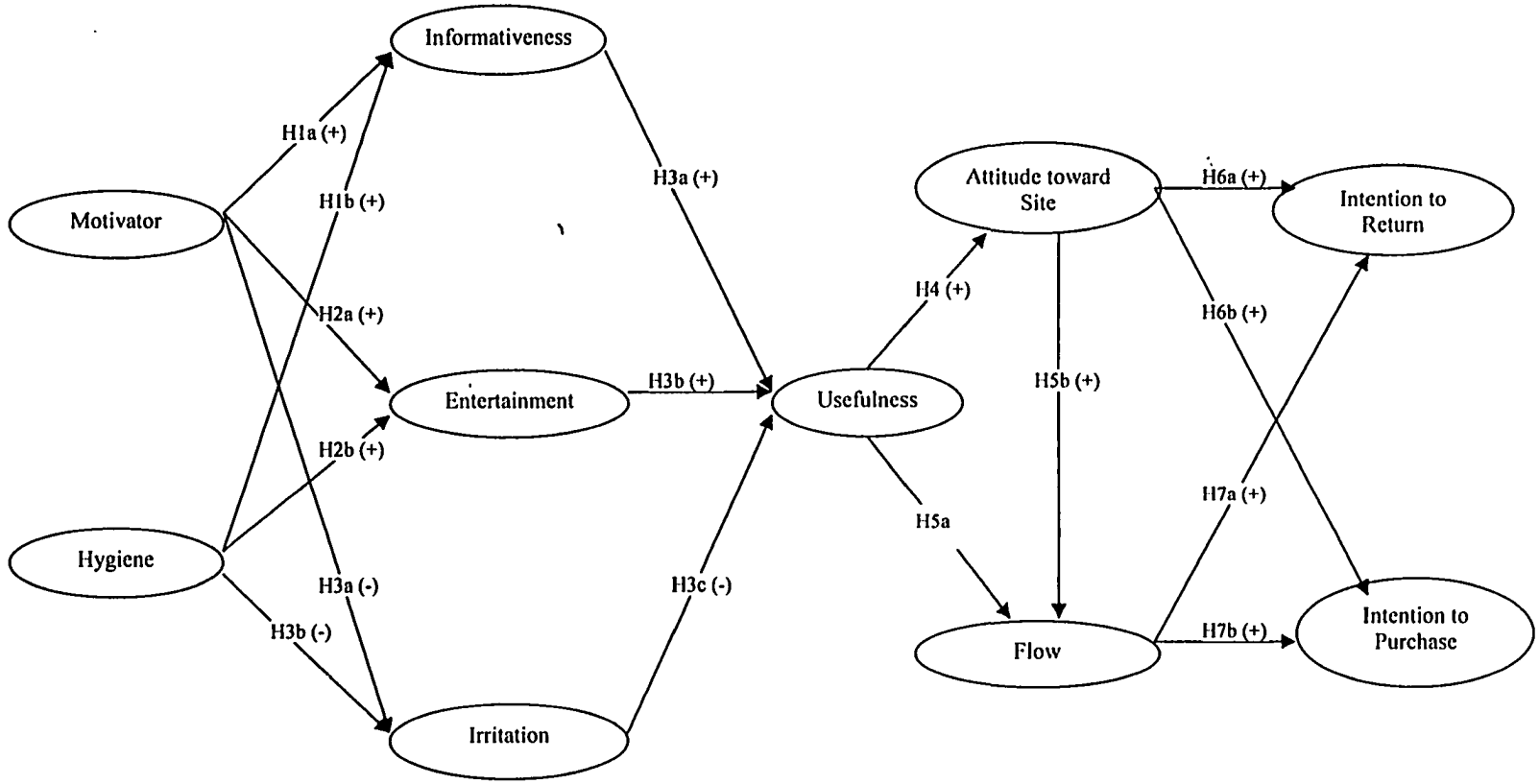
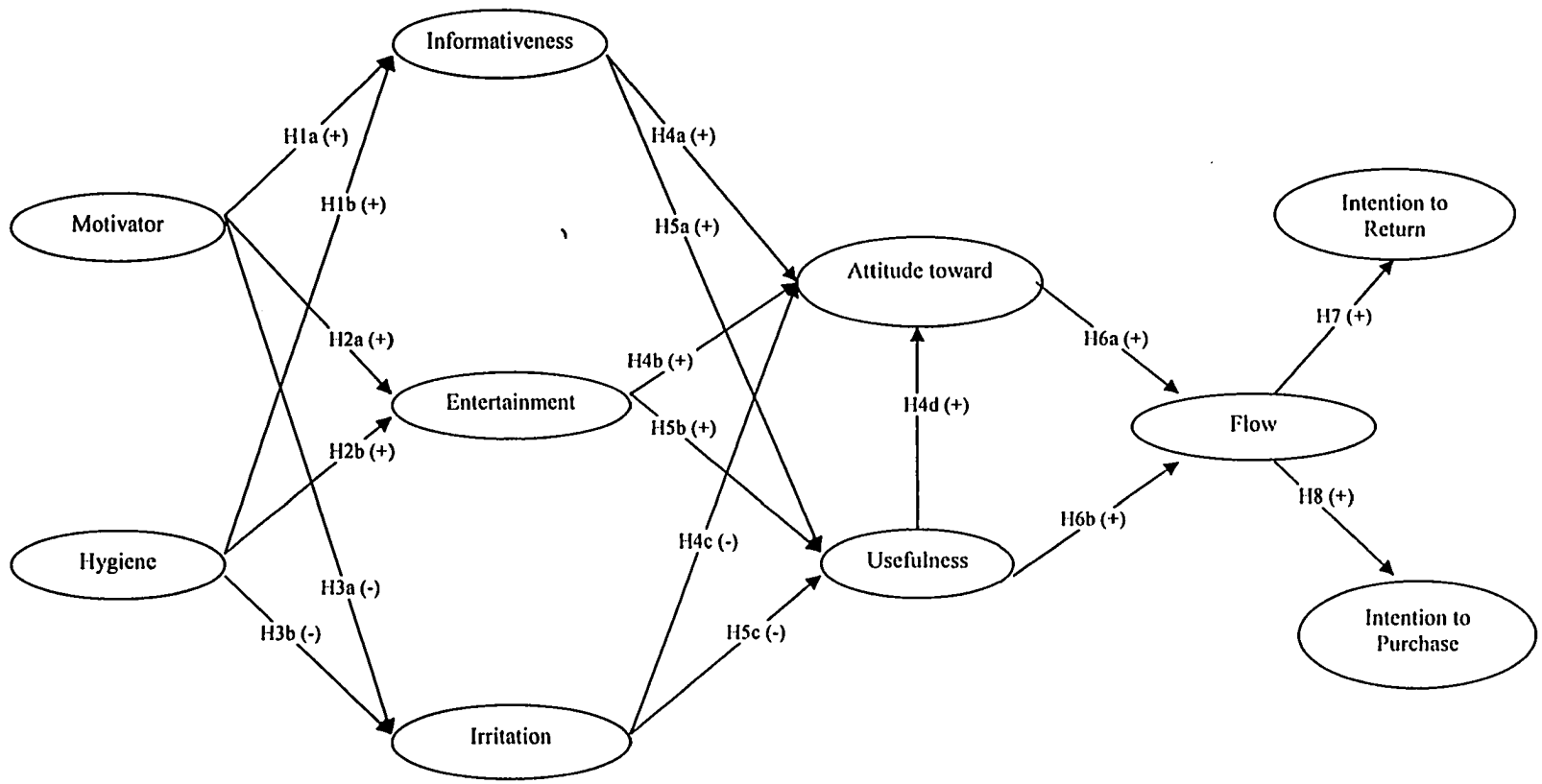


Figure 6. A Priori Structural Model 3



Control Variables

The main outcome variables – intention to purchase and intention to return – are likely to be influenced by several other variables other than those explicitly hypothesized in this research. The literature review suggests that brand familiarity, Web experience, and demographics of consumers who use a Web-based store are critical interfering variables that have the potential to affect online behavioral intentions.

Demographics.

As indicated in the literature review section, while earlier research has shown that user demographics impact usage of the Web, recent studies suggest the Information Superhighway is becoming more demographically mainstream. New online users are more likely to be female, middle aged and come from lower socioeconomic backgrounds than more established users (SIQSS, 2000; Pew Research, 1999). However, according to a National Telecommunications and Information Administration (NTIA) (2002) annual report, gender difference in Internet use disappeared. Since August 2000, males and females have had virtually identical rates of Internet use. In September 2001, the Internet use rate was 53.9 % for males and 53.8 % for females. However, women, from approximately age 20 to age 50, were more likely to be Internet users than men, and from about age 60 on, men have higher rates of Internet use than women (NTIA, 2002). According to Kaye and Johnson (2002), demographics may have less influence on Internet gratification. Kaye and Johnson discovered that only one demographic variable, education, was linked to motives for using the Web. Those who were highly educated

relied on it less to satisfy political guidance, information, entertainment or social utility needs than less educated individuals.

Nevertheless, the study intends to collect and compare demographic data amongst Web users. Even though the literature results are mixed, the general indication is that age, income, education, and gender are demographic variables that may determine consumer behavior on the Web.. Any possible differences that might be explained by them will be examined in this study.

Site Loyalty.

Consumer loyalty can represent either a consumer's desire to return to a particular Website (vendor or site loyalty) or his desire to purchase a particular product (product loyalty). Here, this is interpreted as site loyalty. Site loyalty concerns how favorable consumers' attitudes are towards the firm (ActiveMedia Research, 2000). According Active Media Research (2000), loyal purchasers are predisposed. They ignore competing advertising claims because they aren't in an evaluative, comparative frame of mind. Loyal purchasers don't stop to compare products or vendors for the lowest price before buying. Two of every three sales are made to buyers who had predetermined which vendor they were going to visit before they go online. Supphellen and Nysveen (2001) find that brand loyalty positively affects both attitudes towards the site and intentions to revisit the site. In the online environment, Yoo and Donthu (2001) suggested site loyalty as a possible mask to site evaluation. Online merchant brand reputation is positively associated with consumers' trust in an Internet shopping site (Quelch & Klein, 1996). Therefore, online merchant brand image will affect consumers' judgment of Web site quality. In other

words, site loyalty may mask effects that are otherwise attributable to Web site characteristics.

Web Shopping Experience.

Familiarity with the Web facilitates the navigation and search behavior of the user. Such a skill is considered one of the most important antecedents to flow (Hoffman & Novak, 1996; Koufaris, Kambil, & Labarbera, 2001; Taylor & Todd, 1995b; Trevino & Webster, 1992; Webster et al., 1993). Lack of Web skills may inhibit a visitor from exploring a Web site to its fullest extent. Such skills arise from the extent of Web related experience a user accumulates.

Novak, Hoffman, and Yung (2000) found that Internet skills are positively related to how long a consumer has used the Internet. Moreover, they found that consumers who have used the Internet for longer periods of time were more likely to use the Internet for task-oriented activities, such as looking for reference material or product information, conducting research, and shopping as well as entertainment. Cyber Dialogue (2001) reported that roughly 34% of adult men and women in the U.S. will make an online purchase if they have previously browsed for the item.

However, contrary to the effect of skills, consumers with more shopping experience on the Internet may have already adopted an efficient way of shopping online, such as using only limited interactive functions important for the shopping task. This expectation is in fact consistent with previous findings that as consumers become more experienced, their information search shifts from an extensive manner to a simplified one (Howard & Sheth, 1969). It is likely that experienced Internet shoppers may not explore the web sites as much as those who are less experienced, and thus, may not be impacted

by the presence or absence of some interface features. In a 2002 study, it was found that very experienced Internet users spent the largest percentage of their time dealing with e-mail, browsing, professional work, news, and schoolwork at levels that have remained relatively constant during all three years of the survey. New users also spent the largest percentage of their time with e-mail and browsing, followed by searching for medical information, entertainment information, and professional work (UCLA Center for Communication Policy, 2003).

Product Involvement.

Consumer product involvement is an important factor that affects the consumer decision process. Consumer involvement in the product is the consumer's perceived relevance with the product based on incurred needs, values, and interest (Zaichkowsky, 1995). Marketing literature shows that consumers put the effort to form their attitudes proportionate to their involvement with the product (Petty & Cacioppo, 1986). Depending upon the level of involvement in the product and the extent of decision making, the consumer's effort engage in the five mental steps (i.e. need identification → information search → evaluation alternatives → purchase → post-purchase evaluation) may vary (Boyd & Walker, 1990). For example, high-involvement, complex-decision purchasing of products (e.g., homes, cars) requires a complex decision process that involves extensive information search and alternative evaluation.

The basic approach in this research is to view the consumer decision as involving information processing. According to Betmann (1979), the consumer interacts with his or her choice environment, seeks and takes in information from various sources, processes this information, and then makes a selection from among some alternatives. The notion

of bounded rationality proposed by Simon (1957, as cited in Bettman et al., 1988) is in response to the realization that humans have limitations in processing information (Bettman et al., 1998). That is, due to bounded rationality individuals are often unable to evaluate all available alternatives in great depth for making a choice in a complex environment of decision making (Beach, 1993).

Specific to the Internet shopping environment, Yoo and Stout (2001) found that consumers with a high level of involvement tended to have more "intention to interact" with a Web site. Consequently, consumers with high involvement may engage in a more extensive search and try out more interface features on a Web site than their low involvement counterparts.

Desire to Purchase.

Traditionally, consumer *demand* is considered to be a function of a person's ability and willingness to buy a quantity of a good or service (e.g. Eastwood, 1997). The former depends on the money budgeted and prices, and the latter, which is applicable in this study, is derived from a consumer's preferences for the goods and services. In other words, willingness to buy is the likelihood that the buyer intends to purchase the product.

According to research findings buyers' willingness to buy is positively linked to their overall evaluation of the deal (Della, Monroe & McGinnis 1981; Grewal, Monroe & Krishnan, 1998). Since online shopping is still in the early stage, the purchase intention component of the model may be affected by willingness to purchase instead of just the effects of design features only. Furthermore, early preference patterns of innovators were shown to be predictive of actual decisionsof innovators (Midgley & Dowling, 1993).

Recognizing that a store visit is motivated by purchase needs and the desire to acquire product information, this study introduced a shopping task process in the data collection process (discussed in the next chapter). Survey participants are asked to simulate an online shopping experience for a specific product at selected Web sites. Various attributes of the product are given for which they will use as a guide in their product search. This procedure, thus, ensures a motivation in the desire to find the product. Nonetheless, this study also measured product involvement, since its effects could impact consumers perceptions of interface features.

Chapter Summary

This study focuses on the effect of system interface design features on consumer behavior in the e-commerce environment. Specifically, unlike prior research, which has examined only one aspect of design features, this study provides a more comprehensive conceptual classification of design features into factors based on theory. In other words, in contrast to most previous research which have regarded beliefs about systems as an independent antecedents of attitude, this study posits four belief dimensions (informativeness, entertainment, irritation, and usefulness) as mediating variables between system design features and flow experienced and attitude towards the Web site. Three *a priori* structural models proposed with causal linkages among the independent, mediating, and outcome behavioral intention variables within the Web environment, indicate nomological validity of the constructs by situating them within various theories.

CHAPTER IV

METHODOLOGY

The purpose of this chapter is to describe the empirical aspects of the research study. The major sections in this chapter comprise of detailed description of research design which involves the: a) classification of Web features (Phase I), and b) testing the effects of the design features on consumer online purchase intentions stipulated in the *a priori* structural models (Phase II). First, the research design is presented and highlighted the two-phase process employed in the research project. Second, the methodology process of each phase is then discussed. For each phase, the sample description, data collection procedures, validity issues, and data analysis are presented.

Research Design

The research design process comprised of two phases; first, to identify and classify Web site interface features, and second, to test the proposed *a priori* structural models. The goal in phase I is to help us established constructs in terms of Web interface features. Phase II builds on the first study and employs a survey questionnaire instrument to collect data to test the *a priori* structural models. As such, the instrument's development and refinement are first assessed in a pre-test before collecting the final data for hypothesis testing.

The study utilized a cross-sectional survey data in both phases. These data reflect the perspective of consumers regarding the influence of Web interface features on their intentions to purchase online and revisit the Web site. A further discussion of these studies is presented below.

Phase I. Classification of Design Features

Phase I addresses question 1 of the study – whether design features can be categorized into meaningful and manageable classes. The features were selected based on an extensive survey of existing Web usability, Web design guidelines/checklists, and e-commerce literature (Chen & Wells, 1999; Liang & Lai, 2001; Lohse & Spiller, 1998; Zhang & von Dran, 2000, Zhang et al., 1999, 2000). The features were then classified into two differentiating groups as proposed in Hersberg's two-factor theory. The final intent of this phase of the study is to identify *core features*[7] that can be used to represent hygiene or motivator factors proposed in the *a priori* research models.

Sample Utilized for Classification of Web Site Features

Undergraduate students of a major Texas university were contacted to participate in the survey for extra credit. A total of 121 of 137 enrolled students returned signed consent forms (that contained the purpose of the survey) agreeing to participate, thus, giving a response rate of 88.2%.

In particular, the use of students at this stage of the study was necessitated by a need for subjects with an understanding of Herberg's two-factor theory. Prior pilot testing

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[7] That is, given a feature, the majority of survey participants would classify it into a certain category.

suggested that subjects' understanding of the concepts of hygiene and motivator factors at the work place setting presented in Herzberg's two-factor theory is not easily understood. Thus, this study found it appropriate to use a classroom setting where concepts were first explained before executing the survey. The subjects were then selected to participate based on their understanding of the theory. Nonetheless, in later analysis, the results found with the student sample are validated with a more representative sample of online consumers. This is covered in Phase II of the study where a pilot test is conducted using a convenience sample of consumers.

To begin, demographic information was collected from the 121 student subjects (see Table 2). From the demographic results, the subjects were divided into two teams based on their level of Internet skills. Team A, referred to as "experts", was composed of students who rated their Internet skills as *good* or *excellent*. Team B, referred to as "novice" was comprised of students who rated their Internet use skills as *fair* or *poor* (See questionnaire in Appendix A). The study further investigated subjects understanding of Herzberg's two-factor theory. This prescreening exercise resulted in 87 students who were retained to participate in the classification of features survey.

Data collection from both teams took place in the same week of July, 2003. Thirty eight of 53 students experts completed the survey involving interface feature classification. The novice team was composed of 68 students of which 49 completed the survey. Thus, a total of 87 students undertook the classification of features exercise.

Table 2

Sample Demographics (Phase I)

Variable	Frequency	Percent	Variable	Frequency	Percent
Gender			Education	19	16.1
1. Male	49	40.5	1. HS or less	61	51.7
2. Female	72	59.5	2. Some College	32	27.1
			3. College Degree	6	5.1
Income			4. Grad degree		
1. <$10K	44	36.4			
2. $10K-19.999K	19	15.7	Internet skills	19	13.2
3. $20K-29.999K	23	19.0	1. Poor	60	21.5
4. $30K-49.999K	24	19.8	2. Fair	26	49.6
5. $50K-74.999K	6	5.0	3. Good	16	15.7
6. $75K-100K	4	3.3	4. Excellent	-	-
7. >$100K	1	0.8			
			Online shopping experience		
Ethnicity	1	0.8	1. Never	36	29.8
1. Asian	2	1.7	2. 1/year	39	32.2
2. Black	7	5.8	3. 1/3months	32	26.4
3. Caucasian	107	88.4	4. 1/month	10	8.3
4. Hispanic	4	3.3	5. 1/week	3	2.5
5. Other	-	-	6. >1/week	1	0.8
Age					
1. Less than 18	1	0.8			
2. 18-30	66	54.5			
3. 31-45	36	29.8			
4. 46-60	17	14.0			
5. Over 60	1	0.8			

The benefit of segregating subjects by Internet skills ensured a comparison between novice and expert users in their evaluation of interface features. Literature indicates that there are varied needs of experts and novices on the Web (Navarro-Prieto, Scaife & Rogers, 1999

The sample was skewed toward females, lower income, but fairly educated Web users. The sample is predominantly Hispanic (88.4%). About 70% of the subjects had shopped online. Although this sample clearly is not representative of the population at large, the sample profile, with the exception of ethnic composition, does correspond with currently identified typical students (Shop.org, 2003).

Data Collection Procedure in Phase I

In their study of a two-factor model for Web site design, Zhang and colleagues constructed a list of 74 features in the Web environment (Zhang et al., 1999; 2000). This study adopted their list of features as a starting point. Their list of features was refined by comparing it with several existing Web checklists, resulting in a deletion of redundant items and addition of new ones. The final list contained 60 features (see Appendix A). To ensure clarity, the refined list of features was examined by two faculty members in MIS and Marketing, and two IT professionals who were familiar with commercial Web sites, and experienced Web users.

Given the exploratory nature of this study, a technique similar to "structured concept mapping" was employed in the data collection in Phase I. Developed by William Trochim (1989), concept mapping is a "type of structured conceptualization" that allows participants form a "concept map", comprising the domain of a construct (Trochim 1989,

p. 2). In employing this technique in this study, each feature in the list was classified as either a motivator (satisfiers), hygiene (dissatisfier) or (hygiene), or unclear.

Before participants undertook the survey on classification of features, they were first asked to provide demographic information, including gender, age, income, Internet and online shopping experience, and education (Table 2). An email field was also included to check nonresponses and to assign credit reward.

Prior pilot testing suggested that subjects' understanding of the concepts of hygiene and motivator factors presented in Herzberg's two-factor theory was not easily understood. Thus, this study found it appropriate to use a classroom setting where concepts were first explained before subjects' completion of the survey. To this end, the researcher introduced and explained Herzberg's two-factor theory at the work place in class. A quiz (see Appendix A) was then given to determine subjects understanding of the concepts. Students who scored less than 60% in the quiz were deemed ineligible to take part in the "concept mapping" of the Web features.

Finally, in order to refresh subjects' memory of Web site features commonly encountered in an online shopping environment and to stimulate a shopping desire, subjects were directed to either of two online shops (www.landsend.com or www.dell.com) where a shopping task was simulated. The justification for using these Web sites stem from various reasons: Aside from their varied Web site designs and presentation of diverse interface features, these two sites are considered to be among the top raking performance e-tailers by several rating infomediaries (e.g., Gomez.com, 2000; Forrester Research, 2000; Consumer Reports 2001; Alexa.com, 2003).

Dell (Nasdaq: DELL) designs, develops, manufactures, markets, services and supports computer systems and related equipment, including workstations, desktop systems, notebooks and network servers, as well as software, peripherals and service and support programs. At Dell.com, you can configure and purchase your computer (desktops/laptops and servers) online, use a toll free number, email, or use a chatroom as a means to contact customer support representatives, or track your orders through the site page until you receive them. Landsend (NYSE: LE) sells clothes geared towards casual and the outdoors. At landsend.com, an innovative feature is the ability to create your own virtual model, then shop for clothes to fit the model. Furthermore, choice of the sites is also partly because of the growing popularity of online shopping for products other than consumer nondurables. Taking into consideration that the frequently shopped products are consumer durables (e.g., electronics, clothes) (Vertis, 2002), this study chose sites that sell such products so that quality and performance information represent an important decision criterion. According to an AOL/RoperASW (2002) cyber study the items among the e-commerce leaders include clothing/apparel (36%); computer hardware/software (32%); auctions (24%); concert or movie tickets (28%); CDs/DVDs (27%). Less popular were book downloads (10%); home-delivered groceries (4%); stamps (2%); and pet food (2%). Aaker and Stayman (1992) find that the relationship between perceptual antecedents and attitude is stronger for products other than consumer nondurables (e.g., snacks and drinks). They also find that the strength of the relationship tends to be stronger on novel products than on familiar products. The choice of using consumer durables as stimuli also enables a proper analysis of Web features such as animated product demos. A consumer would be more interested in looking at a three-

dimensional commodity from several different angles (e.g., front, back, side views) than a bottle of coke or a bag of potato chips.

Shopping Task Simulation

The Internet was used as the data collection tool. In usability studies, users are examined either by talking/observing real users using the real product as they perform real tasks (usability testing) or surveys users after they perform their own tasks (customer satisfaction type measures). The current study inclines to the latter method.

Each participant was directed randomly to either www.landsend.com or www.dell.com. At Dell, subjects were asked to shop for a customized laptop computer that would meet certain computer needs (e.g. memory and harddisk size, CPU, etc) and cost between $1,500 and $2,500. At Landsend, participants were told to shop for a pair of "wear to work" clothes that costs between $150 and $250. Participants were seriously warned that this was a simulation; therefore, any actual shopping costs will not be reimbursed. Participants were asked to spend about 20 minutes developing an understanding of each site's characteristics and completing the shopping simulation task. After the shopping simulation, subjects were asked to return to the online survey questionnaire for completion. To ensure a smooth transition between the shopping and questionnaire sites, the URL of each online store (http://www.dell.com and http://www.landend.com) was coded to launch in a different Web browser.

Before deploying the online survey questionnaire, the pages were tested thoroughly to ensure that they appear properly with different Web browsers. To ensure that respondents answer all appropriate questions, JavaScript programming was added to the electronic survey to verify and perform all necessary checking of a user's input before

the survey is submitted. For example, if the respondent omitted answering certain questions, a dialog box would direct users to backtrack, correct the problem, and resubmit the data. An open-ended question was also included which asked participants to list any relevant feature(s) which was missing in the list that was provided.

Validity and Reliability Assessment

Content validity was pursued by following Churchill's seminal work (1979). First, the domains of the constructs were identified from comprehensive literature review. Most of the items generated for the Web interface features are adapted from different sources including Web design guidelines, software design checklists, and previous studies related to Web features and these constructs. In addition, the feedback obtained from 4 faculty members in marketing and MIS, 5 Ph.D. business students and two IT professionals helped ensured that the items are representative of Web interface features. These informants were asked to comment on both their understanding of the features listed and their belief that the features listed in the survey were related to Web interface features online shoppers are likely to encounter during their shopping tasks. Based on this review, several changes in wording and deletion of redundant listings were made. Thus, the final instrument of the 60 features were what informants felt substantially cover the domain of Web interface features in online shopping context. Further components of construct validity were examined in Phase II of the study.

After classifying features into the categories of hygiene and motivator, reliability is assessed by examining inter-rater reliability between subject groups of novice and experts as previously discussed. Inter-rater reliability (also called inter-observer reliability) traditionally refers to how well two or more raters (or coders) agree and is

derived from the correlation of different raters' judgments. For the purposes of this paper, inter-rater reliability was assessed as a measurement of how well 'novices' and 'experts' agree with their classifications of design features.

Some investigators use the percent agreement as a measure of inter-rater reliability. This measure is the ratio of the number of times the raters agree (A + D) divided by the total number of subjects studied, N, (i.e., Inter-rater Reliability = (A+D)/N). However, this method is criticized for not taking into account the possibility of agreement by pure chance (Haley & Osberg, 1989; Topf, 1986). Thus far, the statistic that has been employed almost exclusively in the evaluation of interrater agreements is Cohen's Kappa (Cohen, 1960). According to Emam (1998), Kappa (κ) statistics are appropriate for testing whether agreement exceeds chance levels for categorical ratings. Its calculation is given by $\kappa = (P_o - P_e)/(1 - P_e)$. P_o is the proportion of ratings of ratings upon which the teams agree, and P_e is the extent of agreement that is expected by chance (Emam, 1998). When there is complete agreement between the teams, P_o's value is > 1.

In addition, the study also employed cluster analysis for validation purposes. Cluster analysis is an exploratory data analysis tool for solving classification problems. Its objective is to sort cases (people, objects, events, etc) into groups, or clusters (Ketchen & Shook, 1996). Each cluster thus describes, in terms of the data collected, the class to which its members belong. Ward's method of hierarchical cluster analysis was used for this purpose as it effectively minimizes intra-cluster differences and maximize inter-cluster differences among the variables used for clustering (Zahra & Covin, 1993). Variables used in the cluster analysis were the Web interface features.

Phase II: Questionnaire Survey: Method

In order to test the hypotheses relating to the interrelationships between constructs proposed in the three *a priori* structural models, an online survey method was used. However, this phase builds on the first by using the classification of design features obtained to test their influence on consumer perceptions, attitudes, flow experienced, and online buying intentions using online survey method.

