12-2007

THE CONSUMER CHOICE OF E-CHANNELS AS A PURCHASING AVENUE: AN INVESTIGATION OF THE COMMUNICATIVE ASPECTS OF INFORMATION QUALTIY

Jaejoo Lim
Clemson University, tojlim@yahoo.com

THE CONSUMER CHOICE OF E-CHANNELS AS A PURCHASING AVENUE:
AN INVESTIGATION OF THE COMMUNICATIVE ASPECTS OF INFORMATION
QUALTIY

A Dissertation
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy
in Management

by
Jaejoo Lim
December 2007

Accepted by:
Dr. Varun Grover, Committee Co-Chair
Dr. Russell L. Purvis, Committee Co-Chair
Dr. Jason B. Thatcher
Dr. D. DeWayne Moore

ABSTRACT

A conspicuous paradox is evident in the statistics concerning purchases over the internet. While a majority of the US population uses the internet to seek product information for purchasing decisions, less than two percent of actual retail sales occur on the Internet. To explain this small ratio of e-channel choice for purchase, a comprehensive model that extends DeLone and McLean's (2004) e-commerce success model was developed. The model centers on the importance of perceived information quality and its relationship to e-channel choice as a purchasing channel. Using the overarching theoretical frame of motivation, two questions were examined: (a) what influences consumers' perception of the quality of information in e-channels, and (b) how information quality influences the consumers' choice of e-channels in purchasing products.

Four constructs, based on dimensions of communication theories, are put forward to be important determinants in consumers' perception of information quality in e-channels, which ultimately shape their decision to purchase over the internet. Telepresence and screening capability in the message dimension, and channel trust in receiver dimension are theorized to positively affect perceived information quality. It is also hypothesized that as consumers experience higher levels of cognitive overhead as they use the internet, this will negatively impact perceived information quality in e-channels. Since telepresence is potentially the most manipulative among these factors through current web technologies, this study further investigates its antecedents. Based on human information processing styles, standardization of specification, sensory

descriptiveness, feedback quality, and interactivity are presented as technological design elements to increase telepresence.

The methodology used combined survey and a quasi-experiment, where several important parameters of the experiment were controlled to measure the research model. Several pilot studies were conducted to validate the quasi-experimental design and construct measurement. Analysis using structured equation modeling on a useable sample frame of 309 students provided support that perceived information quality has a positive effect on consumers' choice of e-channels over physical channels for product purchase. Support was found for all factors to information quality and telepresence except feedback quality's effect on telepresence.

Overall, this study presents a framework of e-channel choice that combines motivation theory with the e-commerce success model, and enables better understanding of online consumer behavior. A common belief about the inadequacy of experience goods for electronic transaction is challenged. The results of this study provide insight into the pivotal role of information quality in addressing performance risk, thereby shedding a light on what makes consumers to use e-channels mostly as an information source rather than a purchasing point. Information quality is revealed as a key link between the evaluation aspects of the information search stage and the purchasing aspects of the choice stage. Four effective levers to increase information quality are identified, and telepresence is identified as the most promising tool to increase perceived information quality.

DEDICATION

Thanks be to God through Jesus Christ our Lord. This dissertation is dedicated to my wife, Soonja Jeon, whose love and dedication for me and our children has made reaching my goals possible. I thank you with all of my heart. You have shown great patience and support while I spent countless hours during my study. You are the most important person in my life. I also thank my children, Mihyun and Jeonghyun. You helped me successfully complete this phase of our lives by being healthy good kids.

ACKNOWLEDGMENTS

I would first like to thank my co-advisors, Dr. Grover and Dr. Purvis for their guidance, encouragement, trust, support, and knowledge. They opened my eyes not only for my research as I am pursuing an academic career, but also for my life as mentors. I appreciate Dr. Grover's guidance and advice during the often long process of academic publication, and support in the difficult times of my life outside of school. I appreciate Dr. Purvis's guidance and encouragement in the dissertation, and the job search and interview process. I am grateful for their lessons, and trust and support through their nominations for awards and fellowships. For all of these reasons, I deeply appreciate their impact in my life and education. The members of my committee also deserve a special acknowledgement. Dr. Thatcher was the first person who I worked with toward a publication at Clemson. He has always been willing to help with my research and dissertation. Dr. Moore helped me with the methodology in both my coursework and dissertation. I appreciate the many hours he spent outside of class for my dissertation.