Measurement Scales

Scales which had been developed and validated in prior studies were utilized in for this study. Using established scales has several advantages, including objectivity, communication, economy, and genelizability (Nunnally & Bernstein 1994). Despite the advantages to using established scales, Churchill (1979) contends that many existing measures are of relatively poor quality because not enough rigor was employed developing the scale initially. Also, in many cases, scales developed in one context perform relatively poorly in another context (Churchill, 1979). In light of this, this study conducted a pretest to determine the performance of the instrument.

In this study, careful consideration was given to the context, as well as the number of items measuring each construct. Research results indicate that the number of items in a scale can affect responses in different ways. Scales with too many items and excessively lengthy can induce fatigue and response pattern bias. By keeping the number of items to a minimum, response pattern bias can be reduced (Schmitt & Stults, 1985). However, if too few items are used, then the content and construct validity and reliability of the measure may be at risk (Nunnally & Bernstein, 1994). Single item scales (those scales that ask just one question to measure a construct) are most susceptible to these problems, and thus,

their usage was avoided in this study. Adequate internal consistency reliability can be obtained with as few as three items, and the more items added the progressively less impact they have on the scale's reliability (Hinkin & Schriesheim, 1989). The operationalization of the constructs is discussed in the next section.

Perceived Informativeness, Entertainment, and Irritation.

This study adapted the original 3-item scales from Ducoffe (1995; 1996) in measuring informativeness, entertainment, and irritation. With respect to the measure for irritation, the irritation construct may be similar but not identical between Web advertising and e-stores. For example, amongst Ducoffe's (1996) five items measuring perceived irritation of Web advertising, the item that states Web advertising "insults people's intelligence" is less applicable to an e-store than to advertising in general, for which this item was developed. Therefore, this item was eliminated in this study. The other three items "is annoying", "is irritating", and "is frustrating" are more transferable to the perception of Web sites. Luo (2002), in examining consumer behavior in online environment found evidence of internal consistency for the three constructs (Cronbach's alpha was .91 for entertainment, .89 for informativeness, and .88 for irritation).

Perceived Usefulness of the Site.

Perceived usefulness was operationalized using 4 items from the TAM model. (Davis 1989; Davis, et al., 1989). The 4 items were measured with seven-point Likert-type scales, with 1 = Completely disagree and 7 = Completely agree.

Attitude Toward the Site.

This study adopted the measure of attitude toward the site from Chen and Wells' (1999) study. The scale produced good reliability results in their study. The scaled composed of 6 items, assessed with 7-point Likert-type scales with 1 = Completely disagree and 7 = Completely agree. Though similar to scales used to measure attitude toward advertising in traditional advertising, this scale closely ties into the Web environment and it is deemed appropriate for this current study.

Flow Construct.

As far as measurement of flow, it is suggested that any measure of flow must include its antecedents and consequences (Hoffman and Novak, 1996). Agarwal and Karahanna (2001) reviewed prior work on the operationalization of flow and reported several but related dimensions used to measure flow. Ghani and Deshpande (1994) specified concentration and enjoyment as dimensions of flow. Trevino and Webster (1992) operationalized flow using control, attention focus, curiosity, and intrinsic interest. Based on Ghani and Desphande's (1994) assessment of flow, Koufaris (2002) used challenge, concentration, control, and enjoyment as dimensions in investigating online behavior. This study adopted Koufaris (2002) scale which is deemed applicable in the online shopping context. The scale is composed of a four-item *enjoyment* semantic differential measurement scale (α = .88), four-item *concentration* semantic differential measurement scale (α = .93), four-item *perceived control* semantic differential measurement scale (α = .73), and three-item *challenge* semantic differential scale (α = .79). Assuming that all items had similar significance for each dimension of flow, this study followed Spreitzer's (1995) approach and computed average measures for the

constituent dimensions. They operated as formative indicators for the higher-order flow construct.

Finally, flow is directly measured with a one-item scale adopted from Novak et al. (2000) following a narrative description of flow. Past researchers (Novak et al., 2000; Chen, Wigand, & Nilan, 2000) have successfully used a similar approach in assessments of flow among Web consumers. To minimize bias, this item appeared at the end of the survey.

Intention to Purchase and Intention to Return.

Purchase intent is a widely used measure in studying behavioral intentions. Several scales have been eveloped in this respect. Madrigal (2000) used three pairs of descriptive words, extremely likely - extremely unlikely, not probable - probable, certain chance-no chance to describe purchase intention. Koufaris (2002) used a two-item measure in his study examining online consumer behavior. The scale employed in this study is adopted from Yoo and Donthu (2001) because it properly depicts the context of Web studies and demonstrated a higher reliability compared with most others. It consist of four items ($\alpha = .96$) measured on a seven-point Likert-type scale. Intention to return/revisit was a two-item scale adopted from Yoo and Donthu (2001). This is not ideal but this study feels that a two-item scale can measure a construct well, as has been done in past research (Jarvenpaa, Tractinsky, & Vitale, 2000; Koufaris et al., 2001; Yoo & Donthu, 2001).

Development of New Scales

New scales in the online shopping context were developed for two constructs – hygiene and motivator factors – utilized in this study. Churchill's (1979) work provided the basis for the construction of measures for these constructs. The initial item pool for these constructs was determined by thorough review of the extant literature and interviews with experts and practitioners as discussed in previous sections of this chapter. The classification results of the features in Phase I was used to purify and validate the new scales as recommended by Nunnally and Bernstein (1994) and Churchill (1979). That is, the study in phase I led to the selection of core features to represent hygiene and motivator constructs.

Hygiene and Motivator Factors.

Hygiene and motivator factors in Phase II of this study are identified as the core interface features delineated in Phase I. In Phase II, the influence of the hygiene and motivator factors on belief or perceptual dimensions presented in the research model is examined. Their relative importance was measured by a 5-point (hygiene: 1 = Very dissatisfied, 5 = Not all dissatisfied, motivator: 1 = Not all satisfied, 5 = Very satisfied). In prior studies (e.g., Liang & Lai, 2001), hygiene and motivator factors were measured with a 5 point scale (ranging from Very undesirable to Very desirable). However, as prior discussions suggest, scales measuring hygiene and motivator constructs should explicitly reflect dissatisfaction and satisfaction respectively.

Control Variables

Demographic characteristics were mostly measured as categorical: age was measured in year-categories, gender was measured as a dummy variable (male = 1, female = 2). Similarly, income was measured in annual income groups, so was education (High school or less, some college, college degree, graduate degree). Web skills/experience was measured as poor, fair, good, or excellent. Shopping experience was measured as never shopped online, once a year, once every 3 months, once a month, once a week, or more than once a week.

This study adopted a modified Beatty and Kahle's (1988) brand loyalty scale to assess site loyalty. This scale captures the overall commitment to a specific site (Yoo & Donthu, 2001). Yoo and Donthu (2001) demonstrated a reliability for this scale with alpha = .77. The scale consists of a three-item, 7-point Lykert-type scale. For Web shopping experience, the seven items used in the Georgia Tech GVU (1996) survey were adopted. Finally, Zaichkowsky's (1994) short scale on product involvement was included. It consistd of ten-item, seven-point semantic differential scale.

Instrument Pre-Test and Refinement

The reliability and validity of the new including the old the scales employed in this study were assessed using a pretest sample and cross-validated with the final survey sample. Items of any construct that did not contribute substantially the overall variance of the construct were eliminated from the scale. In this section, the pretest of the instrument and refinement procedures are presented.

To pretest the instrument, the Internet was used as a means to collect the data. Like in Phase I, the online survey Web pages were tested thoroughly to ensure that they

appeared properly with different Web browsers. To make certain that respondents answered all necessary questions, JavaScript programming code was added to the electronic survey to verify and perform all necessary checking of a user's input before the survey is submitted. For example, if the respondent omits answering certain questions, a message box would direct users to backtrack, correct the problem and resubmit the data.

After developing the preliminary questionnaire, a Web link to the instrument was sent to three academics holding Ph.D.s in Marketing and MIS, and two IT professionals who have experience in Web site designers and Network administrators to ensure the comprehensiveness and appropriateness of the scales, the readability, understandability of the scale items, clarity of the instructions as well as page layout of the online survey. Through this process, poor question wording and sequencing, as well as errors in layout problems were addressed.

A convenience pretest sample of consumers was utilized. Students taking Introduction to Business Statistics course and Computer Information Systems course in July/August of 2003 in a major university in Texas managed the data collection from consumers. Each student was asked to invite up to three consumers with Internet access, preferably not a fellow college student, to participate in the survey. A student who invited more than one participant was asked to make sure they belonged to different age groups as specified in the questionnaire. Each student after a week returned with a list of the potential subjects s/he contacted. This was to enable non-response check. The questionnaire site contained a field for the participant to enter his/her contact information (telephone number/email). To confirm that consumers were those who took part in the survey, and not the students themselves, random telephone numbers were then selected

from the completed surveys and the participants contacted to verify their participation. There was no case of disconfirmation. The questionnaire page also contained the instructions and the purpose of the survey. It was made clear that participation was voluntary.

Table 3

Pretest sample demographics (N = 154)

Variable	Frequency	Percent	Variable	Frequency	Percent
Gender			Education		
1. Male	50	33.1	1. HS or less	52	34.7
2. Female	101	66.9	2. Some College	53	35.0
			3. College Degree	36	24.0
Income			4. Grad degree	9	6.3
1. <$10K	15	10.4			
2. $10K-19.999K	30	20.8	Internet skills		
3. $20K-29.999K	58	41.3	1. Poor	7	4.6
4. $30K-49.999K	18	12.6	2. Fair	56	36.8
5. $50K-74.999K	8	5.9	3. Good	73	48.0
6. $75K-100K	1	0.7	4. Excellent	16	10.5
7. >$100K	1	0.7			
			Online shopping experience		
Ethnicity			1. Never	25	16.4
1. Asian	3	2.3	2. 1/year	91	59.9
2. Black	2	1.0	3. 1/3months	16	10.5
3. Caucasian	7	7.7	4. 1/month	12	7.9
4. Hispanic	134	86.3	5. 1/week	7	4.6
5. Other	4	2.7	6. >1/week	1	0.7
Age					
1. Less than 18	20	13.3			
2. 18-30	49	32.2			
3. 31-45	67	43.9			
4. 46-60	16	10.7			
5. Over 60	-	-			

Out of a total of 221 consumers contacted, 154 survey questionnaires were completed, resulting in 70% response rate. The sample demographics, again revealed that it was predominantly women (66.9%), Hispanic (86.6%) with 41.3% in the $20,000 to $29,999 income category. About 42% were between 31 and 45 years and close to the same percentage said they have some college or above degree. More than 60% rated their Internet use skills as above fair (good or excellent) and about the same number reported they have shopped online in the past.

Survey Sample Selection and Data Collection

The sampling population consisted of US Internet consumers. The sampling frame was a randomly generated list of 2500 from a nationwide database of consumers with Internet access. The list was obtained from a reputable online market research agent and a commercial list vendor company, Zoomerang, Inc.

Data Collection Procedure

The data collection was accomplished through an online survey method. The survey questionnaires, with the necessary modifications resulting from the pre-test, were developed using HTML templates provided and hosted by Zoomerang, Inc. The survey pages were tested thoroughly to ensure that they appear properly with different Web browsers. To ensure that respondents answered all necessary questions, JavaScript programming was added to the electronic survey to verify and perform all necessary checking of a user's input before the survey was submitted. For example, if the respondent skips answering certain questions, a message box would inform users to

backtrack and answer the question and resubmit the data. Web server storage services where the survey questionnaires were deployed was also rented from Zoomerang, Inc.

A nationwide random sample of 2500 email addresses of Internet users was generated by Zoomerang, a major online market research agency and a commercial list vendor. Personalized messages were sent to the individual emails inviting them to participate in the survey. Each message informed subjects of the questionnaire URL, stated that the survey was voluntary, and complete confidentiality of subjects was guaranteed. However, completing the survey would qualify a participant to win a monetary award (up to $200 to increase response rate) in a raffle drawing organized by the contracting company, Zoomerang, Inc. A second email was sent after one month of the first wave of emailing, requesting cooperation from non-respondents.

At the online questionnaire Web site, participants were first required to provide general demographic information. Then, they were directed to follow a hyperlink to a randomly pre-selected e-store for online shopping simulation. To facilitate transitions between the e-store and the online questionnaire pages, the hyperlink to the e-store was coded to launch on a new browser application window when clicked, that is, making the e-store the active foreground application and the browser containing the questionnaire pages becomes the background application. Similar to the data collection procedure in Phase I, the task entails a simulation of either online laptop purchase (at Dell.com) or shopping for clothes (at Landsend.com) (see Questionnaire in Appendix A). The purpose of the task was to acquaint and refresh subjects' memories of the online buying process and interface design features commonly encountered in online purchase process. After

completion of site navigation and shopping task, subjects were asked to return to the questionnaire to complete the survey.

The questionnaire site was deployed for two weeks. Total usable responses received were 266 giving a response rate of 10.6%. The sample demonstrated a skew towards women (53%), Caucasians (49.6%), relative youth (18 to 45 years, 49.3%) with averagely good Internet skills (40.2%). In addition, about 70% of subjects reported they shopped online in the past (see Table 4).

Table 4

Demographic information of Survey Subjects

Variable	Frequency	Percent	Variable	Frequency	Percent
Gender			Education		
1. Male	125	47.0	1. HS or less	80	30.1
2. Female	141	53.0	2. Some College	101	38.0
			3. College Degree	59	22.2
Income			4. Grad degree	19	7.1
1. <$10K	39	14.7			
2. $10K-19.999K	105	39.5	Internet skills		
3. $20K-29.999K	30	11.3	1. Poor	18	6.8
4. $30K-49.999K	42	15.8	2. Fair	84	31.6
5. $50K-74.999K	15	5.6	3. Good	107	40.2
6. $75K-100K	8	3.0	4. Excellent	53	19.9
7. >$100K	7	2.6			
8. >$150K	5	1.9			
			Online shopping experience		
Ethnicity					
1. Asian	25	9.4	1. Never	72	27.1
2. Black	39	14.7	2. 1/year	75	28.2
3. Caucasian	132	49.6	3. 1/3months	69	25.9
4. Hispanic	44	16.5	4. 1/month	33	12.4
5. Other	26	9.8	5. 1/week	9	3.4
			6. >1/week	3	1.1
Age					
1. Less than 18	15	5.6			
2. 18-30	70	26.2			
3. 31-45	62	23.1			
4. 46-60	42	15.8			
5. Over 60	40	15.0			

Note: sums of percentages may not add to 100% due to of missing values.

From a demographics standpoint (Table 4), the sample does not show gross deviations from national census studies. For example, each study conducted in 2000, 2001, and 2002 by the UCLA Internet Project (2003) found that almost equal numbers of men and women use the Internet, with men holding a slight edge (73.1% male, 63.9% female in 2002). The slight deviation of this sample to show these proportions may stem from the fact that females were more co-operative in participating in this survey or were more persuaded by the possible monetary reward.

The sample data here is consistent with UCLA Internet Project (2003) report which indicated that users continue to rate their ability to use the Internet highly. In 2002, 63.1% of users ranked their Internet abilities as good or excellent, compared to 65.5% in 2001 and 44.6% in 2000. This compares quite well with the sample (60.1% comprising of 40.2% "good" and 19.1% "excellent"). Still, according to U.S. Census Bureau report (2000), 55.7% Caucasians, 32.8% African Americans, 65.1% Asian and Pacific Islander, and 33.7% Hispanic households had Internet access.

Analysis Plan

The unit of analysis for this study was the individual consumer with Internet access. Since this study sought the perceptions of consumers regarding the effect of Web interface features on online purchase intentions, this unit of analysis is particularly appropriate.

Validity and Reliability Assessment.

Although validated instruments were used in developing the survey instrument, two additional scales are new and some of the items of the validated scales were adapted

to the online shopping context. Regardless, psychometric properties of the research constructs were examined to ensure their suitability in analyzing the model.

The first step in the construct validation process was to establish content validity (O'Leary-Kelly & Vokurka, 1998). Two crucial standards for securing content validity are (a) reasonable methods of instrument construction and (b) a representative set of items (Nunnally and Bernstein, 1994). In this study, Churchill's seminal work (1979) was followed as the procedure to construct the instrument. First, domains of the constructs were identified from a comprehensive literature review. Most of the items and related scales in this instrument are adopted from different questionnaires used in previous studies related to these constructs. The content validity of these scales was established in those studies. The other items were originated based on the literature review and evaluated by other academicians. Furthermore, the feedback obtained during the pilot study helped ensure that the items are representative of the constructs.

To establish construct validity, structural validity and reliability must first be established (O'Leary-Kelly & Vokurka, 1998). Structural validity assures that internal structures for sets of variables do indeed measure an underlying construct. Structural validity can be established by performing principal factor analysis (Nunnally & Bernstein, 1994).

Construct validity assesses the degree to which each measure validly measures the construct it is designed to measure. Exploratory factor analysis (EFA) is first employed to assess construct validity at the pre-test stage. This allowed for the assessment of three components of construct validity – unidimensionality, convergent validity and discriminant validity. Nomological or predictive validity, which looks at the

interrelationships hypothesized by the researcher was assessed via structural equation modeling (SEM), a technique which assesses the relationships among latent constructs (Long, 1983). The importance of utilizing SEM techniques is discussed in the next sections.

The assessment of validity using EFA is limited due to lack of objective assessment tools (Mulaik, 1972). Therefore, before applying SEM for hypothesis testing in the final survey sample, confirmatory factor analysis (CFA) is used to assess the measurement models of the constructs. Adequate reliability of factors was also assessed.

The reliability of each scale was estimated by calculating Cronbach's α (Cronbach, 1951), and composite reliability (Fornell & Lacker, 1981). Cronbach's α tests the internal consistency of the individual scales. It estimates the reliability coefficient from the item intercorrelations and is a measure of the "expected correlation of one test with an alternative form containing the same of items" (p. 235) or a measure of the internal consistency of scale suggesting that the items are measuring the same construct (Nunnaly & Bernstein, 1994). Modest reliability estimates of .70 or higher are acceptable in the early stages of construct validation, but higher reliability estimates of .80 are sufficient for most basic research (Nunnaly & Bernstein, 1994). Composite reliability is similar to Cronbach's α, however, this measure is superior to α in that it does not assume equal item weights (Howell, 1996).

Structural Equation Modeling (SEM).

Structural equation models can be used to test research hypotheses in terms of presumed cause-and-effect variables and indicators of latent variables (Joreskog & Sorbom 1993). SEM tests relationships between the variables in the measurement model

and the structural model simultaneously. In addition, competing or alternate models can be specified, for example, to study interrelationships between manifest variables.

SEM techniques have gained increasing popularity in management sciences, notably marketing and organizational behavior, in the last two decades (Chau, 1996). In technology adoption, several published studies have employed this approach in order to validate research models and hypotheses. Examples include Chau (1996), Hausman and Stock (2003), Koufaris (2002), Lederer et al. (2000), Moon and Kim (2001), Venkatesh and Davis (2000).

According to Gerbing and Anderson (1988), it is more appropriate to adopt a two-step procedure in SEM. That is, one should separately estimate the measurement model before a simultaneous estimation of measurement and structural models. Therefore, in this study all measurement models were evaluated on multiple criteria such as unidimensionality, convergent, discriminant, and reliability validity before testing the *a priori* structural models.

In SEM, a number of alternatives exist in examining model fit to the sample data. Three general classes of model fit measures can be distinguished including absolute, incremental, and parsimonious model fit. Absolute fit measures assess the overall fit of a model to a set of empirical observations and are regarded as the most important development in covariance structure models (Brannick, 1995), p. 203). Absolute fit measures provide a means to assess the fit of the entire model to the sample data and identify problems not revealed by components of the model such as the magnitude and significance of parameter estimates (Bollen, 1989). The fundamental hypothesis in SEM is that the model implied covariance matrix exactly reproduces the population covariance

matrix of observed variables (Kelloway, 1995). Examples of absolute fit measures typically reported by researchers include the standardized residuals, chi-square test statistic, root mean square residual (RMR), root mean square error of approximation (RMSEA), noncentrality parameter (NCP), and the good-of-fit index (GFI).

The second general class of measures, incremental fit indices (Hair et al., 1998), explicitly contrasts the fit of the maintained model with that of competing or baseline model. Incremental fit indices capture the relative improvement in the fitting function when moving from the baseline to the maintained model (Bollen, 1989). In most applications of SEM the baseline model is a null model where the covariances among the observed variables are zero (Kelloway, 1995). Example of commonly reported incremental fit measures comparative fit index (CFI), and adjusted goodness-of-fit index (AGFI).

The third class of fit indices, parsimonious fit measures, reflect the ratio of estimated parameters to the potential number of degrees of freedom available in the data (Mulaik et al., 1998). Examples of parsimonious fit measures parsimonious norm fit index (PNFI), parsimonious goodness-of-fit index (PGFI), normed chi-square, and Akaike information criterion (AIC). Parsimonious fit measures are helpful in revealing whether the level of model fit has been achieved simply by estimating a large number of parameters. The use of parsimonious fit measures is largely restricted to the comparison of rival models (Hair et al., 1998).

In research studies where competing models are specified, such as the present study, two cases are possible. In one case the competing models are nested so they can be ordered in decreasing number of parameters (increasing degrees of freedom) (Jöreskog &

Sörbom, 2003). These ordered models are then tested sequentially by valid goodness-of-fit indices and interpreted in a meaningful way. The approach used in this study presents another case where the models are compared on the basis of some criteria that take parsimony (in the sense of number of parameters) into account as well as fit. This approach can be used regardless of whether or not the models can be ordered in a nested sequence. Three strongly related criteria have been proposed: the AIC measure of Akaike (1974, 1987), the CAIC by Bozdogan (1987), and the single sample cross validation index ECVI by Browne and Cudeck (1989). Thus, in this study several fit measures including absolute-, incremental-, and parsimonious-type measures have been employed in assessing model fit to the sample data. However, theoretical considerations are strongly considered in assessing model fit and not just statistical fit (Jöreskog & Sörbom, 1993).

In the model fitting analysis, several ways were evaluated to improve the models by exploring which parameters might be freed that had been fixed and which might be fixed that had been freed. Using LISREL 8.53 and with the SIMPLIS command language, parameters were changed one at a time in order to determine what changes offer the greatest amount of improvement in the fit of the model.

Non-Response Bias.

Non-response bias was assessed by an extrapolation method where late and early respondents are compared (Armstrong & Overton, 1977; Churchill, 1979). The early respondents were responses that were received in the first half of the data collection period, and the late respondents were the responses received from the second half of the

survey period (Compeau & Higgins, 1995). Mann-Whitney U test and MANOVA comparisons of early and late respondents were used to assess bias.

Summary of Chapter 5

Chapter 5 outlines the research design of this research study. A two-phase research design is employed. Phase I of the study design presents the procedures utilized in identifying and classifying design features. Due to the exploratory nature of Phase I, the technique of concept mapping is used in the classification process where subjects classified predefined interface features as hygiene, motivator, or unclear. The sample employed was a convenient sample of students grouped into experts and novice Internet users. Based on the classification results, core features that represent hygiene and motivator factors are identified.

In Phase II, steps are presented to test the interrelationships outline in the hypotheses. Measures that were used to operationalize individual constructs are identified and support for using these measures are presented. To pretest the instrument, a convenient sample was used and EFA techniques applied to assess validity. The chapter then discussed the final survey sample selection and the rationale for selecting this sample. The chapter ends with a discussion on planned analysis - issues pertaining to validity and reliability of the instrument, statistical techniques to be used in testing proposed hypotheses, as well as how response bias is checked.

CHAPTER V

ANALSYIS AND RESULTS

The purpose of this chapter is to present the outcomes obtained from the analysis of the data. Recall from earlier discussion that Phase I of the research design represents an exploration of Web site interface features with the goal of classifying them into known theoretical constructs. On the other hand, Phase II represents an investigation of the interrelationships among constructs of the *a priori* structural models. First, the outcomes in Phase I are presented, and then followed by those in Phase II.

Classification of Interface Features

The objective of Phase I was to construct a list of understandable features and classifications based on Herzberg's two-factor theory. In order to do this, two groups of subjects (experts and novice) who were introduced to Hertzberg's two-factor theory are asked to classify a set of pre-identified features into hygiene, motivator, and "unclear". A total of 87 subjects (from two teams – novice and experts) participated and completed the survey involving the classification of interface features into hygiene and motivator factors. Data collected from the two teams were combined based on an acceptable level of inter-rater reliability (presented in subsequent sections). Table 5 presents the combined classification results. Rating frequencies range from as low as 2.3% to 95.4%

for hygiene, and from 1.1% to 93.1% for motivator features. Based on these results core hygiene and core motivator features were selected.

Table 5

Classification Frequency (%) of Interface Features

Feature	Hygiene	Motivator	Feature	Hygiene	Motivator
F01	23.0	57.5	**F31**	89.7	3.4
F02	36.8	34.5	**F32**	11.5	86.2
F03	74.7	16.1	**F33**	39.1	31.0
F04	51.7	27.6	**F34**	46.0	26.4
F05	51.7	23.0	**F35**	86.2	6.9
F06	52.9	21.8	**F36**	81.6	9.2
F07	56.3	21.8	**F37**	95.4	3.4
F08	57.5	20.7	**F38**	18.4	77.0
F09	55.2	19.5	**F39**	12.6	86.2
F10	24.1	59.8	**F40**	11.5	82.8
F11	75.9	12.6	**F41**	88.5	9.2
F12	90.8	5.7	**F42**	92.0	4.6
F13	86.2	9.2	**F43**	90.8	6.6
F14	92.0	1.1	**F44**	57.5	25.3
F15	28.7	57.5	**F45**	51.7	24.1
F16	26.4	49.4	**F46**	78.2	10.3
F17	77.0	19.5	**F47**	89.7	5.7
F18	34.5	51.7	**F48**	55.2	23.0
F19	31.0	48.3	**F49**	80.5	11.5
F20	74.7	11.5	**F50**	87.4	8.0
F21	13.8	82.8	**F51**	89.7	4.6
F22	37.9	36.8	**F52**	83.9	9.2
F23	5.7	88.5	**F53**	3.4	92.0
F24	36.8	33.3	**F54**	88.5	5.7
F25	37.9	32.2	**F55**	80.5	8.0
F26	42.5	28.7	**F56**	2.3	93.1
F27	5.7	89.7	**F57**	3.4	92.0
F28	40.2	29.9	**F58**	11.5	87.4
F29	88.5	6.9	**F59**	13.8	78.2
F30	63.2	18.4	**F60**	49.4	21.8

Determination of Core Hygiene and Core Motivational Features

For a feature to be considered core hygiene or core motivator, the *majority* of the subjects would classify it into hygiene or motivator category respectively. A similar approach was used in prior studies examining Web interface features (e.g. Zhang et al., 1999; 2000). Zhang and his colleagues interviewed 8 subjects and specified agreement among 5 subjects out of the 8 (62.5%) as majority. This study used a cutoff of 75% of subjects' agreement, which corresponds to the number of subjects within two standard deviations of the mean (cf. Chebyshev's 1851 theorem as cited in Keller & Warrack 2002). The higher cutoff utilized was to ensure stability in repeat measures of hygiene and motivator features. In other words, convergent validity is enhanced.

Figure 7 illustrates the classification frequencies in a chart ordered by frequency of hygiene features. The figure depicts the hygiene and motivational nature of each feature. As indicated, the length of a bar represents the frequency of subjects' judgment (the motivator side is represented by negative values in order to make the distinction from the hygiene side). As illustrated in the Figure 7, 95.4% of the 87 subjects agree that F37 (allow product return) is a hygiene category, 3.4% think it is a motivator, while the rest of the 1.2% of the subjects (not presented in chart) view it as "unclear". On the other hand, the majority of subjects (93.1%) view F56 (virtual reality features, e.g., 3D product images) as a motivator category.

Among the 60 features (labeled F1-F60), ordered by hygiene frequency and divided by lines H and M (in Figure 7), 23 can be perceived as core hygiene factors (above line H) and 12 as core motivational (below line M). The remaining 25 features could be said to have no predominate hygiene or motivation nature, and, therefore, could

be considered as either hygiene or motivator by respondents. This support Herzberg's findings that certain job factors tend to be consistently related to job satisfaction and others to job dissatisfaction, yet other factors such as salary may act initially as motivator but becomes a hygiene factor with time. In the same vein, unlike an expert, a novice Internet user may not see, for example, a search engine as a hygiene feature since s/he probably has not become familiar with search techniques such as use of proper keywords and logic operators or tools.

Figure 7. Core Hygiene and Core Motivators

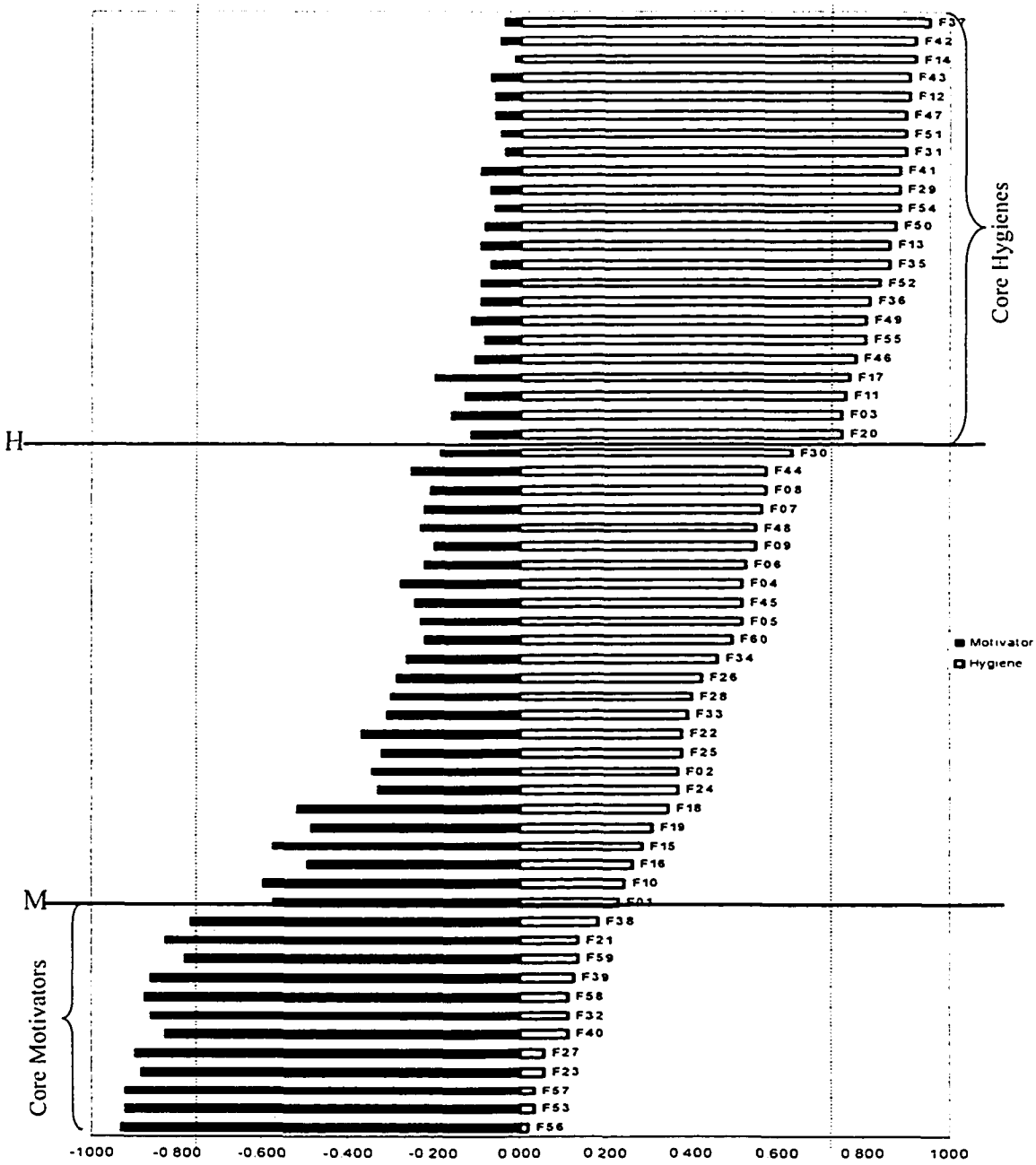


Table 6

Core Hygiene and Core Motivator Feature

Core Hygiene	F17	Declaration of the intended use of customers' supplied information
	F49	Nondiscrimination between the type of browsers (Internet Explorer, AOL, Netscape)
	F3	After purchase tracking services (e.g. through toll free tel., Website tracking)
	F43	Clear displays of page contents
	F11	Choice of product shipping (e.g. overnight delivery, regular mail, etc)
	F20	Familiar terminology
	F46	Presence of clear table of contents (e.g. clear menu items) in each page
	F41	Presence of 'Return to Homepage' button on each page
	F55	Variety of contact features (email, toll free telephone, chatroom, etc)
	F36	Multiple display product images (e.g. front/back view, side views, inside view, etc)
	F52	Assurance of customer's privacy
	F13	Company logo on Web pages
	F35	Variety of contact features (email/toll free/chat room to contact sales personnel, technical support, other customers etc)
	F50	Presence of up-to-date info.
	F29	Logical info. presentation in Web pages
	F54	Variety of payment methods (e.g. money order, checks, credit card, etc)
	F31	Offer of order confirmation (e.g., thank you page, email message)
	F47	Presence of shopping cart
	F51	Be able to 'Undo' a lot of my actions to reverse control
	F12	Colorful and clear hyperlinks
	F14	Consistent style of Web pages
	F42	Indication of security/secure site assurance (e.g. 'lock' symbol, use of https in URL, etc)
	F37	Allow product return
Core Motivator	F56	Virtual reality features in product presentation (e.g., 3D product images, virtual models)
	F53	Use of humorous content at the site (e.g. cartoons, short jokes, etc)
	F57	Gift services (e.g., wrapping, reminders, certificates) were offered at the site
	F27	Provision of links to other Web sites that sell similar products
	F23	Images of national/cultural symbols/icons
	F58	Presence of FAQ section
	F32	Have various language options (e.g., Spanish, French, etc)
	F39	Provision of feedback features. (e.g. comments box, rate service, etc)
	F21	Ability to perform global search while at the site (e.g., Google, Excite, Yahoo, etc)
	F40	Recommendation of product substitutes
	F59	Have various language options (e.g., Spanish, French, etc)
	F38	Sell both new and used products

Results of Reliability

According to Yegedis and Weinbach (1991), among the various methods for estimating the reliability of a measurement, the one that has the greatest relevance for addressing the issue of reliability systematically is inter-rater reliability or agreement. The use of the two teams (novice and experts) in the data collection procedure in Phase I enabled us to determine inter-rater reliability, Kappa.

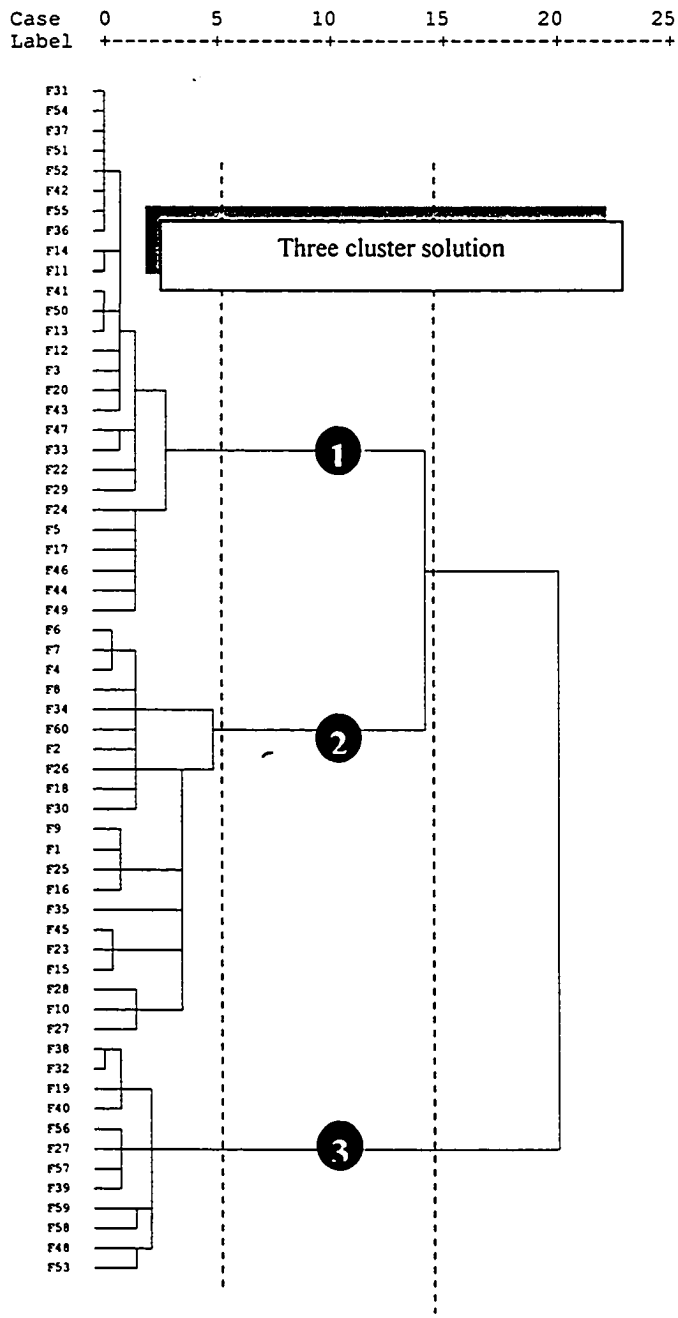
Using crosstabs technique in SPSS, Kappa (k) was determined to be 0.69. According to Hartmann (1977) Kappa values should exceed 0.6. Altman (1991) provided a more detailed benchmark for interpreting the values of Kappa: <0.00 => Poor; 0.00-0.20 => Slight, 0.21-0.40 => Fair, 0.41-0.60 => Moderate, 0.61-0.80 => Substantial, and 0.81-1.00 => Almost Perfect. Therefore, the results of the classification of core hygiene and motivator features obtained indicated substantial inter-rater reliability.

Cluster analysis was used to investigate whether there existed some structure to the classification provided by study subjects. Ward's cluster technique provided clear evidence of three groups of features with no lack of any intermediate group(s). The three-cluster solution was based on inspection of a dendogram (Figure 8) which showed three groups of features (Hair et al., 1998).

The first cluster contained 27 features; the second cluster contained 21 features; while the third contained 12 features. The three-cluster solution can be categorized in a similar fashion as core hygiene, core motivator, and a cluster with no strong dominance of either hygiene or motivator characteristics. Indeed, while cluster 2 is identified with features with non-domineering motivator or hygiene characteristic category such as those between line and H and M in Figure 7, cluster 1 contains 19 out of 27 (70%) of the core

hygiene features, and cluster 3 contains 10 out of 12 (83.3%) of the core motivator features. Thus, the cluster analysis shows substantial support for the classes of features formed.

Figure 8. Results of Hierarchical Custer Analysis of Classification of Features



Phase II – Analysis and Results

Recall from earlier discussions that the goal in Phase II is to test model hypotheses in an effort to investigate the effects of Web interface features on consumer online shopping intentions. The nature of the study guided the analysis process; meaning that similar to the works of other researchers "theoretical significance and epistemological considerations were foremost, rather than maximizing fit of model" (e.g., Hausman, 1998, p. 124). The proposed *a priori* structural models of this study reflect this; demonstrating theoretical proposed linkages, but corresponding to consumer online behavior.

The analysis in Phase II consisted of two stages. During the first stage, the psychometric properties of the scales use were evaluated using a pretest sample and any modifications made based, fundamentally, on theoretical considerations. That is, empirical tests functioned as guides in the evaluation process at this stage, rather than dictating the evaluation. The second stage involved assessing *a priori* structural model fits, comparing models, and hypotheses testing. The analysis and results of the first stage, instrument pretest, is presented in this section.

Instrument Pre-test and Purification

The pre-test sample was a convenience sample of Internet consumers drawn mostly from South Texas region. The psychometric assessment stage began with scale purification using exploratory factor analysis (EFA), inter-item correlations, and reliability assessment to determine which items to include in measuring the various constructs of the model. In assessing validity of construct measures, the new scales were

evaluated separately from the established scales. This allowed for more careful examination of the new scales compared to the established scales.

EFA Evaluation of New Scales.

The hygiene and motivator measurement scales of the instrument as applied to online shopping did not exist prior to this study and required the additional step of purification of the items identified in Phase I. The items used in measuring the hygiene construct were based on the core features delineated in Phase I, and was composed of 23 items. Likewise, the items used in assessing motivator construct were the 12 core features identified is Phase I. For the sake of clarity, the hygiene features were relabeled *HYG1* to *HYG23* and the motivator features labeled *MOT1* to *MOT12*. Each item was measured using a 5-point Likert-type scale as previously described in the data collection section of Chapter 4.

Exploratory factor analysis (EFA) was used to determine the factor structure of the scales. The ability of factor analysis to detect underlying constructs makes it an extremely useful tool for researchers who want to demonstrate that their results have construct validity (Rennie, 1997). In the EFA process, the number of factors to extract was constrained to two-factors in regards to the theoretical considerations of the study. To confirm this, scree test criterion was employed in confirming the number of factors to use.

The extraction method used maximum likelihood factor method and the final solution was obtained using an oblique rotation rather than the more commonly used orthogonal method. Orthogonal rotations offer the advantage of simplicity at the expense of poorer factor definition. The choice of oblique rotation involved some consideration of

possible relationships between features. Factors are usually rotated to make the factor solution more interpretable. Proper rotation will (a) strengthen the relation between variables and factors, (b) concentrate the variance shared by two variables that correlate highly on a single factor, and (c) level the variance. Table 7 presents the Pattern Matrix of partial correlations between each variable and each factor, i.e. the unique variance in each variable that is accounted for by each factor.

After oblique rotation, the Pattern Matrix is traditionally used to identify which variables are associated with which factors. In reference to Hair et al. (1998), 0.45 and above was specified as significant factor loading for each item (cf. Nunnally & Berstein, 1994). Hair et al. (1998) recommend that at an estimated power level of .8, a significance level of 0.05, and a sample size of 150, the appropriate cutoff for factor loadings is 0.45.

As shown in Table 7, the results of rotated factor solution indicate that 15 items loaded significantly on the first factor (hygiene) and 8 items loaded on the second factor (motivator). Items that indicated poor loadings (below 0.45) were dropped and those that showed factor loadings above 0.45 were utilized to develop the respective constructs. Factor loadings displayed in bold typeface in Table 7 show items selected for inclusion in assessing the constructs. Hygiene features eliminated because of poor factor loadings are HYG6, HYG10, HYG11, HYG13, HYG14, HYG18, HYG22, and HYG23. Motivator features eliminated were MOT2, MOT5, MOT9, and MOT11. The EFA results also demonstrated that the two factors were moderately correlated (0.56 inter-factor correlation), thus supporting the choice of oblique rotation.

Table 7

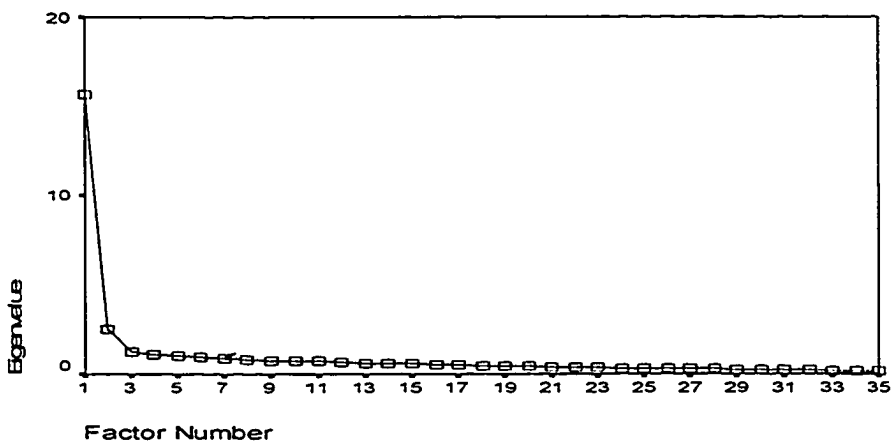
Pattern Matrix of Interface Features

Item	Description	Factor	
		1	2
HYG1	After purchase tracking services	**0.504**	0.008
HYG2	Choice of product shipping	**0.486**	0.153
HYG3	Colorful and clear hyperlinks	**0.510**	0.004
HYG4	Company logo on Web pages	**0.461**	0.002
HYG5	Consistent style of Web pages	**0.523**	-0.256
HYG6	Declaration of the intended use of customers' supplied info.	0.326	0.233
HYG7	Familiar terminology	**0.426**	-0.070
HYG8	Logical info. presentation in Web pages	**0.547**	-0.039
HYG9	Offer of order confirmation	**0.458**	0.187
HYG10	Different sizes of product images; thumbnail vs. large formats.	0.335	-0.031
HYG11	Product images displaying the different parts of the product	0.142	0.203
HYG12	Allow product return	**0.532**	-0.004
HYG13	Presence of 'Return to Homepage' button on each page	0.367	0.156
HYG14	Indication of security/secure site assurance	0.286	0.340
HYG15	Clear displays of page contents	**0.611**	-0.005
HYG16	Presence of clear table of contents	**0.494**	0.152
HYG17	Presence of shopping cart	**0.521**	-0.033
HYG18	Nondiscrimination between the type of browsers	0.285	-0.025
HYG19	Presence of up-to-date info.	**0.559**	0.105
HYG20	Be able to 'Undo' a lot of my actions to reverse control	**0.514**	0.118
HYG21	Assurance of customer's privacy	**0.582**	0.080
HYG22	Variety of payment methods	0.246	0.472
HYG23	Variety of contact features	0.183	0.405
MOT1	Ability to perform global search while at the site	0.082	**0.643**
MOT2	Images of national/cultural symbols/icons	-0.263	0.193
MOT3	Provision of links to other Web sites that sell similar products	0.162	**0.725**
MOT4	Indication of number of visitors to the site	0.032	**0.728**
MOT5	Sell both new and used products	0.193	0.247
MOT6	Provision of feedback features	0.017	**0.686**
MOT7	Recommendation of product substitutes	0.145	**0.734**
MOT8	Use of humorous content at the site	0.059	**0.469**
MOT9	Presence of virtual reality features in product presentation	0.031	0.221
MOT10	Offer of gift services	0.095	**0.544**
MOT11	Presence of FAQ section	-0.106	0.367
MOT12	Have various language options	-0.100	**0.446**

Extraction Method: Maximum Likelihood. Rotation Method: Oblimin with Kaiser Normalization.
Kaiser-Meyer-Olkin Measure of Sampling Adequacy: 0.746
Bartlett's Test of Sphericity: Approx. Chi-Square = 1639.47, Sig. = 0.000

To confirm the specification of extraction of the two factors the scree plot test was employed. Scree is a geological term referring to the debris which collects on the lower part of a rocky slope. The scree plot test is a graphical method proposed by Cattell (1966) which displays the eigen values in a simple line plot. Cattell suggests finding the place where the smooth decrease of eigenvalues appears to level off to the right of the plot. To the right of this point, presumably, one finds only "factorial scree". According to this criterion, there is therefore the statistical support to retain the 2 factors in this study (see Figure 9).

Figure 9. Scree Plot of exploratory factor analysis on the Web interface features



The final statistics indicated that these two factors account for 39% of the variance. Note that maximum likelihood (ML) with two factor oblimin rotation was employed for the present EFA and the goodness of fit test statistics: Chi-square (χ^2) and degrees of freedom (df) obtained were 842.8 and 526 respectively ($p = 0.00$) (i.e., $\chi^2/df = 842.6/526 = 1.6$). Therefore, results demonstrate that this two-factor solution is acceptable.

The reliabilities of the two construct scales were estimated using Cronbach's coefficient α: $\alpha_{hygiene} = .85$, $\alpha_{motivator} = .77$. It is recommended that reliability coefficients of 0.6 for exploratory scales and 0.7 for established scales are considered satisfactory (Cronbach, 1951; Nunnally & Berstein, 1994). By this standard, the hygiene and the motivator scales developed in this study have adequate levels of reliability, at least, at the pretest level.

EFA Evaluation of Established Scales.

Churchill (1979) contends that in many cases, scales developed in one context perform relatively poorly in another context. In light of this, attempts were made during pre-testing to ensure that measures employed were psychometrically sound. The established scales were also subjected to EFA to confirm the unidimensionality of the scales and ensure item loadings conform to those in the literature. Measurement items were drawn from the constructs: informativeness, entertainment, usefulness, irritation, attitude toward the site, intention to purchase, and intention to return. Note, even though flow is not entirely a new scale, it is excluded from the established constructs and assessed separately because of its multidimensionality in nature (discussed in next section).

The factor analysis procedure again utilized maximum likelihood extraction and oblique rotation of factors as done for the new scales of hygiene and motivator constructs in the preceding section. Again, the choice of oblique over orthogonal is based on theoretical considerations. Even though these are considered established scales, there seemed to be no enough theoretical grounding specifying that these model constructs are substantially independent of each other and, therefore, appropriate for orthogonal rotation

of factors. In fact, extant literature suggests the interdependence of these scales (e.g., Davis 1989, Davis et al., 1989).

As done before with the new scales, a factor loading threshold of 0.45 recommended by Hair et al. (1998) (for a sample size of about 150) was utilized to determine which items loaded on a particular factor. Table 8 contains factor loadings for items used to measure, entertainment, information, irritation, usefulness, attitude toward site, intention to purchase, and intention to return.

Table 8

Factor Analysis Results for Established Scales (N = 179)

	Factor						
Item	1	2	3	4	5	6	7
ENTMT1	0.067	0.051	-0.094	0.030	-0.231	-0.153	**0.545**
ENTMT2	0.212	-0.030	-0.084	0.160	0.072	-0.063	**0.621**
ENTMT3	0.166	0.003	-0.079	0.089	0.000	-0.110	**0.623**
INFO1	**0.488**	-0.007	-0.066	0.139	0.097	-0.033	0.369
INFO2	**0.988**	0.040	-0.082	0.033	-0.051	0.018	-0.044
INFO3	**0.616**	-0.010	0.002	0.029	0.044	-0.011	0.278
IRRIT1	0.070	0.015	**0.760**	0.077	0.261	-0.047	-0.164
IRRIT2	-0.056	0.020	**0.811**	-0.039	0.004	-0.008	-0.099
IRRIT3	-0.041	0.030	**0.971**	-0.081	-0.006	0.049	0.053
USEF1	0.009	-0.081	0.253	**0.719**	**0.490**	0.125	0.132
USEF2	0.034	-0.035	-0.074	**0.852**	0.033	-0.104	0.041
USEF3	0.079	-0.008	-0.117	**0.834**	0.046	-0.098	-0.003
USEF4	0.040	0.084	0.072	**0.497**	0.125	0.089	-0.029
ATTITUD1	-0.052	0.047	-0.043	0.042	**0.582**	**0.643**	0.097
ATTITUD2	-0.043	-0.054	0.028	-0.122	0.106	**0.802**	-0.027
ATTITUD3	-0.007	0.020	0.131	-0.143	0.096	**0.642**	-0.205
ATTITUD4	0.009	0.015	-0.066	0.025	0.115	**0.641**	0.112
ATTITUD5	0.221	0.451	0.101	0.004	0.220	**0.486**	0.005
ATTITUD6	-0.112	-0.014	0.201	0.125	0.118	**0.506**	0.103
IP1	-0.147	**0.454**	0.078	0.094	0.090	0.019	0.137
IP2	0.090	**0.453**	0.086	-0.022	**0.450**	-0.078	-0.003
IP3	0.025	**0.701**	0.116	0.312	0.010	0.081	0.001
IP4	0.209	**0.559**	0.067	0.102	0.018	0.007	0.015
IR1	-0.046	0.011	-0.053	-0.031	**-0.776**	0.029	0.032
IR2	-0.053	0.374	-0.010	-0.071	**-0.487**	0.269	-0.165
% of Variance	22.9	13.3	12.2	11.2	9.3	8.0	7.7

The first factor (in Table 8) is identified as informativenss and accounted for 22.9% or the variance. Other factors identified and corresponding amount of variance explained are: Factor 2 (intention to purchase) = 13.3%; Factor 3 (irritation) = 2.2%; Factor 4 (usefulness) = 11.2%; Factor 5 (intention to return) = 9.3%; Factor 6 (attitude toward site) = 8%; and Factor 7 (entertainment) = 7.7% of the variance extracted. Thus, the total variance explained by the seven factors was 84.6%.

The results clearly show that, with the exception of three items (USEF1, ATTITUD1, and IP2) that indicate cross loadings, all the items specified to assess each construct loaded in the corresponding factor. We, however, retained these three cross-loaded items in the final instrument based on theoretical foundations that these factors may be interrelated. In addition, their highest factor loadings are in their respective constructs. As discussed before, the intercorrelations among factors (Table 9), ranging from .22 to .55 in magnitude, further confirms the use of oblimin factor extraction method rather than the commonly used orthogonal factor extraction technique. The results of reliability indicate Cronbach's αs above .90 for these scales. Therefore, they were deemed reliable (Nunnaly & Bernstein, 1994; Hair et al., 1998).

Table 9

Correlation matrix and Cronbach's alphas of established scales

Factor	1	2	3	4	5	6	7	Cronbach's α
1. Informativeness	1.00							.91
2. Int to purchase	0.35	1.00						.97
3. Irritation	-0.32	-0.43	1.00					.97
4. Usefulness	0.54	0.39	-0.31	1.00				.95
5. Int to return	0.30	0.55	-0.34	0.46	1.00			.94
6. Attitude	0.51	0.57	-0.45	0.50	0.34	1.00		.94
7. Entertainment	0.27	0.22	-0.32	0.41	0.58	0.37	1.00	.93

EFA Assessment of Flow Construct.

As discussed in previous chapter, flow is considered a multidimensional construct comprising of four dimensions: enjoyment, concentration, perceived control, and challenge. Using the same exploratory factor analysis procedure employed for the new and established scales discussed in the preceding sections, the multidimensionality of the flow construct was confirmed. Again, using 0.45 (Hair et al., 1998) as the threshold for item loadings, only two items (CONC1 and ENJOY4) did not load in their respective factors. These two items were eliminated in the final instrument (Table 10). As proposed by Churchill (1979) this exclusion is appropriate for better scale validity. Furthermore, the belief is that pre-testing provides a statistical basis to shorten long survey instruments without sacrificing their explanatory power. Participants may perceive long survey instruments as burdensome and may contribute to attrition and/or non-response.

Table 10

Factor Analysis Results for Flow Scales

	Factor			
Item	1	2	3	4
CHALL1	**0.570**	0.111	0.222	0.012
CHALL2	**0.483**	-0.083	-0.102	-0.056
CHALL3	**0.764**	0.113	-0.008	-0.061
CONC1	-0.067	-0.097	-0.145	0.366
CONC2	0.141	-0.010	0.175	**0.756**
CONC3	-0.031	0.144	0.144	**0.841**
CONC4	-0.032	0.235	0.153	**0.689**
CONT1	0.183	**0.451**	0.176	0.141
CONT2	0.102	**0.691**	0.099	0.079
CONT3	-0.016	**0.881**	-0.140	-0.089
ENJOY1	0.190	0.236	**0.465**	0.281
ENJOY2	0.163	0.196	**0.677**	0.159
ENJOY3	0.125	0.061	**0.849**	0.210
ENJOY4	-0.097	-0.055	-0.238	-0.162

Extraction Method: Maximum Likelihood. Rotation Method: Oblimin
Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.853
Bartlett's Test of Sphericity: Approx. Chi-Square = 1648.48, Sig. = 0.000

Table 11

Factor Correlation Matrix – Flow Construct

Factor	1	2	3	4	Cronbach's α
1. Challenge	1.00				.91
2. Control	0.19	1.00			.89
3. Enjoyment	0.54	0.30	1.00		.93
4. Concentration	0.53	0.13	0.42	1.00	.86

The four factors together extracted 74% of total variance. Factor 1 (challenge) contributed 46.3% of the total variance explained, factor 2 (control) provided 15.5%, factor 3 (enjoyment) contributed 7.6%, and factor 4 (concentration) contributed 5.6% of total variance explained. The goodness-of-fit test indicated $\chi^2/df = 137.3/41 = 3.3$ indicating acceptable fit. The reliability coefficients (Table 11) ranged from .86 (concentration) to .93 (enjoyment), suggesting the scales have substantial reliability.