I would also like to give a special thanks to my mother Yunsim Roh, my mother-in-law Kumdoo Park, my sister Mijeong, my brother-in-law Sangho Kong, my former boss Joongha Lee, my friend Jaehoo Oh for all of their continued encouragement and support throughout my graduate work. This encouragement has allowed me to set high goals and achieve them. Lastly, I would like to acknowledge my fellow student, Zimmer J. Christopher, who shared many hours conducting research. Thanks for your friendship and hard work.

TABLE OF CONTENTS

Page

CHAPTER

Table of Contents (Continued)

Table of Contents (Continued)

LIST OF TABLES

List of Tables (Continued)

LIST OF FIGURES

List of Figures (Continued)

Figure   Page

CHAPTER 1

INTRODUCTION

Early projections of the impact of computer and communication technologies predicted that sellers would become highly dependent on electronic transactions (Huber, 1984). As predicted, the Internet opened unprecedented electronic channels[1], where firms could expand their markets by overcoming barriers such as time, distance, and high up-front costs in traditional physical channels. Consequently, when web vendors attract consumers to purchase their products and services, they benefit not only through cost savings, but also through the expanded reach to distant consumers (Chiang and Dholakia, 2003; Keeney, 1999). However in 2003, online sales accounted for only 1.7 percent or 56 billion dollars of the retail sales in the United States (U.S. Census Bureau, 2006), and are predicted to reach 5.3 percent by 2010 (International Council of Shopping Centers, 2000). This relatively small ratio of electronic transactions implies that barriers exist, or that most consumers are uncomfortable purchasing products online.

Considering that eighty percent of the U.S. population has Internet access either at work or at home in 2004, and that seventy seven percent of the Internet users report having used the Internet to search for product or service information (U.S. Census Bureau 2006), the small proportion of electronic retail sales warrants further examination. Conventionally, consumers who seek information through physical channels buy

---

[1] The term, 'electronic channels', is used interchangeably with e-channels or online stores in this dissertation.

products through physical channels. While the Internet is used extensively for searching for product information, why do these consumers turn to physical, and not electronic, channels to buy the products?

Research on e-commerce has identified various channel-choice factors using diverse theoretical foundations. A limitation in this stream of research is that the same dependent variables in e-channel choice studies are used but in different contexts, and with different definitions and meanings. This has caused inconsistent and conflicting descriptions of e-channel choice. For example, 'high intention to purchase online' for Heijden et al. (2003) is interpreted to mean that consumers do not have anxiety in using Internet technologies and are willing to use the Internet as a purchasing channel. However, for Chiang and Dholakia (2003), it is interpreted to mean that consumers want to switch from offline shopping to online shopping. In other words, Heijden et al. are concerned with the choice of whether consumers accept an Internet store as a channel whereas Chiang and Dholakia are concerned with whether consumers, who already accepted it as a channel, choose e-channels over physical channels.

Another cause for concern stems from an over-reliance on the technology acceptance model (TAM) as a theoretical lens in e-commerce research. The e-commerce system that is used as an electronic channel represents a well-established information system (DeLone and McLean, 2004; Spiller and Lohse, 1997), and should be accepted and used by consumers, as are other information systems. This reasoning has highlighted TAM as a prevalent perspective of online-behavior research, through which researchers investigate consumers' willingness to use e-channels.