From the EFA examination of the established scales and the flow construct, the resulting scales substantially corresponded with those in the literature and the items composing each scale (except CONC1 and ENJOY 4 which were dropped for poor factor loadings) were used to construct the questionnaire. The exception to this statement is observed with *enjoyment* and *concentration* scales, where one item was deleted from each measurement scale due to poor factor loadings as discussed above. Further, cross verification of reliability and validity was conducted with the final survey sample before the model selection and hypothesis testing processes.

Reliability and Validity Analysis of Scales – Final Survey Sample Data

The final sample data obtained (N = 266) were tested for reliability and validity to confirm the results of the EFA analysis of pre-test sample. That is, the refined instrument utilized in the collection of the final sample data was assessed for construct validity.

Construct validity, which involves inferences of unobserved variables (constructs) based on observed variables (items), comes from the extent to which a construct met the theoretical expectations held *a priori* (Nunnally & Bernstein, 1994; Hausman, 1998). To achieve construct validity, two components of construct validity – convergent, and discriminant – are assessed.

Discriminant validity is assessed by calculating the bivariate correlations between the constructs (Table 12). In this study, significant correlations were expected because of the theoretical relation between constructs and the large size of the sample. Nevertheless, the correlation coefficients should be lower than the reliability coefficients if discriminate validity is to be achieved. The correlations results show that values range from .04 to .69. No pair of correlations exceeded 0.90, suggesting that there is no multicollineraity but indicating that the measures have discriminant validity.

Table 12

Correlation matrix and reliability analysis

Construct	1	2	3	4	5	6	7	8	9	10	α	ρ
1. Motivator	.67'										.77	.77
2. Hygiene	.25*	.70'									.83	.85
3. Entertainment	.39*	-.01	.89'								.90	.91
4. Informativeness	.42*	.04	.71*	.73'							.85	.88
5. Irritation	-.31*	-.11	-.49*	-.42*	.94'						.93	.97
6. Usefulness	.29**	.04	.69*	.6*	.44*	.90'					.91	.96
7. Attitude	.45*	.08	.75*	.65*	.41*	.69*	.83'				.92	.94
8. Flow	.38*	.14	.68*	.46*	.42*	.57*	.64*	.88'			.76	.96
9. Int purchase	-.10	.29**	.51*	.31*	.17	.44*	.27*	.36*	.96'		.97	.97
10. Int return	.26***	.39**	.53*	.47*	.3*	.39*	.35*	.36*	0.8*	.94'	.94	.95

*p < 0.01, **p < 0.05, ***p < 0.1, ρ = composite reliability, α = Cronbach's reliability coefficient
'Square root of variance extracted.

The obvious pattern in the correlation matrix is that with the exception of intention to purchase and intention to return, hygiene does not show statistical

significance in correlating with the other constructs. Furthermore, Table 12 presents the square root of variance extracted (or average variance extracted) for each construct. The square root of variance extracted reflects the overall amount of variance in the indicators accounted for by the latent construct (Fornell & Larcker, 1981). Fornell and Larcker (1981), and Bagozzi and Yi (1988) recommend that the square root of variance extracted should be >.50 for each construct and should also be > the correlations between that construct and all other constructs (Fornell & Larcker, 1981). Again, this discriminate validity assessment does not reveal any problems.

The extent to which multiple attempts to measure the same constructs are in agreement is the issue in convergent validity (Bagozzi et al., 1991; Anderson & Gerbing, 1988). According to Anderson and Gerbing (1988), convergent validity can be tested with a measurement model by examining whether each indicator's estimated pattern coefficient on its posited underlying construct is significant. The measures in the resulting measurement model (discussed further in the next section) showed acceptable convergent validity. All the measures loadings were higher than .5 and t-values were statistically significant at the .05 level. However, it is notable that some factor loadings (MOT1, MOT6, and MOT12, see Appendix A) of the new scales – hygiene and motivator –, though statistically significant, were slightly lower than the 0.5 threshold. Some researchers, however, suggest that a factor loading higher than 0.35 with exploratory scales is considered statistically significant at $\alpha = .05$ for a sample size of 250 suggested (Hair et al., 1998); thus, all the items were retained for the instrument construction. The t-values of retained items factor loadings are presented in Appendix B.

Reliability analysis consisted of assessing Cronbach's αs (Table 12) and suggested acceptable reliability was based on Nunnally and Bernstein (1994) recommendation of scale reliabilities exceeding 0.70 for theoretical research. As can be seen in Table 12, all of the reliabilities were well above this lower bound, suggesting that results were little attenuated by unreliability (Nuannally & Bernstein 1994). In addition to Cronbach's αs, composite reliabilities[8] (ρ), of constructs were evaluated. Composite reliability is a measure of internal consistency comparable to Cronbach's α (Fornell & Larcker, 1981). However, this measure is superior to α in that it does not assume equal item loadings (Howell, 1996). All scales demonstrated acceptable composite reliabilities, i.e., higher than the .6 benchmark (Bagozzi & Yi, 1988), with values ranging from .77 (motivator) to .97 (irritation, and intention to purchase). Cronbach (1951) noted that the degree to which the interrelationships between constructs are inflated by the use of α depends on the degree to which measures of one or more constructs is multidimensional, or "lumpy". In other words, in the presence of multidimensionality, it is inappropriate to use α. In this case, the appropriate reliability assessment of flow, a multidimensional construct, is its composite reliability (= .96) rather than α =.76. Furthermore, the belief in this study is that because the sample comes from the population of interest – Internet users – rather than from student population, inferences of validity and reliability are inherently stronger.

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[8] $\rho = (\sum_i \lambda_i)^2 \Big/ [(\sum_i \lambda_i)^2 + \sum_i \sigma_i^2]$ where λ is the standardized factor loading and σ^2 is the standardized measurement error (i.e., 1 - λ^2).

Assessing Measurement Models with Survey Sample Data

The relationships between the latent constructs and their observable indicators or their outcomes compose the measurement models. Fit measures used to assess the measurement models included the ratio of χ^2 to the degree of freedom (χ^2/df) and Root Mean Square Error of Approximation (RMSEA). The χ^2 statistic fit index tests the hypothesis that an unconstrained model fits the covariance/correlation matrix as well as the given model. In other words, χ^2 compares whether an *over-identified* model is worse fitting than if it was *just identified*[9]. The χ^2 value should not be significant if there is a good model fit. However, a problem with χ^2 statistics is that it is sensitive to sample size; the larger the sample the more likely the rejection of the model and the more likely a type II error (Byrne, 1998). Therefore, the ratio of χ^2 to the degrees of freedom is often used to adjust for sample size effects. In this study, χ^2/df including other indices is used to assess the measurement models.

As already discussed in the preceding chapter, the other model fit indices examined were the root mean square of error approximation (RMSEA), Goodness of Fit Index (GFI), the Adjusted Goodness of Fit Index (AGFI), the Comparative Fit Index (CFI), and the Normed Fit Index (NFI).

For theoretical considerations all the items were run to see the overall model fit to the data. In addition, individual constructs were run separately to assess potential local problems for each construct. Summarize results of the CFA as well as recommended

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[9] An over-identified model is one with positive degrees of freedom. A just-identified model is one with zero degrees of freedom.

values of the fit indices for satisfactory fit of a model to data are presented in Table 13. The CFA model diagram as well as detailed results of the analysis is presented in Appendix B. These results contain the standardized and unstandardized factor coefficients and their corresponding t-values, error variances as well as well as R^2 values for each item. Note that the measurement model for intention to return assessed with only two items was not included in the CFA because it was under-identified.

Overall, the measurement models exhibited a reasonable fit with the sample data (Table 13). The CFA model, as well as the individual models, resulted in χ^2/df ratios less than the threshold value, 3.0 (Bollen, 1989; Carmines & McIver, 1981). RMSEA values ranged from 0.023 to 0.82 indicating acceptable fits (Byrne, 1998; Jöreskog & Sörbom, 1993). Similarly, with exception of GFI and AGF of the overall CFA model, values of CFI and NFI were all above the threshold (.9) for acceptable mode fit (Byrne, 1998; Mulaik et al., 1989). In examining the other fit indices, the models exhibited fit values exceeding the commonly recommended thresholds for the respective indices. Nonetheless, in a discussion on the use of SEM in MIS research Chin (1998) notes that models with good fit indices may still be considered poor based on measures such as R^2, which measures the strength of the linear relationship. In this case, the factor loadings and R^2s indicates a good fit.

The assumptions of multivariate analysis – normality, linearity, and homoscedasticity – were tested for the variables used in the measurement models. Analyses for the assumptions of the multivariate model indicated no statistically significant violations.

Table 13

Test results of the measurement models and structural model

Measurement models	χ^2/df	RMSEA	GFI	AGFI	CFI	NFI
CFA model	2016.18/1194 = 1.69	0.051	0.77	0.74	0.98	0.95
Motivator	23.77/14 = 1.70	0.052	0.98	0.94	0.99	0.97
Hygiene	84.42/68 = 1.24	0.030	0.96	0.93	1.00	0.98
Entertainment	1.23/1 = 1.23	0.030	.98	0.98	.99	1.00
Informativess	2.77/1 = 2.77	0.082	0.99	0.96	1.00	0.99
Irritation	1.41/1 = 1.41	0.039	1.00	0.98	.98	1.00
Usefulness	2.30/2 = 1.15	0.024	1.00	0.98	1.00	1.00
Attitude toward site	11.60/7 = 1.67	0.050	0.99	0.96	1.00	0.99
Flow	188.13/70 = 2.69	0.080	0.91	0.86	0.95	0.91
Intention to purchase	1.14/1 = 1.14	0.023	1.00	0.98	1.00	1.00

The successful CFA results opened the door for the next stage of analysis – model selection and hypothesis testing. With the final survey data, the three *a priori* structural models were assessed for best fit. In this final process, model assessment was done by examining the standard errors, t-values, standardized residuals, modification indices, standardized residuals, and a number of goodness-of-fit statistics (Jöreskog & Sörbom, 1993).

Assessing *a Priori* Structural Models

As mentioned in the previous section, this study involved unsupported theoretical *a priori* models proposing alternative effects among model variables. Based on the recommendation of Jöreskog and Sörbom (1993), model assessment should include evaluation of the solution, measures of overall fit, and detailed fit statistics. Further assessment of fit must rely on substantive, theoretical consideration, not just statistical measures of fit (Pedhazur & Schmelkin, 1994). The first step, for instance, is to look at

the individual parameter estimates to ensure they are of the correct sign and magnitude, based on theoretical consideration.

Model fitting and testing were accomplished using structural equation modeling, employing LISREL to assess model fit for each *a priori* model proposed in Chapter 3. Using theoretical considerations and model fit indices, the best fitting model was identified and hypothesis testing conducted.

Statistical evaluation of Best Fitting models

Selecting the best fitting model involved a number of fit statistics including: chi-square (χ^2), which is a measure of absolute fit of the model to the data; root mean square error of approximation (RMSEA); goodness-of-fit index (GFI); adjusted goodness-of-fit index (AGFI); comparative fit index (CFI); normed fit index (NFI); parsimonious normed fit index (PNFI), and expected cross-validation index (ECVI).

These fit indices, with the exception of RMSEA, were chosen because of their abilities to adjust for model complexity and degrees of freedom. These indices, however, cannot be used to compare across models, but only if these models are hierarchical or nested within each other. However, the three *a priori* models being compared in this study are not nested. Therefore, two commonly used statistical indices, the Akaike's Information Criterion (AIC), and the CAIC (also called Bozdogan's consistent version of AIC – an extension of the AIC, which more strongly penalizes models for lack of parsimony) were used to compare these three non-nested *a priori* models on a common metric. These statistics are seen as appropriate when comparing non-nested models (Lin & Dayton, 1997). Thus, in combination, the chosen statistics provide a clearer picture of model fits. That is, for any given model, one would not expect all measures of fit to be

identical and discrepancies among statistics do not indicate poor fit (Jöreskog & Sörbom, 1993). However, a pattern should emerge when comparing models, with better fitting models having relatively better fit across indices (Jöreskog & Sörbom, 1993).

The analyses were conducted with LISREL 8.53 (Jöreskog & Sörbom, 2003) and weighted least square estimation (WLS) were used as the method of estimation with polychromic correlation matrices and its corresponding asymptotic covariance weight matrices. The results of the analysis of the three *a priori* structural models are presented in Table 14.

Table 14

SEM Results of A Priori Structural Models

Goodness-of-fit statistics	Model 1	Model 2	Model 3
Chi-square (χ^2)	2350.71	2355.08	2128.85
df	1209	1210	1215
χ^2/df	1.94	1.94	1.75
RMSEA	0.058	0.060	0.051
GFI	0.75	0.75	0.78
AGFI	0.72	0.71	0.73
CFI	0.97	0.97	0.98
NFI	0.95	0.94	0.95
ECVI	9.90	10.12	9.31
Saturated ECVI	10.40	10.40	10.40
AIC	2623.71	2681.08	2466.85
Saturated AIC	2756.00	2756.00	2756.00
CAIC	3366.24	3428.19	3241.46
Saturated CAIC	9072.06	9072.06	9072.06
Significance of χ^2 difference	<.05†	>.05‡	>.05*

†difference between Model 1 & Model 2
‡difference between Model 2 & Model 3
*difference between Model 1 & Model 3

Chi-square is a test of absolute fit between model and data (Schumacker & Lomax, 1996). This statistic is generally of little practical use in research, since most

models fail this test of absolute fit (Jöreskog & Sörbom, 1993). Indeed, in this study, all the *a priori* models failed this test, since all had p-values associated with χ^2 of 0.00, indicating that one should reject the null hypothesis of exact fit. Generally, χ^2 divided by the degrees of freedom (df) is typically used for model evaluation. The ratio $\chi^2/df < 3$ is deemed appropriate and $\chi^2/df < 2$ is ideal (Bollen, 1989; Carmines & McIver, 1981). Looking at Table 14, all the models show acceptable χ^2/df. Thus, χ^2/df test supports all the three *a priori* structural models. Though, Model 3 shows a slight edge in achieving the lowest χ^2/df ratio ($\chi^2/df = 1.75$), compared with Model 1 ($\chi^2/df = 1.94$), and Model 2 ($\chi^2/df = 1.94$), other tests will have to be considered in selecting the 'best fit' model.

RMSEA is a measure of model discrepancy per degree of freedom, which incorporates a measure of parsimony into the measure of fit. Jöreskog and Sörbom (1993) explained that RMSEA recognizes that even models fitting reasonably well in the population will tend to be rejected in large samples and uses the population discrepancy function to give less size biased estimates of fit. These authors suggest values up to 0.08 as representative of reasonable fit. More recently, Hu and Bentler (1999) have suggested RMSEA < 0.05 as the cutoff for good model fit. In reference to the 0.08 threshold (Jöreskog & Sörbom, 1993; Bagozzi & Yi, 1988), all the three models display reasonable fit, but again, Model 3 (RMSEA = 0.051) appears to have a better fit compared to Models 2 and 3.

GFI and AGFI assess how much better the model fits when compared to no model, and is less sensitive to changes in sample size which may artificially improve fit (a potential problem with χ^2 as discussed earlier). Whereas Byrne (1998) and Jackson (2003) suggest values >.90, Schumaker and Lomax (1996) suggest values approaching

.90 represent good fit. Comparatively, none of the models demonstrates a good fit as indicated by GFI values lower than recommended (Byrne, 1998; Jackson, 2003). The other indices, NFI and CFI used in this study measure how much better the particular model fits the sample data compared with an independent or null model. As with GFI, values approaching .90 for these statistics represent good fit (Schumaker & Lomax, 1996). The three models give close values of CFI (Model 1 = .97; Model 2 = .97; and Model 3 = .98) and NFI (Model 1 = .95; Model 2 = .94; Model 3 = .95) that are within the acceptable range.

ECVI validates the models while taking into consideration parsimony, and eliminates the problem of making a type II error potential in other comparative measures (Jöreskog & Sörbom, 1993). This statistic, much like the jackknife statistic in regression, measures the discrepancy between the fitted covariance matrix and the one expected from different sample size (Jöreskog & Sörbom, 1993). In general, models with lower ECVI values are the most stable in the population (Schumaker & Lomax, 1996), thus, suggesting superiority of Model 3 over the others.

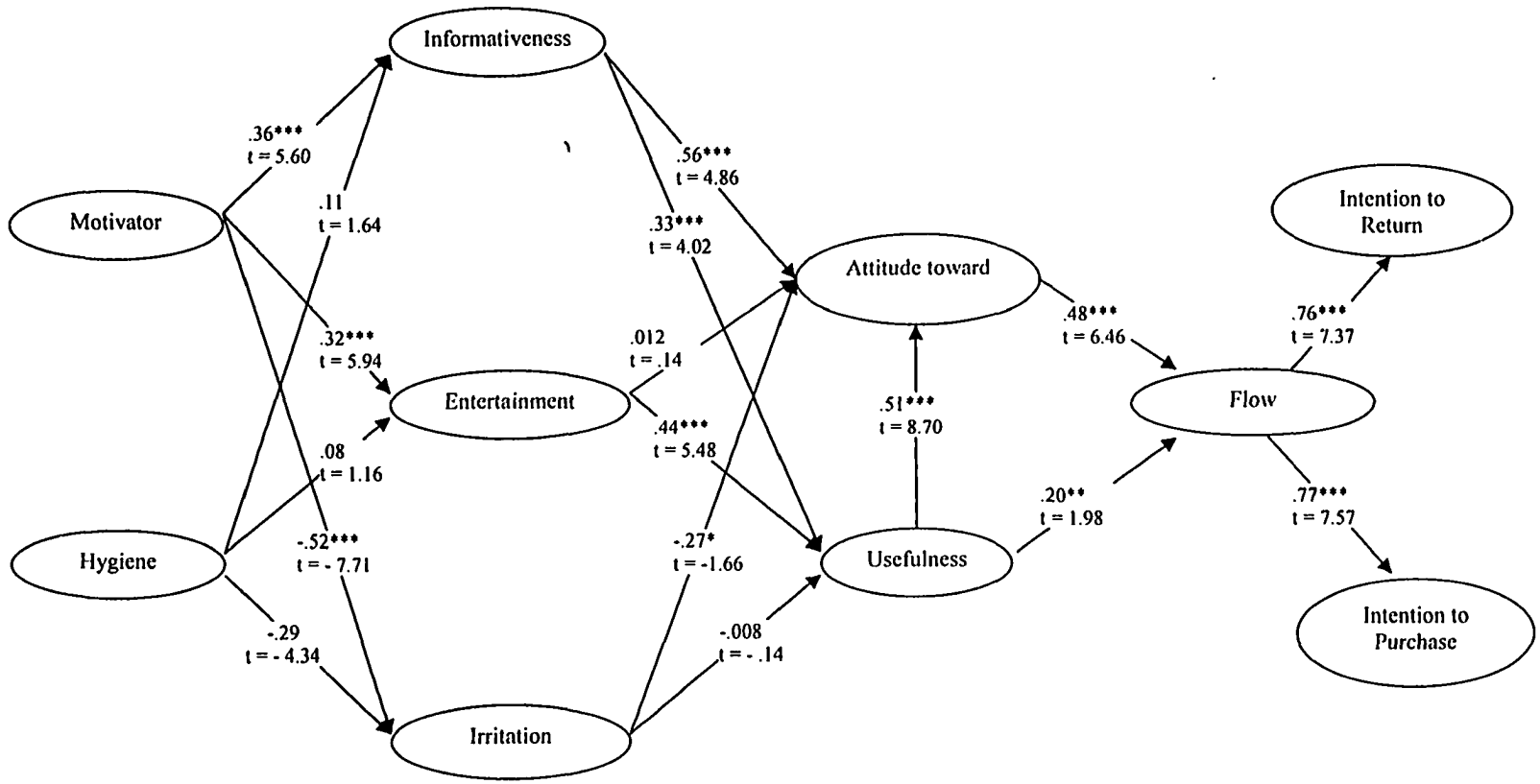
Lastly, indices that compare across models – AIC and CAIC – were examined. The model with the smallest value of these measures (AIC and CAIC) is considered to have a better a fit (Jöreskog & Sörbom, 2003). In this light, Model 3 demonstrates superiority among the three models.

Overall, though Model 3 seems to be the best fitting model, the results did not show substantial discriminations between the models to suggest confidence in one or the other. Therefore, other tests were needed to assess "best fit". As discussed earlier, though χ^2 by itself is of little practical use, it is very useful in a comparative sense, as it is used

in this study, where improvements in χ^2 are assessed and significant improvements can be statistically assessed. Thus, χ^2 difference tests between the models were conducted. The χ^2 difference tests results in Table 14 show no statistically significance between Models 1 and Model 2 ($p < .05$) but statistically difference is observed between Model 1 and 3 ($p > .05$) and between Model 2 and Model 3 ($p > .05$). In addition, an inspection of the standardized residual of these models indicated that only Model 3 had less than 5% of its residuals (57 of the 1378 residuals = 4.1%) exceed the threshold value of 2.58 (Hair et al., 1998). By comparison Model 1 had 91.7% and Model 2 had 93.4% residual covariances below 2.58, indicating Model 3's superiority. See Appendix C for details of standardized residuals.

Based on these measures of fit, Model 3 was selected as the best fitting mode to the data. This model was selected primarily because 1) it has theoretical significance; 2) it produced overall acceptable fit statistics; and 3) when compared with models producing similar fit, it provides a statistically significance χ^2 difference as well as lower covariance residual over the other models. Each path in the figure indicates the associated hypotheses as well as the estimated path coefficients and t-values. Reviewing the t values associated with this model, most are significant (*t*-values for path coefficients greater than 1.65 are significant at $p < .10$; t-values greater than 1.96 are significant at $p < .05$; t-values greater than 2.58 are significant at $p < .01$). The consequence of these results on the proposed hypotheses are discussed in the next section.

Figure 10. LISREL results of *a priori* structural Model 3: Best fitting Model



***Significant at 0.01; **Significant at 0.05; *Significant at 0.1

Results of Hypothesis Testing

The path coefficients in the structural equation model provide direct evidence on whether or not the theoretical hypotheses are supported. The empirical evidence for H1a through H3b can be found in the estimated gamma (γ) coefficients, and the evidence for H4a through H8 can be found in the estimated beta (β) coefficients. According to the LISREL notations, γ coefficients indicate both the direction and strength of the relationships between the independent variables (here hygiene and motivator) and the mediator variables (here entertainment, informativeness, and irritation), and β coefficients represent the relationships among mediator and outcome variables (attitude toward site, flow, intention to purchase, and intention to return).

The standardized path coefficients are illustrated in Figure 10. These coefficients can be interpreted in the same way as the regression coefficients are interpreted. A significant difference is that the estimated γ and β coefficients are "error free" because SEM partials out the measurement errors when estimating these path coefficients. Therefore, SEM is a more powerful statistical tool than regression analysis.

Return to the hypotheses of this study. It was found that two γ coefficients were not statistically significant. Hypotheses H1b ($\gamma_{hygiene \rightarrow informativeness} = .11$, $t = 1.64$) and H2b ($\gamma_{hygiene \rightarrow entertainment} = .08$, $t = 1.16$), which posited that hygiene factor would positively influenced informativeness and entertainment respectively, were not supported. In brief, hygiene features failed to explain a significant amount of variance in the respondents' perception of an entertaining Web site as well as his/her perceived informativeness. The implications of this will be discussed later. However, hypothesis H3b which posited a

negative relationship between hygiene and irritation was supported. In contrast, motivator factor was a significant predictor of informativeness (H1a: $\gamma_{motivator \rightarrow informativeness} = .36$, t = 5.60), entertainment (H2a: $\gamma_{motivator \rightarrow entertainment} = .32$, t = 5.94), and irritation (H3a: $\gamma_{motivator \rightarrow irritation} = -.52$, t = -7.71). In addition, the signs of the coefficients were consistent with the hypothesized directions. The two independent variables – hygiene and motivators – explain 30% of the variance in entertainment; 28% in informativeness; and 38% in irritation.

Hypotheses H4a through H8 concerned relationships among belief constructs (informativeness, entertainment, irritation, and usefulness), attitude toward the site, flow experienced at the site, and the outcome variables of behavioral intentions. Again, referring to Figure 10, one can evaluate these hypotheses by examining the β coefficients. Informativeness is a significant predictor of both attitude toward site (H4a: $\beta_{informativeness \rightarrow attitude} = .56$, t = 4.86) and usefulness (H5a: $\beta_{informativeness \rightarrow usefulness} = .33$, t = 4.82). Entertainment has a positive influence on usefulness (H5b: $\beta_{entertainment \rightarrow usefulness} = .44$, t = 5.48), but surprisingly its influence on attitude toward site was not statistically supported (H4b: $\beta_{entertainment \rightarrow attitude} = .012$, t = .14). As posited, irritation indicated a negative influence on attitude toward the site (H4c: $\beta_{irritation \rightarrow attitude} = -.27$, t = -1.66), but its relationship with usefulness was not statistically significant (H5c: $\beta_{irritation \rightarrow usefulness} = .008$, t = -.14). Consistent with that obtained by Davis et al. (1989), the effect usefulness on attitude toward the site was statistically supported (H4d: $\beta_{usefulness \rightarrow attitude} = .51$, t = 8.70). The four perceptual variables (informativeness, entertainment, irritation, and usefulness) together explain 82% of the variance in attitude toward the site, and

informativeness, entertainment, together with irritation explain 52% of the variance in usefulness.

The hypothesized relationships between attitude toward site, usefulness and flow were also statistically supported (H6a: $\beta_{attitude \rightarrow flow} = .48$, $t = 6.46$; H6b: $\beta_{usefulness \rightarrow flow} = .20$, $t = 1.98$). The amount of variance explained in flow by attitude toward site and usefulness was 83%. Finally, the hypotheses H7 and H8 which posited a positive influence between flow, intention to purchase and intention to return were strongly supported (H7: $\beta_{flow \rightarrow int.\ purchase} = .76$, $t = 7.37$; H8: $\beta_{flow \rightarrow int.\ return} = .77$, $t = 7.57$). Flow accounted for 53% and 60% of the variance in intention to purchase and intention to return respectively. See Table 15 for summary of the results of the hypothesis testing.

Table 15

Summary of Hypothesis Testing

Hypotheses	Relationship	Outcome
H1a	Motivator → Informativeness	supported
H1b	Hygiene → Informativeness	not supported
H2a	Motivator → Entertainment	supported
H2b	Hygiene → Entertainment	not supported
H3a	Motivator → Irritation	supported
H3b	Hygiene → Irritation	supported
H4a	Informativeness → Attitude toward site	supported
H4b	Entertainment → Attitude toward site	not supported
H4c	Irritation → Attitude toward site	supported
H4d	Usefulness → Attitude toward site	supported
H5a	Informativeness → Usefulness	supported
H5b	Entertainment → Usefulness	supported
H5c	Irritation → Usefulness	not supported
H5d	Usefulness → Attitude toward site	supported
H6a	Attitude toward site → Flow experienced	supported
H6b	Usefulness → Flow experienced	supported
H7	Flow experienced → Int. to purchase	supported
H7	Flow experienced → Int. to return	supported

Revised Structural Model

Although the selected model among the three *a priori* structural models that guided this study was statistically consistent with the empirical outcomes, some of the expected relationships did not emerge as significant, leading us to propose and test the reduced mode of Figure 11. The revised structural model is obtained by omitting the non-statistically significant paths. Results of the revised model indicated an improvement only in terms of change in χ^2 test ($\Delta\chi^2 = 42.22$, $\Delta df = 2$, $p > 0.001$). However, there does not seem to be changes with the other fit indices as illustrated in Table 16.

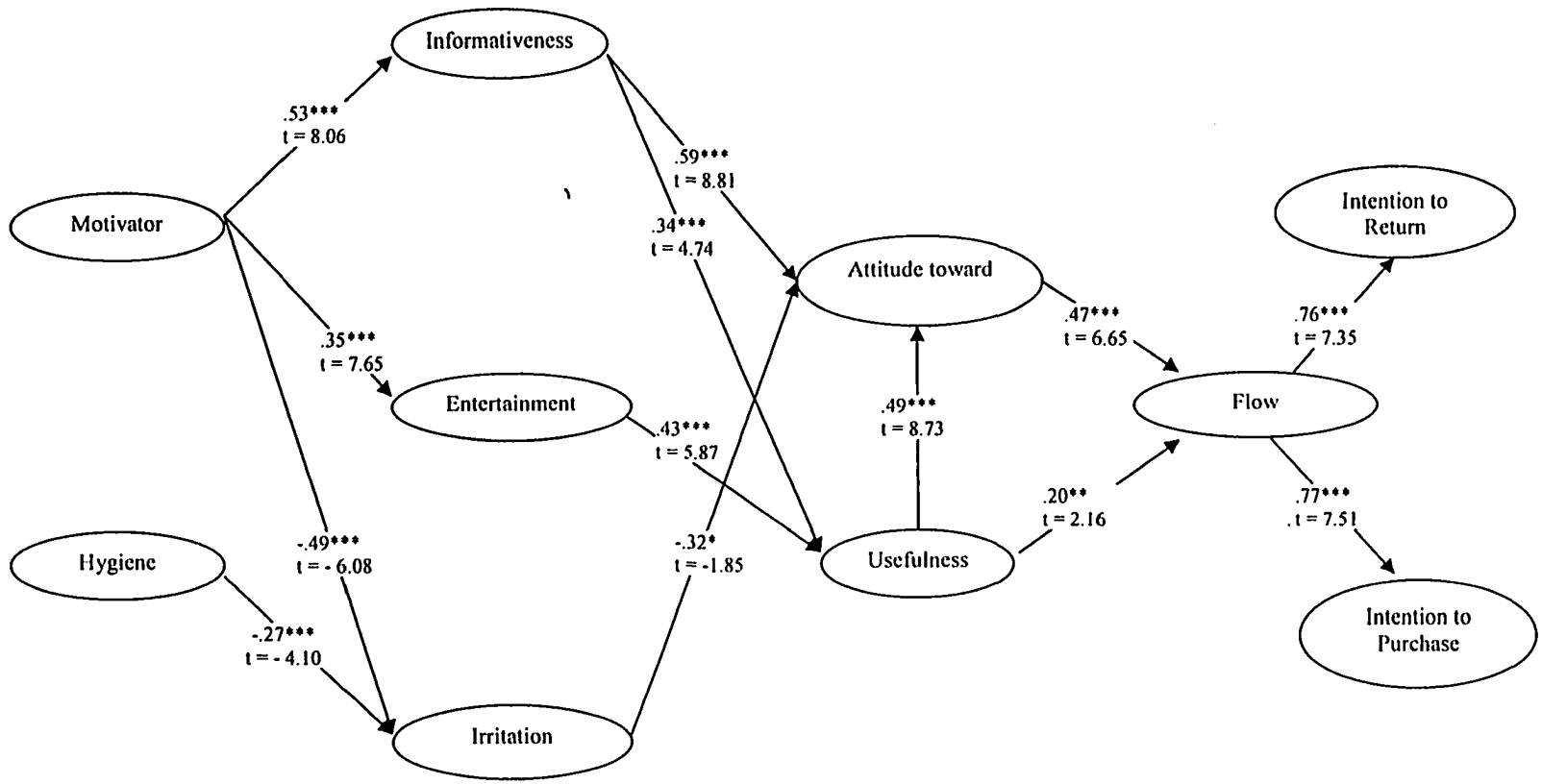
Table 16

Fit measures for the selected and revised models

Goodness-of-fit statistics	Selected (*A priori* Model 3)	Revised Model
Chi-square (χ^2)	2128.85	2054.78
df	1215	1217
Normed χ^2 (χ^2/df)	1.75	1.69
RMSEA	0.051	0.051
GFI	0.78	0.77
AGFI	0.73	0.74
CFI	0.98	0.98
NFI	0.95	0.95
ECVI	9.31	9.12
Saturated ECVI	10.40	10.40
AIC	2466.85	2416.63
Saturated AIC	2756.00	2756.00
CAIC	3241.46	3172.91
Saturated CAIC	9072.06	9072.06

Given the a posteriori nature of this revised model, it can only be offered only as basis for future studies. The reduced model may not fully capture the dynamic properties of Web site features across the broad range of commercial Web site designs. For example, hygiene features influence on informativeness was not statistically supported in this study. However, at certain Web sites the information content or informativeness may be highly determined by the information's logical presentation and organization, a hygiene feature.

Figure 11. Revised structural model



***Significant at 0.01; **Significant at 0.05; *Significant at 0.1

Non-Bias Response Test

Non-response bias is an important source of bias in survey research. Due to the relatively small percentage (10.6%) of responses received from the emailing, it was particularly important to assess the effect of non-response bias on the results. If it is not addressed properly, it can lead to conclusions that differ systematically from the actual situation in the population.

Extrapolation methods, which compare early respondents to late respondents, can be used to predict non-response bias (Armstrong & Overton, 1977; Churchill, 1979). Since late respondents require prompting to respond and are therefore apparently less eager, they are likely to be similar to non-respondents. Thus, if late respondents and early respondents do not differ in certain characteristics, it is less likely that non-respondents will differ significantly from respondents (Compeau & Higgins, 1995). Consistent with prior research, non-response bias was assessed by using extrapolation methods. The midpoint of the data collection period was used as the cutoff point for distinguishing between early and late respondents. 71.8% of the responses (191 out of 266) were from early respondents and the remaining 28.2% was from late respondents (75 out of 266).

To ensure that the early respondents and late respondents did not systematically differ, these two groups of respondents were compared based on demographic data and model constructs using non-parametric and MANOVA techniques respectively.

Before the MANOVA analysis, the Box's Test of equality of covariance matrices and the Levene's Test equality of error variances were assessed. These tests indicate whether the data violates the assumption of homogeneity of covariances matrices. Box's Test significance value was .056, and the Levene's Test also indicated F values with p-

values > .05 across all the constructs, thus, meaning the data does not violate the assumption of homogeneity of covariances matrices. From the MANOVA analysis, no significant differences were found between the early and late respondents at $\alpha = 0.05$ level (see Appendix B). In comparing demographic variables, a nonparametric technique, the Mann-Whitney U test, was employed. The Mann-Whitney U test tests whether or not two independent samples are from the same distribution. In other words, the Mann-Whitney U test is the nonparametric equivalent of the independent t test. The results of the demographics comparison between the late and early respondents indicated differences were with: 1) number or hours per week spent on the Internet (Nettime), and 2) how often they engage in online shopping (NetShop). The non-respondents spend less time on the Internet ($Mean_{non\text{-}respondents} = 2.40$, $mean_{respondents} = 2.63$) and are less likely to use the Internet for shopping than the respondents ($Mean_{non\text{-}respondents} = 1.92$, $mean_{respondents} = 2.31$) (See Appendix B).

These findings suggests that non response did not affect the observed results significantly and were, probably, more a reflection of how often the Internet is used in general, and not how the interface features impacts perceptions. Therefore, based on these findings, response bias could be confidently ruled out in this study.

The Effect of Control Variables

Recall that in prior discussions control variables that have the potential to affect the outcome variables of the proposed model were recognized. For example, it is noted online users are more likely to be male, relatively young (between 20 to 50 years), educated, and come from upper socioeconomic backgrounds (SIQSS, 2000; Pew Research, 1999, NTIA, 2002). The literature also indicates that site loyalty positively

affects both attitudes towards the site and intentions to revisit the site (Supphellen & Nysveen, 2001), and site loyalty may possibly affect site evaluation (Yoo & Donthu, 2001). In addition, Yoo and Stout (2001) found that consumers with a high level of product involvement tended to interact more with a Web site.

This research study investigated the role of these control variables (gender, age, ethnicity, education, income, site loyalty, and product involvement) on the effect of hygiene and motivator factors on informativeness, entertainment, and irritation. The fundamental argument is that consumers in different categories of these variables will have different perspectives of Web interface features, consequently leading to different perceptions of the site.

A multivariate analysis of covariance (MANCOVA) was conducted using informativeness, entertainment, and irritation as dependent variables, and the control variables as the independent variables. Since this study proposed, from extant literature, that hygiene and motivator factors affect perceptions of the Web site, they were added here as covariates. Site loyalty, measured using Likert-type scales (See Questionnaire in Appendix A), was recoded into "low site loyalty", "medium site loyalty", and "high site loyalty". Similarly, product involvement was recoded into "low involvement", "medium involvement", and "high involvement".

The results show that with the exception of Internet experience, there is no statistical support that gender, age, education, ethnicity, and income, influence consumers perceptions of a Web site based on interface features (Table 17). On the contrary, the MANCOVA revealed that product involvement and site loyalty controlled the relationship between interface features and user perceptions of the Web site. (Table 18).

The tests of between-subjects effects (Table 19) revealed that product involvement significantly affected informativeness (F = 6.13, p =.00), and irritation (F = 14.11, p = 0.00), but marginally so with entertainment (F = 2.72, p = .07). On the other hand, site loyalty was statistically significant across informativeness, entertainment, and irritation. The interactive effect of both involvement and loyalty was significant with only irritation (F = 4.81, p = .00). Visual inspection of the interactive effects between involvement and loyalty (see Appendix C), revealed that the difference in perceptions across the three perceptual variables (informativeness, entertainment, and irritation) is obvious at high involvement.

Table 17

Effect of demographic variables on consumers' perceptions of Web site

Effect		Value	F	Hypothesis df	Error df	Sig.
Gender	Pillai's Trace	0.011	0.868	3	237.0	0.458
	Wilks' Lambda	0.989	0.868	3	237.0	0.458
	Hotelling's Trace	0.011	0.868	3	237.0	0.458
	Roy's Largest Root	0.011	0.868	3	237.0	0.458
Ethnicity	Pillai's Trace	0.059	1.190	12	717.0	0.286
	Wilks' Lambda	0.942	1.194	12	627.3	0.283
	Hotelling's Trace	0.061	1.197	12	707.0	0.281
	Roy's Largest Root	0.049	2.918	4	239.0	0.022
Age	Pillai's Trace	0.044	0.889	12	717.0	0.558
	Wilks' Lambda	0.957	0.885	12	627.3	0.563
	Hotelling's Trace	0.045	0.880	12	707.0	0.567
	Roy's Largest Root	0.025	1.477	4	239.0	0.210
Income	Pillai's Trace	0.144	1.559	18	558.0	0.066
	Wilks' Lambda	0.863	1.550	18	520.9	0.069
	Hotelling's Trace	0.152	1.539	18	548.0	0.071
	Roy's Largest Root	0.069	2.154	6	186.0	0.049
Education	Pillai's Trace	0.043	0.892	9	558.0	0.532
	Wilks' Lambda	0.958	0.891	9	448.0	0.533
	Hotelling's Trace	0.044	0.889	9	548.0	0.534
	Roy's Largest Root	0.035	2.188	3	186.0	0.091
Internet Experience	Pillai's Trace	0.092	1.965	9	558.0	0.041
	Wilks' Lambda	0.909	1.982	9	448.0	0.040
	Hotelling's Trace	0.098	1.990	9	548.0	0.038
	Roy's Largest Root	0.077	4.767	3	186.0	0.003

Table 18

Effect of product involvement and site loyalty of perceptions of Web site – MANCOVA results

Effect		Value	F	Hypothesis df	Sig.
Involvement	Pillai's Trace	0.119	5.37	6	0.000
	Wilks' Lambda	0.882	5.46	6	0.000
	Hotelling's Trace	0.132	5.54	6	0.000
	Roy's Largest Root	0.117	9.94	3	0.000
Site Loyalty	Pillai's Trace	0.073	3.19	6	0.004
	Wilks' Lambda	0.927	3.24	6	0.004
	Hotelling's Trace	0.078	3.29	6	0.003
	Roy's Largest Root	0.078	6.62	3	0.000
Involvement * Site Loyalty	Pillai's Trace	0.083	1.82	12	0.041
	Wilks' Lambda	0.917	1.85	12	0.038
	Hotelling's Trace	0.089	1.87	12	0.035
	Roy's Largest Root	0.079	5.04	4	0.001

Table 19

Effect of product involvement and site loyalty of perceptions of Web site – Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	F	Sig.
Involvement	Informativeness	12.4	2	6.130	0.003
	Entertainment	6.8	2	2.716	0.068
	Irritation	55.2	2	14.114	0.000
Site loyalty	Informativeness	8.7	2	4.312	0.014
	Entertainment	24.2	2	9.721	0.000
	Irritation	9.5	2	2.428	0.090
Involvement * Site Loyalty	Informativeness	6.2	4	1.537	0.192
	Entertainment	11.1	4	2.235	0.066
	Irritation	37.6	4	4.813	0.001

CHAPTER VI

DISCUSSION, IMPLICATIONS, AND CONCLUSIONS

This section reviews the research objectives and discusses the relationships between these objectives and the study findings. It also addresses the implications of this study for both academics and practitioners. Finally, this chapter points to some of the limitations of this research and proposes future projects related to this study.

Summary of Research Objectives

The stated objectives of this study were to develop an understanding of Web design interface features in theoretical terms and to determine their effect on consumer online shopping intentions. Specifically, this study looked at how interface features could be organized into dissatisfier (hygiene) and satisfier (motivator) constructs. The project also looks at the constructs mediating the effect of interface features online shopping intentions. By understanding these effects, e-tailers can choose appropriate design techniques in the development and implement more effective e-commerce sites.

Prior researches have been limited to investigating on the frequency of use of the Web but not online shopping per se (e.g., Novak et al. 2000). Few Web studies are based on either theoretical frameworks or empirical evidence (Small, 1998; Wilkinson, Bennett, & Oliver, 1997). Those that have dealt with Web design features are mostly narrow in their investigation of single or limited number of features and mostly measure direct impacts on various dependent variables (e.g., switching, attrition, customer satisfaction,

customer loyalty, etc.) without consideration any intervening perceptions or beliefs and attitudes. As was demonstrated in this study, these factors can significantly affect consumer online shopping intentions.

Efforts to reach these objectives involved developing *a priori* theoretical models (as shown in Figures 4, 5 and 6) for empirical testing. These models proposed a series of relationships among interface features, perceptions, attitudes, flow experienced, and online shopping intentions. A necessary condition for investigating these construct relationships for this study was to obtain real consumers with Internet access who currently shop online or are potential participants of online shopping.

Classification of Interface Features

Innovations in Web technology has enabled countless numbers of interface features to the extent that it is impracticable to investigate individually the characteristic and effects of these features on usability. As such, a form of classification of these features is called for. Past researchers have proposed applying Herzberg's two-factor theory in the Web environment where Web interface features could be classified as motivators (satisfiers) and hygiene (dissatisfiers) (Zhang et al., 1999; 2000; Liang & Lai, 2001). This study recognizes the relevance and importance of such theoretical categorization of features and, therefore, adopted this approach in the current study to investigate the effect of design features on consumers' shopping intentions. In phase I of the methodology of this project, commonly encountered Web interface features were identified and Herzberg's two factor theory was imposed in classifying the Web features.

In contrast to the expectation based Herzberg two-factor theory, the classification of Web features resulted in three categories. It was found that certain features were

clearly identified as hygiene or motivational in nature. For example, those features describing the functionality and security of a Web site are consistently identified as hygiene in nature by most survey subjects. Conversely, among the motivational characteristics of Web sites are those that enhance cognitive outcomes, enjoyment, visual appearance and credibility. Like previous studies (Zhang et al., 2000) these results suggest that a two-factor theory may provide a framework for Web designers who want to increase user satisfaction and decrease dissatisfaction. However, a third class of features could be clearly classified to the two factors of hygiene and motivators, perhaps, due to individual differences in Web skills. These results do not contradict prior research findings in the Web context. For example, Chen and Wells (2001) found that .com satisfaction and .com dissatisfaction are partially, but not completely independent; just as they are partially, but not completely equal and opposite. By interviewing Web developers they suggested that at least three kinds of facets helps describe, explain, and predict .com satisfaction and dissatisfaction. The findings in this study, therefore, answers the first question addressed in the research project – whether it is plausible to organize interface features into theoretical constructs that help managerial understanding of Web design and practical application in Web design. The immediate implication of this is that it aids in theory development and testing as demonstrated in this study. Other implications are discussed later sections.

The Category of Interface Feature Counts in Shaping Consumer Perceptions

The findings in this study indicate that there are differences between the effect of hygiene and motivator factors on consumer perceptions of a Web site. The hypothesis testing results indicate that motivator features are positively associated with

informativeness, entertainment, usefulness, but negatively associated with irritation. However, the results show that hygiene factor has no significant influence on informativeness and entertainment, but showed a positive influence on usefulness and a negative influence on irritation.

These results are not contradictory with past research findings. Chen and Wells (1999) found that the entertainment factor is best defined by fun, exciting, cool, imaginative, and flashy. These factors may serve consumer needs for escapism and, therefore, are motivators more than they are hygiene. With informativeness, one would expect that well-defined Web content captures the attention of its visitors and lengthen the duration of the visit. Indeed, information gathering is the oldest and most frequent web usage. A successful information site provides quick, relevant and accurate information the visitor can trust. However, the structure of the information (i.e., the logical flow of information or information structure) may differ from the amount of information (informativeness). Whereas the former is necessary to understand the content and navigate through a site (i.e. hygiene), the latter relates to the amount of information perceived by the user to be relevant. For example, providing detailed product information (e.g., price, discounts, performance, and dimensions such as color, shape, size, etc) may strongly motivate the consumer and help shape his/her perceptions of informativeness, and not necessarily the information structure about the site.

These findings on the impact of interface features are consistent with Hezberg's theory. Herzberg argued that hygiene factors must be dealt with before motivation and resultant productivity increases can occur. Motivator factors rather than hygiene factors provide the real motivation for productivity by workers. Applying this to this study's

findings suggest that in the Web design process, perceived usefulness and irritation issues which are affected by hygiene features should be dealt with first before going on to address issues pertaining to informativeness and entertainment at the site.

Importance of Attitudes and Flow Experienced at the E-Store

The hypotheses tests results indicated that consumers perceived usefulness, irritation, and informativeness significantly influenced attitude toward site. Surprisingly, entertainment's relationship with attitude toward site was not statistically significant. This may mean that providing an entertaining site that is not related to the shopping experience expected at the site may not necessarily lead to attitude development about the site. For example, if a site that sells laptops contains humorous content such as cartoons and animation that do not relate to the performance or the buying process of computers, consumers may not necessary develop positive attitudes about the site even though they may stop over to enjoy one or two jokes. At landsend, for instance, users may enjoy creating and fitting clothes to their virtual models as entertainment. However, if other aspects of the site are irritating, consumers will dislike shopping for clothes at the site. Thus, more research is needed in this direction to identify the levels and types of entertainment that lead to consumer attitude development.

Consistent with other studies that have shown that customers want quality Web sites (Jarvenpaa & Todd, 1997), this study found that if they do not perceive an e-store as being useful, informative, and not irritating, they will not develop positive attitudes toward the site. Therefore, the results suggests that e-stores can stimulate a positive attitude by increasing their perceived usefulness and informativeness both by providing as much technology features as possible to aid the decision making process (such as

search engines, one-click checkouts, recommendations) as well as providing clear page layout and improve site organization to minimize irritation.

Attitude toward the site in past research is found to be a strong determinant of shopping intentions. Attitude accounted for almost one-third of the variation in intention to purchase apparel in online shopping context (Shim & Drake, 1990). The results of this study support this finding by demonstrating a significant positive relationship with both intention to purchase and intention to return.

In addition to perceptions and attitudes, the literature on Web design suggests interactivity to facilitate user navigation process at the Web site. In 1996, Hoffman and Novak extended Csikszentmihalyi's (1975) work to consumer navigation on the Web. They proposed that users return to web sites that facilitate flow and suggest that online marketers offer these flow opportunities (Hoffman & Novak, 1996). Nearly 45% of the users they surveyed experienced flow online.

In the study, the relationship between consumer perceptions and flow experienced were investigated and found that there is statistical significance between entertainment, informativeness, usefulness and flow experienced at the site. Once users are in the right place to do what they want such as get information, entertainment, and/or shop, flow comes into play as an attribute of how much work they need to do to satisfy their goal. Not surprising, irritation had no influence on flow. That is, users are unlikely to experienced flow at commercial Web sites that are irritating since they can click their way to other sites. With flow experienced, the results also indicate a positive relationship both to intention to purchase and intention to revisit as hypothesized.

Consumer Demographics and Online Shopping Intentions

Past research on online behavior has yielded mixed results regarding the importance of online consumer demographics on behavior and attitude (Jarvenpaa & Todd, 1997; Korgaonkar & Wolin, 1999). This study looked at the possible effects of gender, age, education, income, and ethnicity. The results show no significant relationships between these variables and online consumer purchase and revisit intentions. This may be a reflection of the "equalizing" effect of the Internet and the Web. At the introductory stage, the technology and e-commerce may have imposed restrictive characteristics to the extent that demographic segments played a role in its adoption and use. As the technology matures these demographic grouping may tend to disappear. In fact, a UCLA Internet project report (2003) questioned whether we should redefine the "digital divide". Developments with the Internet and Web may parallel those in past with technologies such as public switched telephone network (PSTN) or plain old telephone service (POTS).

However, the effect of other confounding variables (Internet skills, measured as poor, fair, good, and excellent, site loyalty and product brand involvement measured with a 7-point likert-type scale) on consumer purchase and revisit intentions demonstrate statistical significance. The brief implications are that despite the importance of the Web site, e-tailers still need to undertake other marketing programs to promote site loyalty as well as product brand loyalty. In fact, a Jupiter report shows that 22% of shoppers indicate that their preference for online buying incentive is a loyalty program (Gutzman, 2000).

Research Contributions and Implications

Innovation adoption and technology acceptance have been important research topics in many fields including MIS and Marketing. Unquestionably, e-commerce is one concept which represents a radical innovation in both technological and commercial senses, however, few theoretical and empirical studies have investigated what technology, in this case a commercial Web site, features motivates consumers to accept or reject online shopping. This research was intended to fill this gap. The current study contributes to academic and practical research in several aspects.

Academic Implications.

The research communities should benefit from these findings in several ways. Theoretically, the current research addresses a timely issue – adoption of online shopping. In recent years, the usability research and practices have seen a surging interest in improving Web sites (Nielsen, 1993; 1999a; 1999b; 1999c; 2000; 2001; Lohse & Spiller, 1998; Zhang et al., 1999; 2000; Liang & Lai, 2001). In a sense the current research corresponds to this trend.

Different from previous research that often focuses attention on observable and tangible antecedents of online shopping adoption, the current research emphasizes unobservable and intangible characteristics, which can be referred to as individual perceptions and attitudes toward the Web site. The empirical results of this study indicate the important role of consumer perceptions and attitudes as well as flow experienced in Web design's impact on online shopping decisions. Moreover, the study used a behavioral approach to investigate the Web interface factors affecting online shopping.

Besides investigating the relationships among constructs, this study empirically examined some new constructs, as they were relatively new to marketing and information systems research. The constructs of hygiene and motivator were recently introduced into IS research (Zhang et al., 1999; 2000; Liang & Lai, 2000). These constructs, which are particularly relevant to workplace productivity, however, have been lightly examined in the IS and marketing literature. As evidence of this point, this research notes that there were not well-validated measurements for these constructs in information systems research. In that, the purpose of creating an e-commerce site is similar to creating a motivating workplace, examination on these satisfaction-related factors in the Web environment appears quite critical.

Hygiene and motivator constructs have been focal constructs in this study. As a practical solution to the non existence of measures to these constructs, working perceptual measures to these constructs were developed based on Zhang et al. (1999; 2000) conceptualization of interface features. Results from the study provide some insights regarding these constructs. These measures, after revisions, showed adequate reliability (Cronbach's > .80) and convergent validity. Discriminant validity was also satisfactory (average variance extracted = 0.67 and 0.70 for motivator and hygiene respectively). However, subjects' evaluation and classification of a substantial number of features could not be clearly categorized into hygiene or motivator factors. The expectation was that based on the definition of these constructs, a Web feature should clearly fit into one or the other. This discrepancy from theoretical projection was possibly due to individual differences in Internet experience and other Internet use factors. Despite the discrepancy, features selected in this study as core hygiene and core motivators

substantiated the relationships between Web design and consumer perceptions indicating that they were nomologically valid for the study. This, discrepancy, however, indicated a possible future research direction – searching for more generalizable measurements of hygiene and motivator factors.

Flow is one of the experiences that customers expect from e-stores (Hoffman & Novak, 1996). Results of this study show that the measure of flow as a multidimensional construct was adequate in reliability and convergent validity. The results indicate intentions to purchase and revisit the site is positively influence by flow.

Finally, the last but not the least major academic contribution of this study is the extension of knowledge base regarding consumer behavior and media choice. The extension resides in the following practices. First, this study tests models and theories in e-commerce settings new to traditional media choice and consumer behavior research. As e-commerce continues to encroach on traditional commerce, business needs to understand how new consumer interaction forms affect business assumptions and strategies. This study lends insight into how theoretical models of consumer behavior apply to e-commerce. Furthermore, as more businesses open their online channels, marketers also need to understand how their theories adopt. Second, traditionally in IS and HCI research user interface design is an issue concerned with usability engineering. This study tests the effects of features on consumer behaviors, extending usability to exploration in new domains. Born out of communications research, traditional ideas of how consumer needs (e.g., cognitive and social needs) dictate media choice are transferred effectively to the impacts of user attitudes and patronage intentions.

Lastly, this study explores a new approach of online data collection and deploying real e-commerce sites for online shopping simulation experimental tasks. Prototype designed sites often omit important elements of a real e-commerce site. The use of real settings in a survey is not new in the areas of marketing and IS research. However, using real e-commerce sites and data collection has demonstrated that this is an effective approach to study e-commerce. By its very nature, e-commerce research calls for e-approaches.

Managerial Implications.

The current research findings also have significant managerial implications for e-commerce practices. As discussed in Chapter 1, excellent customer service and support are critical to e-business success. Excellent customer service and support increases customer satisfaction, and loyalty, encourage customer purchase and word-of-mouth recommendations (Pastore, 2000). As a desirable quality in building customer relationship, facilitating customer support, and converting visitors into customers, the site design is believed critical to customer interaction, customer service, and support in e-commerce activities (Upshaw, 1995; Ghose & Dou, 1998).

This study examined interface features and their relationships with salient constructs in the consumer online shopping experience. In Phase I, for example, the research explored the classification of Web interface features into groups based on theoretical foundations. A practical implication is that Web sites or e-stores may be designed by optimizing these features to achieve customer satisfaction. Knowing that hygiene features are necessary but not sufficient to motivate online shoppers is critical in site design. The absence of theoretical based guidance for Web design has resulted in

over-blown technologies that may irritate or frustrate the online user rather than the aiding the user in undertaking shopping tasks

Phase II explored some psychological mechanisms underlying individuals' decisions about purchasing products or services on the Internet. This line of inquiry, although popular in marketing literature, has been largely overlooked in the studies on consumer behavior in the context of online shopping. The reported empirical findings indicate that cognitive and psychological factors do have meanings when we attempt to understand what motivates the online shopper. In short, designers may need to take another look at Web interface features based on consumer perceptions and attitudes.

In the Internet era, consumers are gaining more and more autonomy and bargaining power. If the e-tailers want to appeal to their customers, they must know what the latter prefer. In other words, successful consumer relation management should be based on an in-depth understanding of the consumers' minds and hearts. In view of this necessity, online behavioral research should be given more attention. Take the findings of this study as an example; motivator Web features may influence the consumers' perceived entertainment of the Web site which in turn positively influences the attitude developed about the site. Accordingly, Web designers may add motivator features such as the use of humor, 3d virtual models to attract and motivate consumers to purchase and revisit the site. On the other hand, Hygiene features should be considered primary in every site design to allow consumers to understand the site layout and navigate in their search for products and services offered at the site.

Limitations and Further Research

This study is not without limitations. In fact, the current findings resulted from an extensive study but only managed to scratch the surface of what determines online consumer behavior and attitudes. Much further research is necessary until we have a clear picture of the major factors that influence the way people feel, think, make decisions, and purchase on the Web. The findings indicate several promising future research directions.

A first limitation of this study is that it is cross-sectional. The way that Web features were identified and selected e-stores evaluated is static, in that it merely reflects a relationship between Web site design features and consumer perceptions and attitudes only at point in time. Thus, caution must be taken when generalizing findings obtained in this study. In particular, Web sites are dynamic in their developments; therefore, a longitudinal survey is needed to identify the changing roles of Web features as perceived by consumers along side Web technology advancements and consumer continued use of the Web services.

The use of students as a population for Phase I survey experiment posed as a limitation. This study recognized that student samples have often been criticized for their lack of generalizability and their inability to represent the population of interest (Gordon, Slade, & Schmitt, 1987). However, the view here is that these criticisms might be less applicable to this study. For one thing, this study is focused on revealing the psychological processes of potential, as well as current online consumers (Internet adopters); in this sense college students are part of this population. Furthermore, college students engage in online shopping. According to a National Association of College Stores (2003) survey, most college students, 72%, make a general range of purchases on

the Web. Thus, clearly, students are currently part of online consumers. Second, classroom settings may create higher levels of overall involvement with the material presented; therefore, the results may not be typical of consumer responses to actual classification of Web features.

This research was conducted on the B2C market. It is reasonable to assume that business markets would react differently to some of the factors identified in this study. For example, entertainment might be of lesser importance for the business market relative to the consumer market. Investigating B2B market behavior, therefore, would improve the understanding managers have of how to attract potential customers to their shopping sites.

It is have seen that Web features affect the shopping experience in this study. This may be affected by the shopping context in which the consumer is making a purchase. Further research can determine the types of products or e-stores where certain Web features are more important. Perhaps for leisure products (such as music and books), entertaining features may be more important, whereas for utilitarian products (such as detergents and construction equipment) features related to perceived informativeness has a larger impact. It is possible that flow is a more significant determinant of consumer behavior in e-stores that are more interactive in nature such as online auctions. More research can verify or reject our speculations.

There are many other factors that can influence the shopping experience. In fact, with the proliferation of broadband technologies, the shopping experience becomes richer and more engaging. Will we see consumers demanding for more Web features in exchange for loyalty? Or will we see them lose more control over what they see and do

on the Web? Future research can study the impact of features such as product value co-creation (e.g., customer reviews and product customization) that are largely fed by the consumers. Recent research suggests that time-related factors (e.g. download time) of Internet shopping might affects consumers (Rose & Straub, 2001). The time spent in the site, therefore, should be taken into account in the design process. Likewise, the understanding of shopping behavior on the Web will gain from studying the time variable in this context. Furthermore, even though this research study incorporated flow to capture the interactivity and extent of involvement with the shopping process, future studies could include other antecedents of flow such as telepresence.

The ability to buy from anywhere in the world at anytime brings consumers from all over the world into one international marketplace. Here they can exchange information, interact socially, and influence each other's purchasing decisions. Does this lead to more universal consumer profile where cultural and ethnic factors matter less? Research similar to what is conducted in this dissertation will have to be replicated in different parts of the world to determine whether consumers will remain different or become more similar with time. Lynch and Beck (2001), using a sample of advanced Internet users from 20 countries found differences in beliefs, attitudes, perceptions, and Internet buying behavior depending on country of origin.

How does the knowledge about online consumer behavior affect the overall strategic development of Web-based companies? Knowing that loyalty is highly dependent on the Web design could, for example, shift the mission statement of an e-tailer from simply a provider of goods to a comprehensive Web site where customers can

buy, have fun, and enjoy themselves. The strategic implications of research on online consumer behavior remain largely an uncharted territory.

Finally, the shopping tasks conducted in this study only examined a two product categories (i.e., apparel & computers). While the apparel industry and the PC industry comprise a significant portion of online sales, it provides a relatively small test of Web interfaces. Future research should address this issue within a broader range of product categories and industries.

Conclusion

Technology advancement has made online shopping the object of intense media interest and retailer enthusiasm. This research project identified and pooled together a set of Web design features and mediating factors affecting customers' intention to purchase and revisit a Web site. Specifically, this study empirically addressed the Web interface design issue in a B2C e-commerce context. To this end, we verified the applicability of Herzberg's two-factor theory in classification of interface features and investigated the relationships between these Web interface features, consumer perceptions, attitudes, and purchase intentions.

A number of interesting results were found. The study found statistical significant support for the relationship between motivator interface features and four consumers' perceptions considered in this study (informativeness, entertainment, irritation, and usefulness), and also between hygiene interface features and two of the perceptual variables (irritation, and usefulness). The study also found significant support for the relationships between most of the perceptual variables and attitude toward the site as well as flow experienced at the site. Last but the least, the role of attitude and flow

experienced in determining purchase and revisit intentions also received a significant support. Overall, the results of this study provide important insights into the online consumer experience, with implications for academic research and e-commerce system design.

From the standpoint of academics, this study extended research in consumer behavior and MIS in the online shopping context within the hypermedia environment. In addition, it built a foundation upon which further research regarding system design and customer relationship management could be pursued in the online context. It also expands the knowledge base of consumer behavior and MIS to accommodate the increasingly important area of e-commerce system design and online customer relationship management by incorporating relatively new variables that are traditionally out of the domain of these disciplines.

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APPENDICES A

QUESTINNAIRE DEVELOPMET

List of Interface features for classification into Hygiene and Motivator Factors

	Web Feature
F1.	Attractive screen background
F2.	Access restrictions (e.g. password/registration requirements)
F3.	After purchase tracking services (e.g. through toll free tel. numbers, tracking number at Web site)
F4.	Animated graphics/text' (e.g. scrolling, bouncing, flying text characters) is desirable
F5.	Absence of gender/racial/ethnic biases
F6.	Background music
F7.	Bright Web pages
F8.	Buyer club features (e.g. VIP membership)
F9.	Ability to 'cancel' order at anytime
F10.	Pictures of celebrities (e.g. Michael Jordan, Britney Spears, etc)
F11.	Choice of product shipping (e.g. overnight delivery, regular mail, etc)
F12.	Colorful and clear hyperlinks
F13.	Company logo on Web pages
F14.	Consistent style of Web pages
F15.	Ability to customize the background color
F16.	Ability to customize media type (e.g. text only display, text + graphics, graphics, animation, etc)
F17.	Declaration of the intended use of customers' supplied info. (e.g. not to provide to venders, not for marketing purpose, etc.)
F18.	Detailed product descriptions (e.g. features, quality, performance etc)
F19.	The site showed eye catching homepage title
F20.	Familiar terminology
F21.	Ability to perform global search while at the site (i.e. search entire Internet – Google, Excite, Yahoo, etc)
F22.	Indication of page/file download times
F23.	Images of national/cultural symbols/icons
F24.	Provision of links to company affiliates
F25.	Ability to acquire new knowledge from using the site
F26.	Ability to use a local site search engine (i.e. within the company's Web site only)

List of Interface features for classification into Hygiene and Motivator Factors (Cont.)

F27.	Provision of links to other Web sites that sell similar products
F28.	Provision of adequate on-screen 'Help' messages (e.g. tool tips, links to terminology explanations/definitions, etc)
F29.	Logical info. presentation in Web pages
F30.	Ability to observe online product demonstration
F31.	Offer of order confirmation (e.g., thank you page, email message)
F32.	Indication of number of visitors to the site (e.g. shown by a counter)
F33.	Ability to create a personalized folder (e.g. my account info.)
F34.	Experienced pop-up ads while at site
F35.	Presentation of product images in both thumbnail and large formats.
F36.	Product images displaying the different parts of the product (e.g. front/back view, top/bottom view, sides view, inside view, etc)
F37.	Allow product return
F38.	Sell both new and used products
F39.	Provision of feedback features. (e.g. comments box, rate service, etc)
F40.	Recommendation of product substitutes (e.g. customers who bought product X also bought Y)
F41.	Presence of 'Return to Homepage' button on each page
F42.	Indication of security/secure site assurance (e.g. "you are entering a secured site" message, show 'lock' symbol, use of https in URL, etc)
F43.	Clear displays of page contents
F44.	Presentation special effects of text (e.g. glowing, rainbow, etc text)
F45.	Presence of a sitemap menu option
F46.	Presence of clear table of contents (e.g. clear menu items) in each page
F47.	Presence of shopping cart
F48.	Absence of unbiased information
F49.	Nondiscrimination between the type of browsers (Internet Explorer, AOL, Netscape can be used)
F50.	Presence of up-to-date info.
F51.	Be able to 'Undo' a lot of my actions to reverse control
F52.	Assurance of customer's privacy
F53.	Use of humorous content at the site (e.g. cartoons, short jokes, etc)
F54.	Variety of payment methods (e.g. money order, checks, credit card, etc)
F55.	Variety of contact features (email/toll free/chat room to contact sales personnel, technical support, other customers etc)
F56.	Presence of virtual reality features in product presentation (e.g., 3D product images, virtual models)
F57.	Gift services (e.g., rapping, reminders, certificates) were offered at the site
F58.	Presence of FAQ section
F59.	Have various language options (e.g., Spanish, French, etc)
F60.	Embedded Ads (i.e. ads as part of Web page content)

SCREENING OF RESPONDENTS

Herzberg's Two- Factor Theory: Quiz

Your Full Name: _____ Your ID#: _____

1. This theory states that two separate and distinct aspects of the work environment are responsible for motivating and satisfying employees.
   a. Herzberg's two-factor theory. b. job characteristics theory.
   c. equity theory. d. Hackman-Oldham job enrichment model.

2. Frederick Herzberg theorized that employee satisfaction depends on two sets of issues:
   a. "hygiene" and "dissatisfiers" b. "hygiene" issues and motivators
   c. motivator and satisfiers d. salary and working conditions

3. In Herzberg's two factor theory of motivation, one such factor that causes or prevents job dissatisfaction relates closely to
   a. Maslow's lower-level needs b. Maslow's top-level needs.
   c. Self-Actualization d. Exploitive authoritarianism

4. According to Herzberg's two-factor theory of work motivation, a motivating factor is a satisfier and a hygiene factor is a(n)_____
   a. unsatisfier b. not satisfier
   c. dissatisfier d. none of the above

5. According to Herzberg's two-factor theory of work motivation, the opposite of satisfaction is dissatisfaction.
   a. True b. False

6. Based on Herzberg's two-factor theory classify each of the following as either hygiene or motivator factor

	Hygiene	Motivator
a. Achievement	[ ]	[ ]
b. Advancement	[ ]	[ ]
c. Company and administrative policies	[ ]	[ ]
d. Interpersonal relations	[ ]	[ ]
e. Recognition	[ ]	[ ]
f. Responsibility	[ ]	[ ]
g. Salary	[ ]	[ ]
h. Supervision	[ ]	[ ]
i. Work itself	[ ]	[ ]
j. Working conditions	[ ]	[ ]

SURVEY QUESTIONNAIRE – Phase I

Thank you for agreeing to participate. This survey consists of two parts. Your participation will be structured as follows:

First, you will be asked to answer a few **demographic questions** (part I) and upon completion of that part you will be directed to an **online store**. You will then be asked to **simulate** an online shopping process. Once you complete your visit of the online store, you are asked to return and fill out the second part of the survey. **Please, respond to every question.**

PART I:

1. What is your gender?
O Male
O Female

2. What is your approximate annual income?
O Less than $10,000
O $10,000 - $19,999
O $20,000 - $29,999
O $30,000 - $49,000
O $50,000 - $75,999
O $75,000 - $99,999
O $100,000 - $150,000
O Over $150,000

3. What is your ethnic background
O Asian
O Black
O Caucasian
O Hispanic
O Other

4. What is your age category?
Less than 18 years
O 18 – 30
O 31 – 45
O 46 – 60
O Over 60

5. How many hours a week, on average, do you spend on the Internet?
O Less than one hour
O One to less than 5 hours
O 5 to less than 10 hours
O 10 to less than 15 hours
O Over 15 hours

6. What is your level of Education?
O Poor
O Fair
O Good
O Excellent

7. How would you rate your Internet use skills?
O High School or Less
O Some College
O College Degree
O Graduate Degree

8. About how often do you shop online?
O Never
O Once a year
O Once every 3 months
O Once a month
O Once a week
O More than once a week

9. When was the last time you shopped online?
O Within the past 3 months
O About 3 to 6 months ago
O About 6 to a year ago
O More than a year ago
O Can't remember
O Never in the past

Congratulations! You have successfully completed the first part of the survey. Now, before you continue there is a little task we want you to do.

Your Task: Choose either task A or task B

A. Imagine that you have the money and wish to buy a laptop or notebook computer from **http://www.dell.com.** Your aim is to select a laptop that costs between $1500 and $2500. Customized the laptop in the best possible you can that has the best performance as well as emphasizes the newest notebook technology and yet affordable.

B. Imagine the only choice to buy clothes is through an online store. Use the online store **http://www.landsend.com** to search for your choice of clothes to buy. Make use of the Web features such as search engines, sitemaps, virtual models or whatever is available to find your best choice of clothes. Attempt to buy the , but DO NOT ACTUALLY BUY it from the online store. You will NOT be reimbursed for any purchases that you make. You are only required to experience the buying process till the point of submission of the online form. You may use fictitious names, address, emails, card numbers to enable you get to the Submit button. Again, DO NOT HIT ON THE SUBMIT BUTTON once you are done.

At the site make use of the Web features such as search engines, sitemaps, virtual models, product demos, or whatever you often use at sites that are available here to find your best choice of the product. Attempt to buy, but DO NOT ACTUALLY BUY it from the online store. You will NOT be reimbursed for any purchases that you make. You are only required to experience the buying process till the point of submission of the online form. You may use fictitious names, address, e-mails, to enable you get to the "submit button". The aim is for you to refresh your mind on Web site interface features/elements, particularly, in the online shopping context.

After you finish with the purchase simulation, close or minimize the browser window and return to the PART II of the survey.

PART II: PERCEPTIONS OF E-STORE

Using Herzberg's two factor theory as guide, how will you classify the following Web site interface features in the context of onlin shopping? If a feature is not clear, classify it accordingly (i.e., "Not Clear"). You may add any relevant feature(s) that you feel is l out, and please suggest a class for it.

	Web Feature	Hygiene	Motivator	Unclear
F1.	Attractive screen background	O	O	O
F2.	Access restrictions (e.g. password/registration requirements)	O	O	O
F3.	After purchase tracking services (e.g. through toll free tel. numbers, tracking number at Web site)	O	O	O
F4.	Animated graphics/text' (e.g. scrolling, bouncing, flying text characters) is desirable	O	O	O
F5.	Absence of gender/racial/ethnic biases	O	O	O
F6.	Background music	O	O	O
F7.	Bright Web pages	O	O	O
F8.	Buyer club features (e.g. VIP membership)	O	O	O
F9.	Ability to 'cancel' order at anytime	O	O	O
F10.	Pictures of celebrities (e.g. Michael Jordan, Britney Spears, etc)	O	O	O
F11.	Choice of product shipping (e.g. overnight delivery, regular mail, etc)	O	O	O
F12.	Colorful and clear hyperlinks	O	O	O
F13.	Company logo on Web pages	O	O	O
F14.	Consistent style of Web pages	O	O	O
F15.	Ability to customize the background color	O	O	O
F16.	Ability to customize media type (e.g. text only display, text + graphics, graphics + animation, etc)	O	O	O
F17.	Declaration of the intended use of customers' supplied info. (e.g. not to provide to venders, not for marketing purpose, etc.)	O	O	O
F18.	Detailed product descriptions (e.g. features, quality, performance etc)	O	O	O
F19.	The site showed eye catching homepage title	O	O	O
F20.	Familiar terminology	O	O	O

	Web Feature	Hygiene	Motivator	Unclear
F21.	Ability to perform global search while at the site (i.e. search entire Internet – Google, Excite, Yahoo, etc)	O	O	O
F22.	Indication of page/file download times	O	O	O
F23.	Images of national/cultural symbols/icons	O	O	O
F24.	Provision of links to company affiliates	O	O	O
F25.	Ability to acquire new knowledge from using the site	O	O	O
F26.	Ability to use a local site search engine (i.e. within the company's Web site only)	O	O	O
F27.	Provision of links to other Web sites that sell similar products	O	O	O
F28.	Provision of adequate on-screen 'Help' messages (e.g. tool tips, links to terminology explanations/definitions, etc)	O	O	O
F29.	Logical info. presentation in Web pages	O	O	O
F30.	Ability to observe online product demonstration	O	O	O
F31.	Offer of order confirmation (e.g., thank you page, email message)	O	O	O
F32.	Indication of number of visitors to the site (e.g. shown by a counter)	O	O	O
F33.	Ability to create a personalized folder (e.g. my account info.)	O	O	O
F34.	Experienced pop-up ads while at site	O	O	O
F35.	Presentation of product images in both thumbnail and large formats.	O	O	O
F36.	Product images displaying the different parts of the product (e.g. front/back view, top/bottom view, sides view, inside view, etc)	O	O	O
F37.	Allow product return	O	O	O
F38.	Sell both new and used products	O	O	O
F39.	Provision of feedback features. (e.g. comments box, rate service, etc)	O	O	O
F40.	Recommendation of product substitutes (e.g. customers who bought product X also bought Y)	O	O	O
F41.	Presence of 'Return to Homepage' button on each page	O	O	O
F42.	Indication of security/secure site assurance (e.g. "you are entering a secured site" message, show 'lock' symbol, use of https in URL, etc)	O	O	O
F43.	Clear displays of page contents	O	O	O
F44.	Presentation special effects of text (e.g. glowing, rainbow, etc text)	O	O	O

	Web Feature	Hygiene	Motivator	Unclear
F45.	Presence of a sitemap menu option	O	O	O
F46.	Presence of clear table of contents (e.g. clear menu items) in each page	O	O	O
F47.	Presence of shopping cart	O	O	O
F48.	Absence of unbiased information	O	O	O
F49.	Nondiscrimination between the type of browsers (Internet Explorer, AOL, Netscape can be used)	O	O	O
F50.	Presence of up-to-date info.	O	O	O
F51.	Be able to 'Undo' a lot of my actions to reverse control	O	O	O
F52.	Assurance of customer's privacy	O	O	O
F53.	Use of humorous content at the site (e.g. cartoons, short jokes, etc)	O	O	O
F54.	Variety of payment methods (e.g. money order, checks, credit card, etc)	O	O	O
F55.	Variety of contact features (email/toll free/chat room to contact sales personnel, technical support, other customers etc)	O	O	O
F56.	Presence of virtual reality features in product presentation (e.g., 3D product images, virtual models)	O	O	O
F57.	Gift services (e.g., rapping, reminders, certificates) were offered at the site	O	O	O
F58.	Presence of FAQ section	O	O	O
F59.	Have various language options (e.g., Spanish, French, etc)	O	O	O
F60.	Embedded Ads (i.e. ads as part of Web page content)	O	O	O

Source of Measurement Scales

Scale	Source
Informativeness INFO1. The Web site good source of product information INFO2. This Web site supplies relevant information INFO3. This Web site is informative about the company's products	Ducoffe (1995; 1996)
Entertainment ENTERT1. This Web site is enjoyable ENTERT2. This Web site is pleasing ENTERT3. This Web site is entertaining	Ducoffe (1995; 1996)
Irritation IRRIT1. This Web site is annoying IRRIT2. This Web site is frustrating IRRIT3. This Web site is irritating	Ducoffe (1995; 1996)
Usefulness USEF1. Using this web site can improve my shopping performance USEF2. Using this web site can increase my shopping productivity USEF3. Using this web site can increase my shopping effectiveness USEF4. I find using this web site useful	Davis (1989), Davis, et al., (1989)
Attitude toward the site ATT1. This Web site makes it easy for me to build a relationship with this company. ATT2. I would like to visit the Web site again in the future. ATT3. I am satisfied with the service provided by this Web site. ATT4. I feel comfortable in surfing this Web site. ATT5. I feel surfing this Web site is a good way to spend my time. ATT6. Compared with other Web sites, I would rate this one as one of the best	Chen & Wells (1999)
Flow ***Instructions:*** *The word "flow" is used to describe a state of mind sometimes experienced by people who are deeply involved in some activity. One example of flow is the case where a professional athlete is playing exceptionally well and achieves a state of mind where nothing else matters but the game; they are completely and totally immersed in it. The experience is not exclusive to athletics – many people report this state of mind when playing games, engaging in hobbies, or working. Activities that lead to flow completely captivate a person for some period of time. When in flow, time may seem to stand still and nothing else seems to matter. Flow may not last for a long time on any particular occasion, but it may come and go over time. Flow has been described as an intrinsically enjoyable experience.* FLO. Thinking about your own use of the Web Do you think you experienced flow on the Web you visited?	Novak et al (2000)
Challenge CHALL1. Globally, how do you evaluate online shopping? CHALL2. How will you label online shopping? CHALL3. Overall, how challenging do you find online shopping?	Koufaris (2002)
Control CONT. Feel confused about what to do/Clearly know the right things to do CONT2. Feel agitated/Feel calm CONT3. Do not feel in control/Feel in control	Koufaris (2002)

Scale	Source
Concentration CONC1. Not deeply engrossed/Am deeply engrossed in activity CONC2. Not absorbed intensely/Am absorbed intensely in activity CONC3. Attention not focused/Attention is focused on activity CONC4. Do not fully concentrate/Concentrate fully on activity	Koufaris (2002)
Enjoyment ENJOY1. Uninteresting/Interesting ENJOY2. Not fun/Fun ENJOY3. Dull/Exciting ENJOY4. Enjoyable/ Not enjoyable (reversed)	Koufaris (2002)
Intention to purchase IP1. I will definitely buy products from this site in the near future. IP2. I intend to purchase through this site in the near future. IP3. It is likely that I will purchase through this site in the near future. IP4. I expect to purchase through this site in the near future.	Yoo and Donthu (2001)
Intention to return/revisit IP1. I am likely to revisit this site in the near future. IP2. I am encouraged to revisit this site in the near future	Yoo and Donthu (2001)
Site Loyalty SLOYAL1. I consider myself to be loyal to this site. SLOYAL2. This site would be my first choice. SLOYAL3. I will not shop on other sites as long as I can access this site.	Beatty & Kahle (1988); Yoo & Donthu, 2001
Web shopping experience On average, how often do you search for information from Web-based vendors about products or services you have an intention to buy at some point in the near future? 1. Don't do at all 2. Do less than once each month 3. Do about once each month 4. Do several times each month 5. Do about once each week 6. Do several times each week 7. Do at least once each day	Georgia Tech GVU (1996)
Product involvement PIV1. Important/Unimportant (reversed) PIV2. Boring/Interesting PIV3. Relevant/Irrelevant (reversed) PIV4. Exciting/Unexciting (reversed) PIV5. Means nothing/Means a lot to me PIV6. Appealing/Unappealing (reversed) PIV7. Fascinating/Mundane (reversed) PIV8. Worthless/Valuable PIV9. Involving/Uninvolving (reversed) PIV10. Not needed/Needed	Zaichkowsky's (1994)

SURVEY QUESTIONNAIRE – Phase II

E-MAIL INVITATION

Dear Panel Member
Each year hundreds of new online stores are introduced, only to fail because they don't meet consumer needs or expectations.

We would like to invite you to take part in an interesting interactive research survey today. With your opinions, consumers like you help make new products and improve existing ones. You are one of relatively few people across the country who have been asked to participate in this study and your answers are very important to us! Click below to take part in the survey, and be entered into a drawing to win one of more than fifteen prizes – three $500 grand prize and fifteen $100 prizes.

http://www.zoomerang.com/survey.zgi?CTKHX82EQ7XLEFLJNW65A945

You have received this letter because you are part of the survey research panel, and we want to assure you that in this survey, privacy is guaranteed.

Thank you!

SURVEY QUESTIONNAIRE – Phase II

Web Site Features Survey

Thank you for agreeing to participate in this survey. We are conducting a study on electronic store (e-store) design and effects on consumer online behavior. By answering this survey, you can help us to better design Web sites that meet customer expectations in executing online shopping tasks.

The survey comprises of two parts: First you will be asked to visit an e-store to refresh your memories on online shopping tasks and the use of Web features to support these tasks. You may spend as much time as you want at the e-store. Once done, return to complete the survey. It will take approximately 15 minutes to complete. Click on "START SURVEY:" button below to the survey.

Click here to learn more about Zoomerang

Web Site Features Survey

Instructions

Thank you for agreeing to participate. This survey consists of two parts. Your participation will be structured as follows:

First, you will be directed to an online store. You will then be asked to simulate an online shopping process. Once you complete your visit of the online store, you then return to this questionnaire to complete the survey.

***Task:**
Imagine that you have the money and wish to buy a laptop or notebook computer from www.dell.com. Your aim is to select a laptop that costs between $1500 and $2500. Customized the laptop in the best possible you can that has the best performance as well as emphasizes the newest notebook technology and yet affordable. Make use of the Web features such as search engines, sitemaps, virtual models or whatever is available to find your best choice of clothes. Attempt to buy the, but DO NOT ACTUALLY BUY it from the online store. You will NOT be reimbursed for any purchases that you make. You are only required to experience the buying process till the point of submission of the online form. You may use fictitious names, address, emails, card numbers if need be.
Again, DO NOT HIT ON THE SUBMIT BUTTON once you are done.

After you finish with the purchase simulation, close or minimize that browser window and return to the second part of the survey.

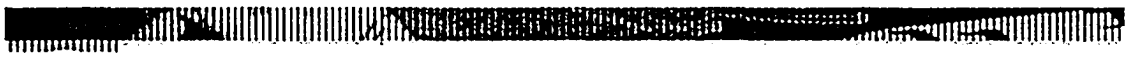
Click on www.dell.com to go to Landsend.com. After returning from the the shopping simulation click 'Submit' button to go to the survey questions.

Click the "Submit" arrow to send your answers
and proceed to the next page in the survey.

*With www.landend.end, the task is modified to shop for clothes and the URL changed to www.landsend.co

Web Site Features Survey

Questions marked with an asterisk (*) are mandatory.



1

*The following features are suppose to motivate you in carrying out the online shopping tasks. To what extent are you satisfied with their presence/absence?

1	2	3	4	5
Not at all Satified				Very Satisfied

Ability to perform global search while at the site (e.g. search entire Internet with Google, Excite, Yahoo, etc).

1 | 2 | 3 | 4 | 5

Presence of Images of national/cultural symbols/icons (e.g, the American Eagle, French Eifel Tower, etc).

1 | 2 | 3 | 4 | 5

Provision of links to other Web sites that sell similar products.

1 | 2 | 3 | 4 | 5

Indication of number of visitors to the site (e.g. shown by a counter).

1 | 2 | 3 | 4 | 5

The e-tailer sells both new and used products.

1 | 2 | 3 | 4 | 5

Provision of feedback features. (e.g. comments box, rate service, etc).

1 | 2 | 3 | 4 | 5

SUBMIT

Click the "Submit" arrow to send your answers and proceed to the next page in the survey.

Web Site Features Survey

2

*These are additional features for you to rate your level of satisfaction with respect to their motivation role in shopping online.

1	2	3	4	5
Not all Satisfied				Very Satisfied

Recommendation of product substitutes at the site (e.g. customers who bought product X also bought Y).

1 2 3 4 5

Use of humorous content at the site (e.g. cartoons, short jokes, etc).

1 2 3 4 5

Presence of virtual reality features in product presentation (e.g., 3D product images, virtual models).

1 2 3 4 5

Presence of gift services (e.g., rapping, reminders, certificates) were offered at the site.

1 2 3 4 5

Presence of FAQ section.

1 2 3 4 5

Presence of various language options (e.g., Spanish, French, etc)

1 2 3 4 5

SUBMIT

Click the "Submit" arrow to send your answers and proceed to the next page in the survey.

Web Site Features Survey

3

*Using the scale provided, what is your opinion on the dissatifaction level resulting from the presence or absence of the following features?

1 Very Dissatisfied . 2 3 4 5 Not all Dissatisfied

Presence of after purchase tracking services (e.g. tracking number at Web site or use toll free tel. numbers).

1 2 3 4 5

Choice of product shipping (e.g. overnight delivery, regular mail, etc).

1 2 3 4 5

Use colorful and clear hyperlinks.

1 2 3 4 5

Clear indication of Company logo on Web pages.

1 2 3 4 5

Consistent style of Web pages.

1 2 3 4 5

Declaration of the intended use of customers' supplied info. (e.g. not to provide to venders, not for marketing purpose, etc)

1 2 3 4 5

SUBMIT

Click the "Submit" arrow to send your answers and proceed to the next page in the survey.

Web Site Features Survey

4

*The presence/absence of the following features at the site may result in dissatisfaction with your online shopping efforts. Please, rate these features with the scale provided.

1 Very Dissatisfied 2 3 4 5 Not at all Dissatified

Use of familiar terminology.

1 2 3 4 5

Logical information presentation in Web pages.

1 2 3 4 5

Offer of order confirmation (e.g., thank you page, email message).

1 2 3 4 5

Presentation of product images in both thumbnail and large formats.

1 2 3 4 5

Product images displaying the different parts of the product (e.g. front/back view, top/bottom view, sides view, inside view, etc).

1 2 3 4 5

Indication that product return is allowed.

1 2 3 4 5

SUBMIT

Click the "Submit" arrow to send your answers and proceed to the next page in the survey.

Web Site Features Survey

5

*Again, with the scale provided rate these Web features with respect to their role in leading to your dissatisfaction.

1	2	3	4	5
Very Dissatisfied				Not all Dissatisfied

Presence of 'Return to Homepage' button on each page.

1 2 3 4 5

Indication of security/secure site assurance (e.g. "you are entering a secured site" message, show 'lock' symbol, use of https in URL, etc).

1 2 3 4 5

Clear displays of page contents.

1 2 3 4 5

Presence of clear table of contents (e.g. clear menu items) in each page.

1 2 3 4 5

Presence of shopping cart.

1 2 3 4 5

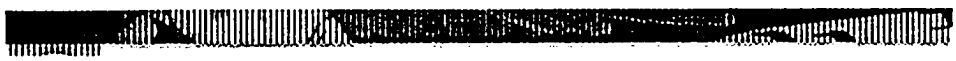
Nondiscrimination between the type of browsers

1 2 3 4 5

SUBMIT

Click the "Submit" arrow to send your answers and proceed to the next page in the survey.

Web Site Features Survey



6

*One last set of features to rate. Please, respond to your level of satisfaction with the following Web features.

1 Very Dissatified	2	3	4	5 Not all Dissatisfied

Presence of up-to-date information.

1 | 2 | 3 | 4 | 5

Be able to 'Undo' a lot of my actions to reverse control.

1 | 2 | 3 | 4 | 5

Assurance of customer's privacy.

1 | 2 | 3 | 4 | 5

Presence of variety of payment methods (e.g. money order, checks, credit card, etc).

1 | 2 | 3 | 4 | 5

Presence of variety of contact features (email/toll free/chat room to contact sales personnel, technical support, other customers, etc).

1 | 2 | 3 | 4 | 5

Absence of pop-up ads while at site.

1 | 2 | 3 | 4 | 5

SUBMIT

Click the "Submit" arrow to send your answers and proceed to the next page in the survey.

Web Site Features Survey

7

*The following questions relate to your general perceptions while at the Web site. Please, respond to the questions as accurately as you can with the scale provide.

1	2	3	4	5	6	7
Definitely Disagree						Definitely Agree

This Web site is enjoyable

1 2 3 4 5 6 7

This Web site is pleasing

1 2 3 4 5 6 7

This Web site is entertaining

1 2 3 4 5 6 7

8

*How informative do you think the site is?

1	2	3	4	5	6	7
Definitely Disagree						Definitely Agree

The Web site provided good source of product information.

1 2 3 4 5 6 7

This Web site supplies relevant information.

1 2 3 4 5 6 7

This Web site is informative about the company's products.

1 2 3 4 5 6 7

SUBMIT

Click the "Submit" arrow to send your answers and proceed to the next page in the survey.

Web Site Features Survey

9 *How iritating is the Web site?

1 Definitely Disagree	2	3	4	5	6	7 Definitely Agree

This Web site is annoying

1 2 3 4 5 6 7

This Web site is frustrating

1 2 3 4 5 6 7

This Web site is irritating

1 2 3 4 5 6 7

10 *In what ways do you think the Web site is useful to you?

1 Definitely Disagree	2	3	4	5	6	7 Definitely Agree

Using this web site can improve my shopping performance

1 2 3 4 5 6 7

Using this web site can increase my shopping productivity

1 2 3 4 5 6 7

Using this web site can increase my shopping effectiveness

1 2 3 4 5 6 7

I find using this web site useful

1 2 3 4 5 6 7

SUBMIT

Click the "Submit" arrow to send your answers

and proceed to the next page in the survey.

Web Site Features Survey

11

*What is you attitude toward the Web site?

1	2	3	4	5	6	7
Definitely Disagree						Definitely Agree

This Web site makes it easy for me to build a relationship with this company.

1 2 3 4 5 6 7

I would like to visit the Web site again in the future.

1 2 3 4 5 6 7

I am satisfied with the service provided by this Web site.

1 2 3 4 5 6 7

I feel comfortable in surfing this Web site.

1 2 3 4 5 6 7

I feel surfing this Web site is a good way to spend my time.

1 2 3 4 5 6 7

Compared with other Web sites, I would rate this one as on of the best.

1 2 3 4 5 6 7

SUBMIT

Click the "Submit" arrow to send your answers and proceed to the next page in the survey.

Web Site Features Survey

12

*Select a rating a point that best describes how you feel in response to the following questions:

1 Very Complex 2 3 4 5 6 7 Very Easy

Globally, how do you evaluate online shopping?

1 2 3 4 5 6 7

How will you label online shopping?

1 2 3 4 5 6 7

13

*Overall how challenging do you find online shopping?

Very Challenging Very Simple

1 2 3 4 5 6 7

14

*To me the Web site was

Uninteresting Interesting

1 2 3 4 5 6 7

SUBMIT

Click the "Submit" arrow to send your answers and proceed to the next page in the survey.

Web Site Features Survey

15

*The Web site was

Not fun — Fun

1 2 3 4 5 6 7

16

*The Web site was

Dull — Exciting

1 2 3 4 5 6 7

17

*The Web site was

Not Enjoyable — Enjoyabble

1 2 3 4 5 6 7

SUBMIT

Click the "Submit" arrow to send your answers and proceed to the next page in the survey.

Web Site Features Survey

18

*While at the Web site, I

felt confused about what to do — Clearly knew the right things to do

1 2 3 4 5 6 7

19

*While at the Web site, I felt

aggitated — calm

1 2 3 4 5 6 7

20

*While at the Web site, I

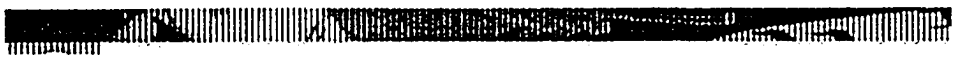
did not feel in control — felt in control

1 2 3 4 5 6 7

SUBMIT

Click the "Submit" arrow to send your answers and proceed to the next page in the survey.

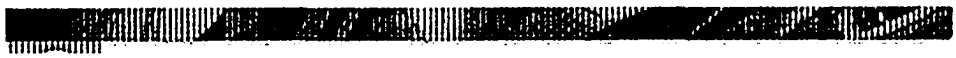
Web Site Features Survey



21

*To me, at the Web site I was

not deeply engrossed						deeply engrossed with activities
1	2	3	4	5	6	7



22

*At the Web site, I was

not absorbed intensely						absorbed intensely in activities
1	2	3	4	5	6	7

23

*While at the site, my

attention was not focused						attention was focused on the activities
1	2	3	4	5	6	7

24

*At the site, I

did not fully concentrate						concentrated fully on the activities
1	2	3	4	5	6	7

Click the "Submit" arrow to send your answers and proceed to the next page in the survey.

Web Site Features Survey

25

*How do you respond to the following questions:

	1 Very unlikely	2	3	4	5	6	7 Very likely
I will definitely buy products from this site in the near future.	1	2	3	4	5	6	7
I intend to purchase through this site in the near future.	1	2	3	4	5	6	7
It is likely that I will purchase through this site in the near future.	1	2	3	4	5	6	7
I expect to purchase through this site in the near future.	1	2	3	4	5	6	7

26

*What are your revisit intentions to this site in the future if you ever consider to buy the type of products offered at this Web site?

	1 Definitely Disagree	2	3	4	5	6	7 Definitely Agree
I am likely to revisit this site in the near future.	1	2	3	4	5	6	7
I am encouraged to revisit this site in the near future	1	2	3	4	5	6	7

SUBMIT

Click the "Submit" arrow to send your answers and proceed to the next page in the survey.

Web Site Features Survey

27

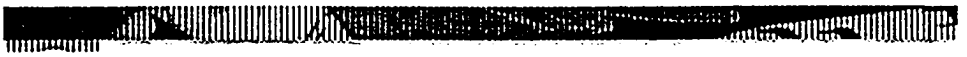
*To me a clothes are

	1 Definitely Disagree	2	3	4	5	6	7 Definitely Agree
Important	1	2	3	4	5	6	7
Boring	1	2	3	4	5	6	7
Relevant	1	2	3	4	5	6	7
Exciting	1	2	3	4	5	6	7
Means nothing	1	2	3	4	5	6	7
Appealing	1	2	3	4	5	6	7
Fascinating	1	2	3	4	5	6	7
Worthless	1	2	3	4	5	6	7
Involving	1	2	3	4	5	6	7
Not needed	1	2	3	4	5	6	7

SUBMIT

Click the "Submit" arrow to send your answers and proceed to the next page in the survey.

Web Site Features Survey



28

*How do you consider your loyalty to the site (Landsend.com) you visited?

1 Definitely Disagree	2	3	4	5	6	7 Definitely Agree

I consider myself to be loyal to this site.

1 2 3 4 5 6 7

This site would be my first choice.

1 2 3 4 5 6 7

I will not shop on other sites as long as I can access this site.

1 2 3 4 5 6 7

Questions marked with an asterisk (*) are mandatory.

29

*Flow

***Instructions**: The word "flow" is used to describe a state of mind sometimes experienced by people who are deeply involved in some activity. One example of flow is the case where a professional athlete is playing exceptionally well and achieves a state of mind where nothing else matters but the game; they are completely and totally immersed in it. The experience is not exclusive to athletics – many people report this state of mind when playing games, engaging in hobbies, or working. Activities that lead to flow completely captivate a person for some period of time. When in flow, time may seem to stand still and nothing else seems to matter. Flow may not last for a long time on any particular occasion, but it may come and go over time. Flow has been described as an intrinsically enjoyable experience.*

Thinking about your own use of the Web:

Do you think you experienced flow on the Web you visited?

Definitely Disagree						Definitely Agree

1 2 3 4 5 6 7

SUBMIT

Web Site Features Survey

30

What is gender?

Please Select

31

What is your ethnicity?

Please Select

32

What category of age do you belong?

Please Select

33

Your approximate annual income is

Please Select

34

What level of education have you attained?

Please Select

35

How do you rate your Internet use skills?

Please Select

36

On the average, wow many hours per week do you spend on the Internet?

Please Select

37

About how often do you shop online

Please Select

38

When was the last time you shopped online?

Please Select

SUBMIT

Click the "Submit" arrow to send your answers and proceed to the next page in the survey.

Interested in taking more surveys or sending a survey like the one you just received?

Become a panelist and start earning rewards
Click here to register with our ZoomPanel and have your opinions heard!

Send your own Zoomerang survey today
Click here to register with Zoomerang

Thanks for taking our survey!

APPENDIX B

MEASUREMENT MODELS

Measurement Models - CFA Results

Factor loadings, standardized errors, t-values, and R^2 values

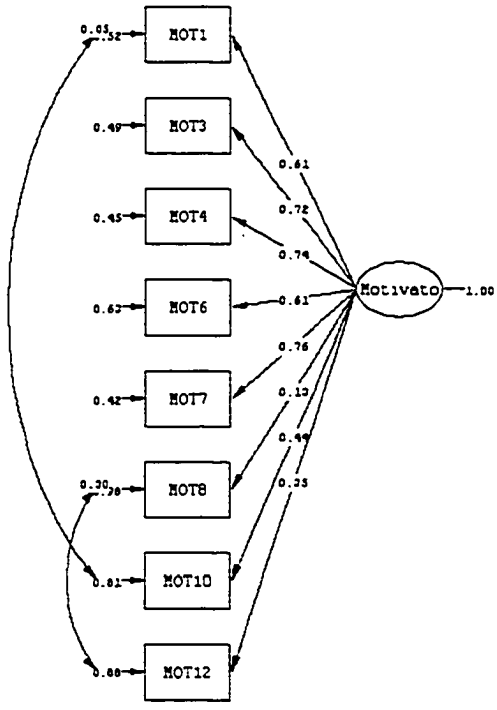
Constructs/Items	LISREL Estimates	Standardized coefficients	Standardized errors	t-value	R^2
Hygiene					
→ HYG1	0.71	0.66	0.062	11.45	0.44
→ HYG2	0.65	0.65	0.058	11.15	0.42
→ HYG3	0.64	0.61	0.062	10.42	0.38
→ HYG4	0.55	0.59	0.057	9.61	0.34
→ HYG5	0.58	0.60	0.058	9.94	0.36
→ HYG7	0.57	0.55	0.064	9.00	0.30
→ HYG8	0.57	0.61	0.055	10.29	0.37
→ HYG9	0.69	0.65			0.42
→ HYG12	0.57	0.51	0.069	8.26	0.26
→ HYG15	0.64	0.64	0.059	10.88	0.41
→ HYG16	0.67	0.67	0.057	11.67	0.45
→ HYG17	0.60	0.58	0.062	9.69	0.33
→ HYG19	0.57	0.61	0.055	10.38	0.38
→ HYG20	0.61	0.60	0.061	9.90	0.35
→ HYG21	0.55	0.55	0.061	8.96	0.30
Motivator					
→ MOT1	0.58	0.48	0.075	7.74	0.24
→ MOT3	0.77	0.65	0.077	9.99	0.41
→ MOT4	0.97	0.84	0.079	12.40	0.59
→ MOT6	0.46	0.40	0.079	5.81	0.16
→ MOT7	0.73	0.58	0.076	9.56	0.35
→ MOT8	0.85	0.69	0.076	11.19	0.48
→ MOT10	0.52	0.48	0.076	6.88	0.20
→ MOT12	0.47	0.34	0.089	5.31	0.13
Entertainment					
→ ENTERT1	1.29	0.91			0.83
→ ENTERT2	1.24	0.91	0.054	22.85	0.83
→ ENTERT3	1.26	0.79	0.074	17.25	0.63
Informativeness					
→ INFO1	1.16	0.89			0.80
→ INFO2	1.11	0.82	0.065	17.17	0.68
→ INFO3	1.07	0.84	0.060	17.89	0.71

Factor loadings, standardized errors, t-values, and R^2 values (Cont.)

Irritation					
→ IRRIT1	1.42	0.89			0.79
→ IRRIT2	1.55	0.91	0.068	22.76	0.82
→ IRRIT3	1.59	0.97	0.061	25.92	0.93
Usefulness					
→ USEFUL1	1.40	0.87			0.77
→ USEFUL2	1.44	0.93	0.069	20.73	0.82
→ USEFUL3	1.44	0.89	0.071	20.14	0.80
→ USEFUL4	1.37	0.86	0.075	18.29	0.71
Attitude					
→ ATT1	1.23	0.78			0.61
→ ATT2	1.40	0.87	0.087	16.00	0.76
→ ATT3	1.18	0.79	0.084	14.04	0.62
→ ATT4	1.28	0.81	0.088	14.53	0.66
→ ATT5	1.38	0.75	0.100	13.27	0.57
→ ATT6	1.34	0.81	0.092	14.58	0.66
Flow					
→ CHALL	0.59	0.49			0.18
→ CONC	1.34	0.92	0.210	6.50	0.80
→ CONT	1.06	0.77	0.140	7.60	0.50
→ ENJOY	1.00	0.80	0.160	6.27	0.62
→ Int purchase					
→ IP1	1.74	0.96			0.92
→ IP2	1.75	0.97	0.043	40.43	0.94
→ IP3	1.77	0.96	0.047	37.85	0.92
→ IP4	1.80	0.95	0.055	32.66	0.91
Int return					
→ IR1	1.72	0.95			0.89
→ IR2	1.69	0.94	0.058	29.32	0.80

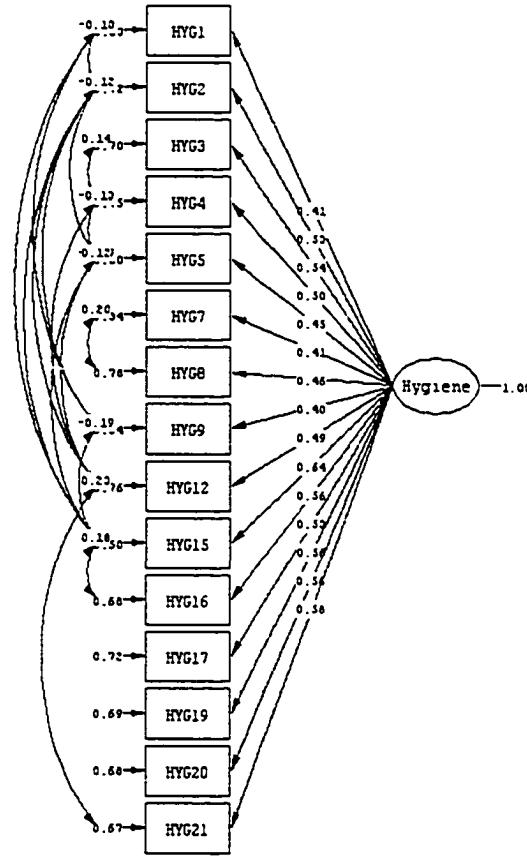
Confirmatory Factor Analysis

Iindividual Measurement Models



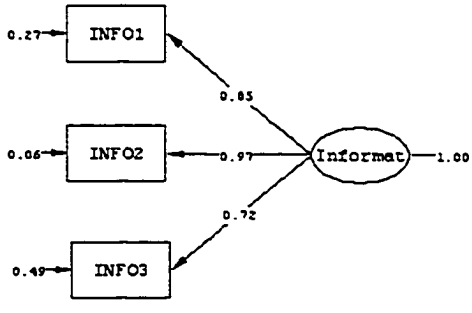
Chi-Square=26.92, df=18, P-value=0.08047, RMSEA=0.057

Motivator



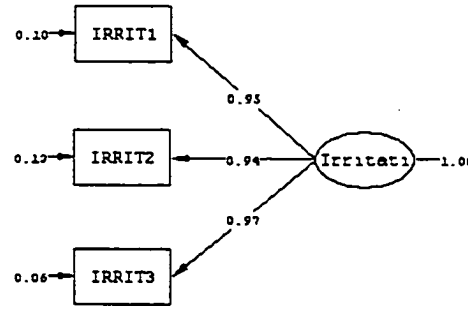
Chi-Square=104.29, df=74, P-value=0.01170, RMSEA=0.052

Hygiene



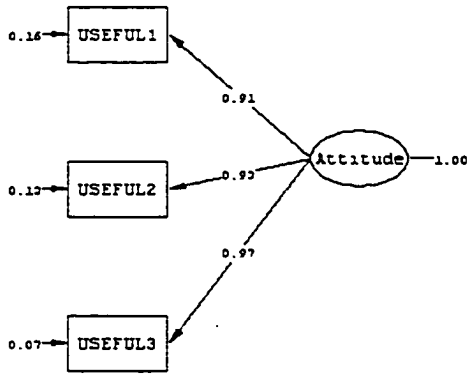
Chi-Square=1.75, df=1, P-value=0.18644, RMSEA=0.070

Informativeness



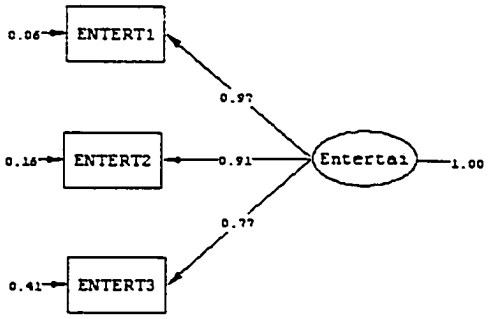
Chi-Square=1.78, df=1, P-value=0.18195, RMSEA=0.071

Irritation



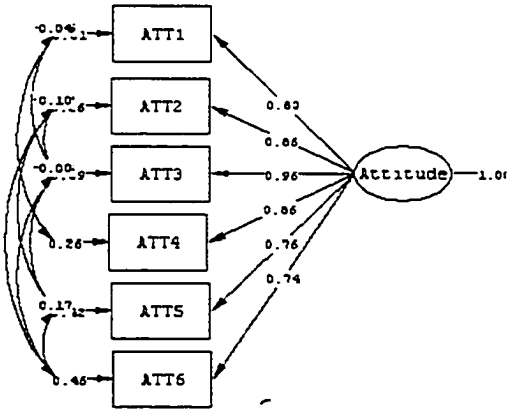
Chi-Square=1.25, df=1, P-value=0.26423, RMSEA=0.041

Usefulness



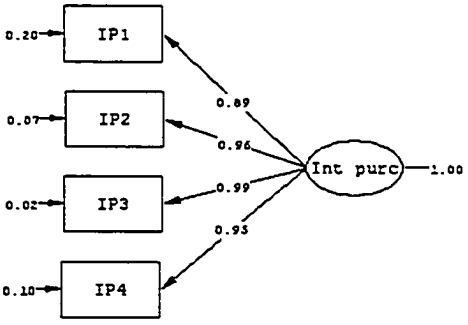
Chi-Square=1.54, df=1, P-value=0.21470, RMSEA=0.060

Entertainment



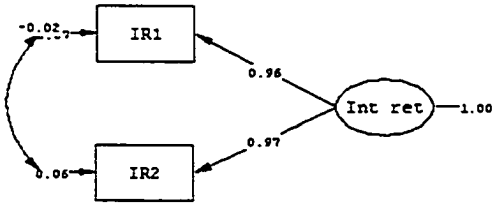
Chi-Square=1.56, df=1, P-value=0.21234, RMSEA=0.060

Attitude toward site



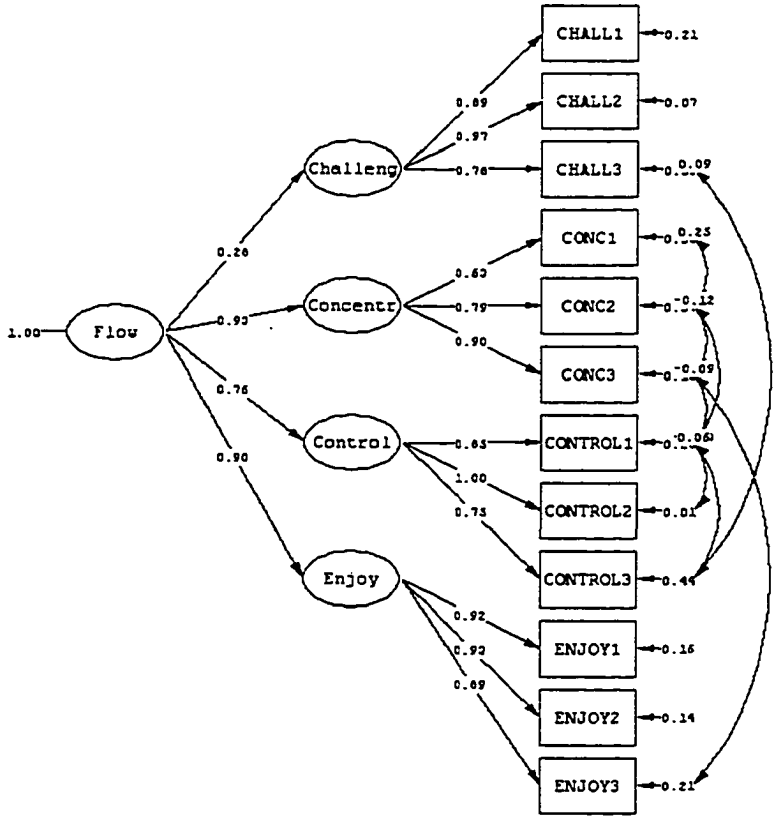
Chi-Square=5.63, df=2, P-value=0.05984, RMSEA=0.13

Intention to purchase



Chi-Square=0.00, df=0, P-value=1.00000, RMSEA=0.0

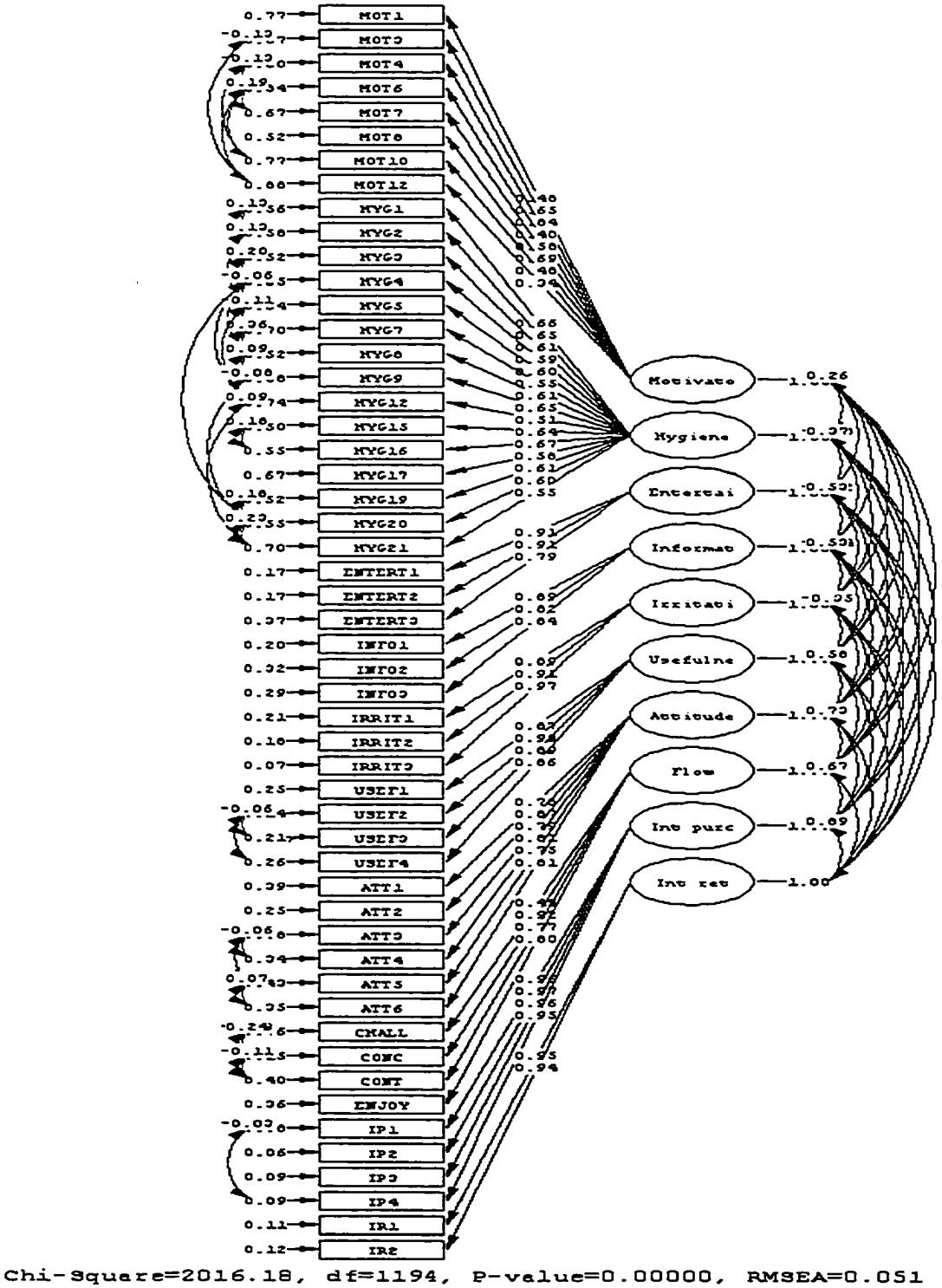
Intention to return



Chi-Square=85.16, df=42, P-value=0.00009, RMSEA=0.082

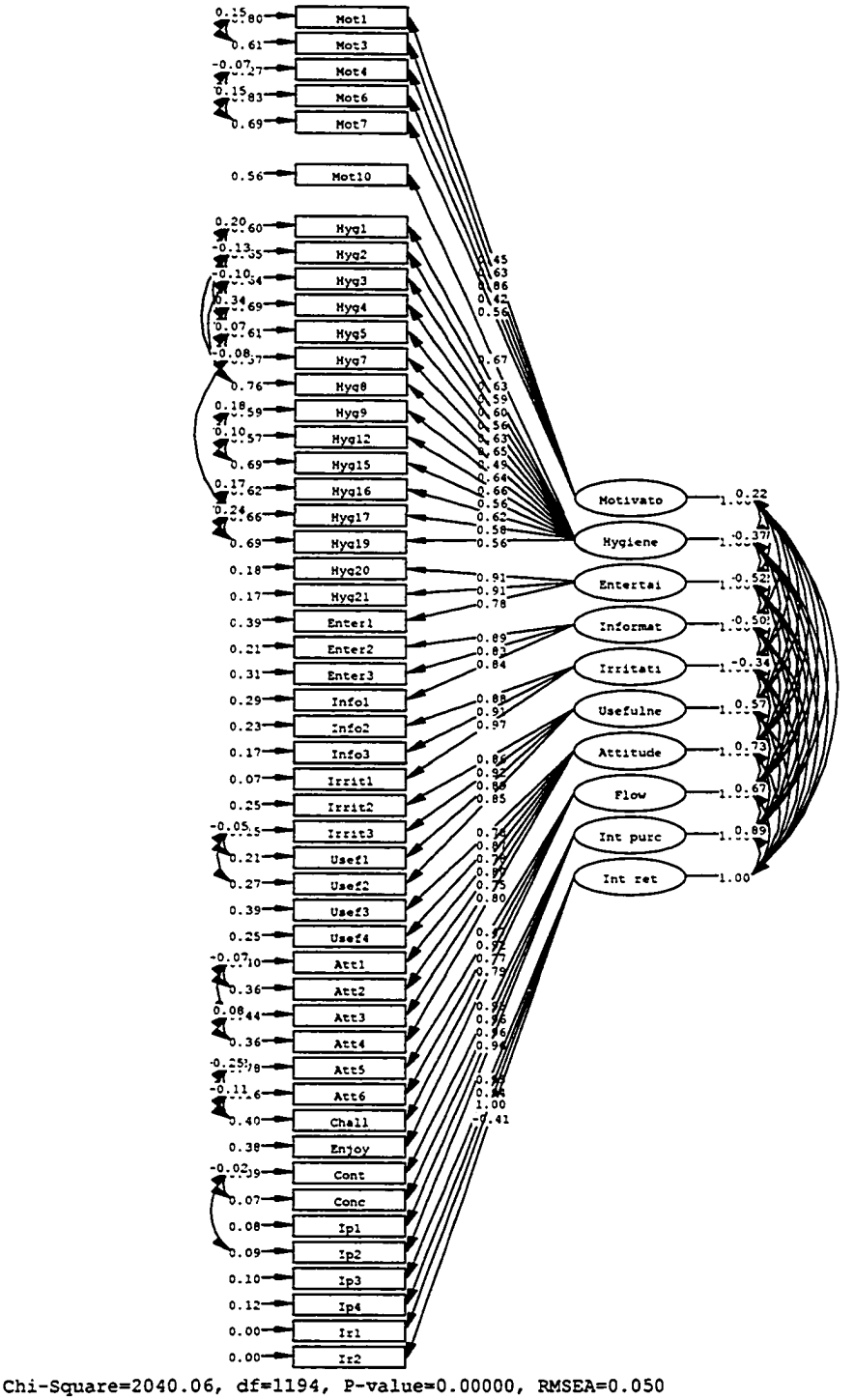
Flow

Overall Measurement Model



Chi-Square=2016.18, df=1194, P-value=0.00000, RMSEA=0.051

Revised Measurement Model



Note: MOT8 and MOT12 are dropped from model (No significant improvement in fit observed)

APPENDX C

SEM PATH ANALYSIS, NONRESPONSE BIAS,

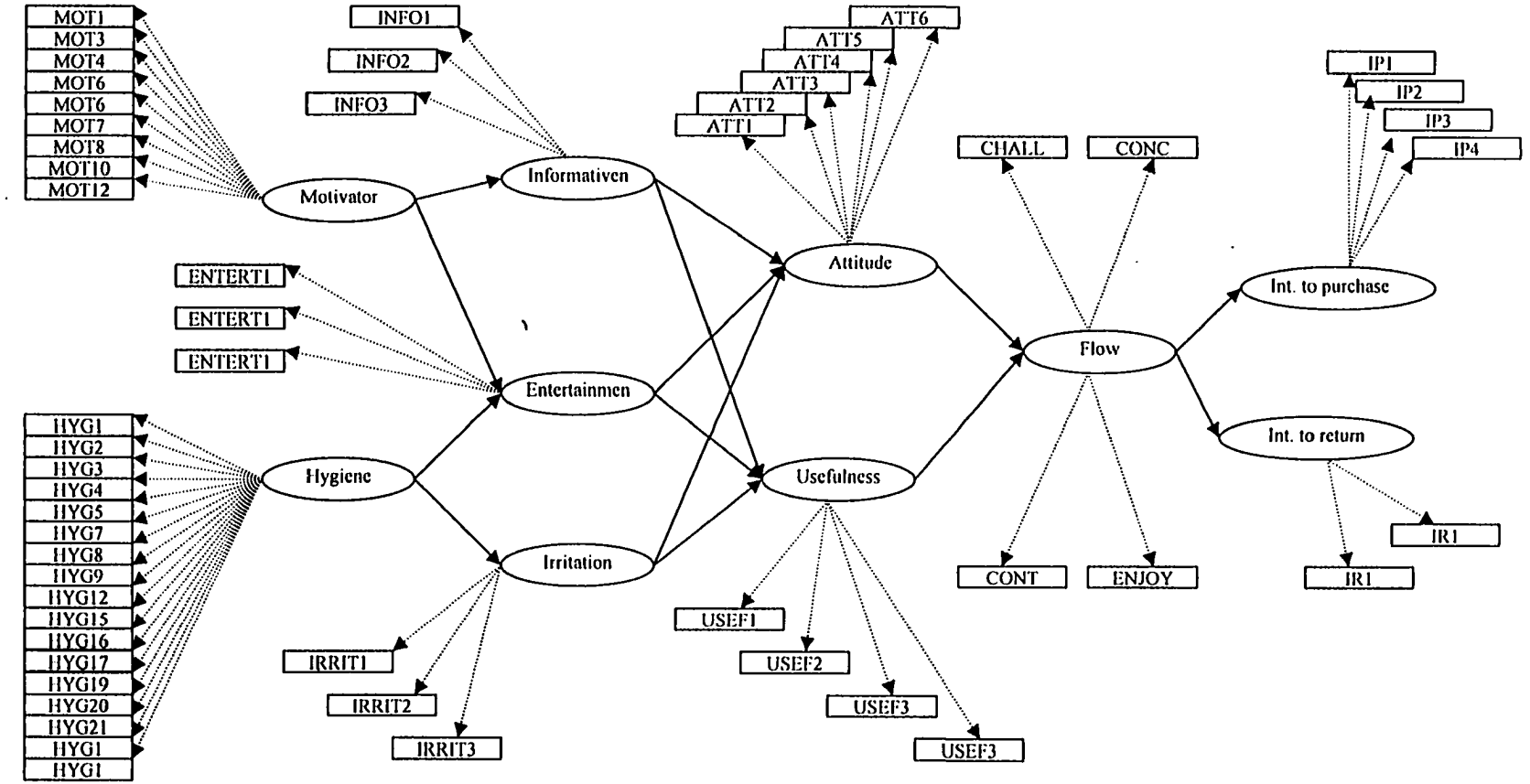
AND THE EFFECT OF CONTROL VARIABLES

SEM Analysis

Structural path coefficients, standardized errors, t-values and R^2 values

Structural Equations	Stdzed coeffs	Stdzed errors	t-value	R^2
Entertainment				0.30
← Motivator	0.32	0.064	5.60	
← Hygiene	0.08	0.061	1.61	
Informativeness				0.28
← Motivator	0.36	0.064	5.60	
← Hygiene	0.11	0.067	1.64	
Irritation				38
← Motivator	-0.52	0.067	-7.71	
← Hygiene	-0.29	0.068	-4.34	
Usefulness				
← Entertainment	0.44	0.081	5.48	0.52
← Informativeness	0.33	0.082	4.02	
← Irritation	-0.008	0.059	-0.14	
Attitude toward site				0.82
← Entertainment	0.012	0.11	.14	
← Informativeness	0.56	0.054	4.86	
← Irritation	-0.27	0.059	-1.66	
← Usefulness	0.51	0.041	8.70	
Flow				0.83
← Usefulness	0.20	0.10	1.98	
← Attitude	0.48	0.17	6.46	
Intention to purchase				0.53
← Flow	0.76	0.10	7.37	
Intention to return				0.60
← Flow	0.77	0.050	7.57	

Structural Equation Model of *A Priori* Model 3



Standard Residual of A priori Model 3

	ITEM	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.	ENTERT1	1.06																
2.	ENTERT2	1.28	1.06															
3.	ENTERT3	1.27	-1.11	1.06														
4.	INFO1	0.94	1.09	-1.54	- -													
5.	INFO2	0.14	1.96	-2.29	1.52	- -												
6.	INFO3	0.88	0.62	-1.6	-0.28	-1.02	- -											
7.	IRRIT1	-0.5	-0.85	-0.46	0.54	0.38	-0.99	3.24										
8.	IRRIT2	0.62	-1.5	0.34	1.12	-1.38	0.12	2.17	3.24									
9.	IRRIT3	-0.33	-1.1	1.48	-0.25	-0.6	-1.31	2.8	3.27	3.24								
10.	USEF1	-0.23	0.55	0.26	-1.65	-0.86	-2.21	1.61	1.73	2.78	2.11							
11.	USEF2	-1.44	-1.29	-1.95	-2.12	-0.43	-1	-0.61	-0.2	-0.2	5.18	3.11						
12.	USEF3	-0.71	-0.29	-1.45	-2.23	0.35	-0.48	1.09	1.22	2.66	5.02	3.15	2.11					
13.	USEF4	2.28	2.53	0.92	3.81	2.91	2.94	-1.46	-3.33	-3.37	-4.03	-1.19	-2.04	2.11				
14.	ATT1	-1.41	-0.66	-1.5	-1.17	-1.55	-1.99	2.97	2.72	3.5	1.67	3.53	2.95	4.23	2.09			
15.	ATT2	-1.75	-0.71	1.23	-0.67	0	-1.6	-0.68	-0.63	-0.13	-1.43	-2.92	-1.69	3.98	0.77	2.09		
16.	ATT3	1.03	0.81	-0.21	2.43	-0.43	2.18	-2.44	-0.29	-1.95	0.41	-0.37	-0.4	3.05	0.27	1.51	2.65	
17.	ATT4	0.43	-0.21	-2.87	2.33	2.97	2.12	-2.58	-4.45	-4.97	-3.12	-1.86	-1.37	4.62	0.17	1.19	2.6	2.09
18.	ATT5	2	1.79	3.73	-2.72	-1.12	-2.55	0.92	1.32	2.17	-0.85	-1.7	-2.62	-0.57	0.93	0.22	-0.37	-1.42
19.	ATT6	-2.35	-1.76	1.49	-0.01	-1.13	0.93	1.69	1.71	1.92	-1.14	-2.97	-2.8	3.6	0.28	0.84	0.52	0.17
20.	CHALL	-2.75	-2.41	-3.56	-0.11	1.31	0.29	1.76	0.34	1.3	0.53	0.62	0.93	0.93	0.79	-3.18	-1.92	1.63
21.	CONC	3.26	4	7.1	2.97	1.42	1.24	-3.01	-3.83	-2.86	-1.32	-2.37	-1.77	2.38	-3.72	1.63	-1.77	-1.2
22.	CONT	-0.81	0.39	-1.22	0.65	1.63	1.07	-2.26	-4.88	-2.88	0.28	0.24	0.02	1.97	-0.47	-2.73	-1.67	3.67
23.	ENJOY	-1.16	-1.04	2.41	-1	-1.11	-1.2	0.48	0.43	1.76	0.25	-0.43	-0.06	0.9	-1.46	-2.33	-1.21	-2.28
24.	IP1	-0.93	-0.56	2.46	-0.05	0.24	-1.77	1.78	0.67	1.47	0.84	0.22	1.3	3.18	1.42	3.96	-1.48	-1.64
25.	IP2	-2.44	-1.75	1.25	-0.03	0.26	-2.25	1.49	0.56	1.36	0.57	-0.6	0.16	2.3	-0.49	2.72	-2.84	-2.24
26.	IP3	-2.07	-1.48	1.51	-0.41	-0.05	-2.33	-0.1	-0.59	0.06	0	-0.49	0.58	2.62	-0.25	3.42	-1.77	-1.07
27.	IP4	-2.05	-1.83	1.35	-1.74	-1.39	-3.58	1.16	0.09	1.24	-0.97	-1.4	-0.83	2.24	-0.77	2	-3	-2.96
28.	IR1	-1.11	-1.31	0.86	1.39	1.47	-0.93	0.25	-0.56	-0.31	-0.95	-0.57	-0.3	3.03	0.17	3.35	-1.97	0.66
29.	IR2	-1.22	-1.39	0.32	-0.17	1.21	-1.51	1.04	0.29	0.74	-0.22	-0.14	0.67	3.77	1.51	3.72	-0.77	0.11
30.	MOT1	0.12	0.95	0.31	1.78	1.55	1.29	-0.35	-1.67	-1.28	0.87	1.18	1.49	1.83	1.55	0.69	0.04	1.46
31.	MOT3	-1.33	-1.11	1.09	-0.12	-1.03	-2.48	0.31	-1.08	-0.17	0	-0.94	0.2	0.45	-0.91	-0.7	-0.29	-2.02
32.	MOT4	-2.21	-1.92	1.77	-1.58	-0.49	-3.08	1.98	1.23	2.7	1.42	-0.45	0.26	0.33	-0.87	-0.74	-1.78	-2.45
33.	MOT6	2.44	1.82	2.33	4.63	4.51	3.89	-1.84	-1.67	-1.46	3.99	4.1	4.19	5.58	2.23	4.44	2.96	3.1

ITEM	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
34. MOT7	1.08	1.86	1.94	1.85	2.37	1.02	-0.76	-1.12	-1	1.51	0.93	1.46	1.82	2.3	2.36	0.72	1.48
35. MOT8	-2.38	-3.05	1.88	-1.55	-1.36	-2.94	1.92	1.44	1.92	-1.15	-1.02	-0.12	-0.64	0.69	-0.76	-1.81	-1.61
36. MOT10	0.4	1.07	1.18	1.31	1.21	1.27	-1.28	-1.84	-1.21	1.63	1.21	2.45	1.38	0.42	0.88	0.57	0.49
37. MOT12	1.76	2.12	2.19	3.1	3.24	3.26	-1.63	-1.52	-1.31	2.43	2.14	2.66	3.23	0.8	1.92	1.26	0.45
38. HYG1	-0.97	-0.63	-1.63	-1	-1.32	0.21	-0.99	-0.39	-0.75	-1.71	-0.75	-0.67	0.91	0.16	0	-0.22	-0.28
39. HYG2	-1.04	0.23	-2.48	-0.55	0.44	-0.72	0.09	0.06	-0.08	0.53	0.35	1.3	2.3	0.14	1.25	0.52	0.23
40. HYG3	-0.3	0.05	-1.1	-1.04	-2.25	0.74	-0.24	-0.06	-0.14	-0.99	-0.86	-0.28	2.02	1.33	0.48	0.43	0.01
41. HYG4	-2.05	-1.86	-4.22	-1.08	-1.86	0.37	0.75	0.88	0.52	-1.06	-0.37	0.14	1.36	0.63	-0.57	-0.3	0.49
42. HYG5	-0.48	-0.69	-2.74	-0.16	-0.61	1.77	-0.84	0.92	0.51	-0.25	0.67	1.39	1.59	1.65	-0.21	1.47	1.14
43. HYG7	-0.32	0.19	-1.22	-0.94	0.76	-0.47	0.16	-0.66	0.36	0.59	1.43	1.74	1.89	3.14	1.89	0.72	1.54
44. HYG8	0.1	0.59	-0.96	0.09	1.76	0.25	0.14	-0.67	-0.21	1.62	2.04	2	3.03	2.21	2.06	1.87	2.41
45. HYG9	0.76	0.67	-1.19	-1.04	0.03	0.39	-0.51	-1.24	-1.1	0.46	0.67	1.15	1.58	0.96	0.82	1.23	1.59
46. HYG12	-0.12	-0.75	0.52	-1.09	-2.21	-1.95	1.77	1.92	1.9	0.43	0.08	-0.08	1.25	1.37	2.32	1.12	-0.3
47. HYG15	-0.66	-0.77	-2.54	-0.58	-0.09	0.72	-0.57	-0.15	-0.06	-2.21	-1.22	-0.49	0.56	-0.35	-1.19	0.45	0.36
48. HYG16	1.15	0.11	-1.24	-0.44	-0.48	2.11	0.08	0.78	0.36	-1.81	-0.66	0.59	0.97	1.8	-0.31	0.73	0.83
49. HYG17	0.78	1.15	0.33	1.59	0.49	3.08	-0.05	-0.48	-0.03	2.15	1.25	1.05	2.74	1.77	1.08	1.6	0.47
50. HYG19	-1.2	-0.5	-2.54	1.42	2.16	3.29	-0.62	-0.06	-0.6	-0.9	0.24	0.45	1.06	0.42	0.02	-0.45	0.54
51. HYG20	-0.95	0.01	-0.74	-1.32	-1.24	1.55	-0.84	-1.03	-0.41	0.42	0.57	0.29	1.17	0.45	-0.43	0.24	-0.12
52. HYG21	0.37	0.7	-0.22	-1.22	1.36	1	0.13	-0.6	-0.37	2.94	1.96	1.55	1.91	1.4	2.96	2.15	1.96

Standard Residuals of A priori Model 3 Cont.

ITEM	18	19	20	21	22	23	24	25	27	27	28	29	30	31	32	33	34
18. ATT5	1.64																
19. ATT6	0.99	2.09															
20. CHALL	-1.21	-1.46	-0.92														
21. CONC	2.99	2.76	1.7	1.49													
22. CONT	-1.46	-1.03	-0.21	1.51	0.96												
23. ENJOY	3.33	3.1	0.49	1.16	1.24	2.47											
24. IP1	1.81	2.04	2.64	-0.99	0.05	2.17	1.51										
25. IP2	1.45	1.65	2.74	-2.7	-0.49	1.84	1.97	1.51									
26. IP3	1.83	1.98	2.49	-1.63	1.16	1.87	0.77	1.13	1.51								
27. IP4	1.3	-0.12	2.24	-2.91	-0.89	0.61	1.51	0.59	1.71	1.51							

	ITEM	18	19	20	21	22	23	24	25	27	27	28	29	30	31	32	33	34
28.	IR1	1.27	1.59	2.35	-2.83	1.15	0.5	-0.99	1.86	1.15	0.79	2.04						
29.	IR2	0.57	1.4	2.62	-3.64	0.62	0.84	-0.85	-0.32	0.31	3.45	2.04	2.04					
30.	MOT1	0.86	-0.09	2.28	0.24	1.97	0.65	1.73	0.96	0.76	0.8	1.43	0.99	- -				
31.	MOT3	0.12	-0.93	-1.62	-1.04	-2.35	-0.45	0.04	-0.57	-0.73	-0.59	-1.57	-0.96	2.9	1.38			
32.	MOT4	2.22	0.4	-1.64	-0.2	-2.69	-0.29	1.11	0.37	0.08	-0.03	-2.13	-1.42	1.06	1.38	0.35		
33.	MOT6	3.94	3.34	1.02	1.75	1	2.29	2.97	2.73	2.2	2.71	2.61	2.99	-0.81	0.61	-1.47	0.37	
34.	MOT7	3.81	1.15	-0.87	0.89	-1.3	0.02	1.61	0.92	0.78	0.71	0.98	0.49	-0.25	-0.71	-0.47	-0.76	- -
35.	MOT8	2.89	0.96	-1.61	-0.85	-3.04	0.59	0.92	1.25	0.82	1.08	0.11	-0.28	-1.65	-0.14	0.45	-0.81	-0.16
36.	MOT10	2.56	-0.78	-0.49	-0.02	-0.67	1.5	0.75	0.86	0.67	0.58	0.28	-0.13	-1.08	-0.92	-0.5	2.62	1.45
37.	MOT12	2.02	3.36	-1.07	2.07	0.11	1.19	0.43	0.63	0.17	0.66	0.7	0.65	-0.79	0.64	-1.82	-0.65	-1.74
38.	HYG1	-1.65	-0.03	1.73	0.21	1.03	0.53	1.83	1.68	2.16	1.36	2.31	2.54	0.36	-1.34	-2.01	4.07	1.57
39.	HYG2	-1.42	-0.63	1.76	-0.26	-0.07	-1.1	1.28	1.27	1.9	0.98	1.43	1.42	0.55	1.6	-1.03	4.37	1.81
40.	HYG3	-0.67	1.26	1.7	-0.25	1.21	1.4	1.08	0.83	1.16	0.33	1.88	1.42	1.28	0.52	-1.59	1.63	0.96
41.	HYG4	-1.66	-1.06	1.87	-2.48	0.18	-0.11	-0.2	0.09	0.85	0.06	1.58	0.9	-0.79	-1.04	-4.26	1.88	0.97
42.	HYG5	-2.16	-0.12	1.49	-1.65	0.81	-0.82	-0.39	-0.39	0.35	-0.84	0.81	-0.03	-0.43	-1.61	-2.85	0.8	0.11
43.	HYG7	0.21	0.36	2.96	0.88	3.95	3.18	1.65	2.08	2.68	2.09	1.53	2.41	-0.14	-0.64	-1.67	2.92	0.11
44.	HYG8	0.01	1.18	3.54	0.45	4.03	3.37	1.21	1.87	2.12	1.59	2.05	2.46	1.54	-0.3	-1.45	3.51	0.5
45.	HYG9	-0.13	1.1	1.43	1.54	1.96	2.18	1.48	1.4	1.55	1.01	0.72	1.29	1.97	1.89	0.1	2.92	1.76
46.	HYG12	0.04	2.57	-1.1	0.85	-0.73	0.46	0.85	1.19	1	0.87	0.95	1.42	1.97	1.84	2.36	4.39	1.1
47.	HYG15	-1.68	0.06	2.09	0.45	2.03	1.68	-0.17	-0.33	0.37	-1.07	0.29	0.27	0.64	-0.07	-2.13	1.83	0.96
48.	HYG16	-1.31	0.99	1.76	0	1.13	0.81	0.4	0.08	0.45	-0.78	0.9	1.26	2.4	1.07	-1.02	2.7	0.91
49.	HYG17	0.33	1.6	1.68	2.39	2.21	2.83	1.51	1.22	1.21	-0.27	1.02	0.39	0.78	-1.6	-2.71	1.98	0.87
50.	HYG19	-1.93	0.19	2.1	0.34	1.59	0.16	1.2	1.16	1.38	-0.34	1.18	1.07	0.5	-1.85	-1.96	2.36	-0.4
51.	HYG20	-1.3	1.56	2.39	0.27	2.31	1.14	0.34	-0.01	0.26	-0.9	0.69	0.63	0.36	-1.38	-2.81	2.58	-0.61
52.	HYG21	0.25	2	1.81	-0.01	2.25	1.24	2.26	1.44	2.04	1.28	1.7	2.31	0.62	-1.07	-0.44	4.51	1.35

Standard Residuals of A priori Model 3 Cont.

	ITEM	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
35.	MOT8	- -																	
36.	MOT10	-0.72	- -																
37.	MOT12	1.93	2.09	-0.99															
38.	HYG1	0.12	2.86	1.48	- -														

39.	HYG2	-1.31	2.73	0.21	1.86	1.86													
40.	HYG3	0.42	1.91	0.01	2.46	3.95	--												
41.	HYG4	-2.3	1.61	-1	2.01	4.13	3.7	3.9											
42.	HYG5	-1.83	0.17	-1.02	2.48	4.45	4.14	3.99	4.36										
43.	HYG7	-0.91	2.07	-0.18	-1.68	-0.56	0.69	-0.29	-1.41	-1.41									
44.	HYG8	-1.91	2.01	1.14	-1.08	-0.25	-0.49	-0.54	-1.8	-1.8	1.13								
45.	HYG9	-0.58	3.48	1.31	-0.49	0.56	-2.42	-0.59	-1.35	-1.35	1.64	1.19							
46.	HYG12	3.65	1.91	4.24	0.33	-1.48	-2.66	-3.59	-3.13	-3.13	1.73	1.74	0.33						
47.	HYG15	-0.8	1.21	0.21	-0.95	-1.28	-0.48	-1.29	-1.43	-1.43	0.59	0.86	-0.19	--					
48.	HYG16	1.05	1.72	1.01	-2	-1.71	-0.04	-0.72	1.06	1.06	-1.99	0.78	-0.04	--	--				
49.	HYG17	-2.65	1.21	-0.36	0	-0.85	-0.92	-0.26	-0.2	-0.2	0.16	0.76	-0.53	1.11	2.25				
50.	HYG19	-0.59	1.47	2.07	0.98	0.56	0.3	1.23	-0.39	-0.39	-0.32	-2.7	-0.69	1.29	1.19	-2.28	--		
51.	HYG20	0.2	0.07	1.75	0.23	-0.83	0.81	-0.03	-0.4	-0.4	-0.54	-2.44	2	0.73	0.47	-1.35	1.01	1.07	
52.	HYG21	0.12	1.39	2.23	-0.34	-0.65	-0.73	-0.76	-0.92	-0.92	1.91	-0.24	1.39	0.42	0.24	-0.89	-0.6	1.64	1.46

Summary Statistics for Standardized Residuals

Smallest Standardized Residual	=	-4.97
Median Standardized Residual	=	0.42
Largest Standardized Residual	=	5.58

Stemleaf Plot

```
- 5|0
- 4|94320
- 3|876643211000
- 2|999999888888777777776655555554444444433333333222222222111111000000000000+21
- 1|99999999988888888888888777777777777777776666666666666666665555555555555+14
- 0|99999999999999999999988888888888888888888888777777777777777777777777777+91
  0|11111111111111111111111111111111112222222222222222222222222222222333333+94
  1|00000000000000000000000000000011111111111111111111111111111112222222222+92
  2|00000000000000000000000000000011111111111111111111112222222222222223333+69
  3|0001123455677899
  4|00112244566
  5|06
```

Non Response Bias

Comparison of construct variables between early and late respondents – Results of MANOA analysis

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	1.0	1490.0	10	255	0.000
	Wilks' Lambda	0.0	1490.0	10	255	0.000
	Hotelling's Trace	58.4	1490.0	10	255	0.000
	Roy's Largest Root	58.4	1490.0	10	255	0.000
NONRESP	Pillai's Trace	0.1	2.9	10	255	0.072
	Wilks' Lambda	0.9	2.9	10	255	0.072
	Hotelling's Trace	0.1	2.9	10	255	0.072
	Roy's Largest Root	0.1	2.9	10	255	0.072

Comparison of demographic variables between early and late respondents – Results of nonparametric analysis

	N	Mean	Std. Dev	Mann-Whitney U	Wilcoxon W	Asymp. Sig. (2-tailed)
Gender				6986.5	25322.5	0.712
early	191	1.60	0.491			
late	75	1.63	0.487			
Ethnicity				6970	25306	0.622
early	191	3.76	0.636			
late	75	3.80	0.520			
Age				6853.5	9703.5	0.545
early	191	2.60	0.876			
late	75	2.55	0.905			
Income				5592	8077	0.130
early	181	2.57	1.729			
late	70	2.13	1.318			
Education				5974.5	8602.5	0.119
early	187	2.14	0.856			
late	72	1.94	0.710			
Netskill				6204.5	8979.5	0.148
early	188	2.77	0.844			
late	74	2.61	0.841			
Nettime**				5609.5	23375.5	0.018
early	188	2.63	1.196			
late	72	2.40	1.233			
Netshop**				5726	8427	0.030
early	188	2.31	1.263			
late	73	1.92	1.010			
Shoplast				6285.5	8913.5	0.356
early	188	2.80	1.534			
late	73	3.32	1.393			

Effect of Control Variables:

Profile Plots of Estimated Marginal Means