2

A caveat to the TAM approach is that it focuses only on consumer 'resistance to use' e-channels. However, resistance and its consequent determinants of the channel choice may vary depending on whether consumers regard the Internet as an information source or a purchasing place. For example, the security of e-channels may be an important factor for online buyers who are supposed to expose their credit card numbers, but it might not be so important to people who use the Internet only as an information source. Therefore, an explanation for the small ratio of electronic transactions might be based on Booker's (1995) finding that most consumers use the Internet only as an information source to complement physical channels. However, studies that recognize the distinction between using e-channels as an information source compared to a purchasing place are rare. Several studies acknowledge e-channels uniquely as an information source, but they fail to perceive it as a purchasing point as well (Chiu et al., 2005; Ratchford et al., 2001; Wintrob, 1995). While other studies perceive an e-channel as a purchasing place, they do not consider the potential relationship between information search and purchase behaviors, and the relationship between the information search and the purchasing channels (Gupta et al., 2004; Liang and Huang, 1998; Alba et al., 1997).

Investigating the e-channel choice and the potential linkage from information-source to the purchasing-place roles of e-channels, a critical issue is "how well consumers are able to evaluate the characteristics of goods in the digital environment" (Ba et al., 2005). When online consumers can assess the value and quality of a product, they may be inclined to buy the product online due to the benefits offered by e-channels (e.g., shopping convenience and lower prices). Being able to evaluate a product should be

facilitated by high information quality enabled by information technologies. Whereas the importance of information has been emphasized in the marketing and e-commerce literature, information quality has been limited in the studies that regard the Internet as a purchasing channel. Consequently, this dissertation examines information quality in relation to various factors that lead consumers to use electronic channels beyond information search and as a purchasing channel by building on past research and focusing on a theoretical framework combining motivation theory, communication theories, and an e-commerce success model.

1.1 Choice of E-Channels

Consumers can choose electronic channels as an information source, a purchasing place, or a marketplace where consumers search for information and make actual purchases. Some argue that the raison d'être of e-channels is providing information (Huizingh, 2000). However, consumers perceive the e-channel not only as an information source but also as a purchasing place (Maignan and Lukas, 1997). An issue in this argument is whether consumers actually buy products through e-channels. In this regard, choice of e-channels represents consumers' intention to use e-channels as a purchasing place beyond an information source, and to substitute physical channels with e-channels.

A brief glance over consumers' current usage of e-channels offers a starting point for the study of the e-channel choice issue. The task of purchasing products has basically two components: (1) search[2] for a product that satisfies a consumer's desire, and (2) the

---

[2] Search includes the evaluations of alternatives.

actual purchase (Patwardhan and Ramaprasad, 2005). The usage of e-channels can be understood by looking at how consumers combine these two components of purchasing: search and purchase as illustrated in Figure 1.1. Non-commercial consumers shown in cell (A) use e-channels for non-transactional purposes, usually entertainment (e.g., chatting, game, e-mail). This segment does not utilize the Internet as an information source nor as a purchasing channel. Consumers in the cell (B) of complementary information source utilize e-channels for information search, but usually purchase products through physical channels. Consumers in the cell (C) of complementary purchasing place, either have pre-knowledge of the products or physical experiences before purchase, but buy the product in e-channels because of the comparative benefits such as lower price. Finally, consumers in the substitute marketplace cell (D) use e-channels for searching information as well as buying products. While a consumer can move between cells depending on situational contingencies, a U.S. Census Bureau report (2006) shows a small portion of online sales results from a large population who search for product information in e-channels. This suggests that the majority of U.S. consumers are in cell B, using the Internet only as an information source. Consequently, this dissertation focuses on understanding why consumers shift from using the Internet solely as an informational source (cell B) to using it as an informational source and purchasing channel (cell D). Further, it examines why a consumer who uses the Internet as an information source and purchasing channel (cell D) sometimes returns to using the Internet solely for information search (cell B).

Task		Search	
		Physical channels	E-channels
Purchase	Physical channels	Non-Commercial Activity (A)	Complementary Information Source (B)
	E-channels	Complementary Purchasing Place (C)	Substitute Marketplace (D)

Figure 1.1 E-channel usage.

1.2 Information Quality

Information quality is a critical building block of e-commerce (Xu and Koronios, 2004). In the traditional information systems (IS) literature, there are various definitions of information quality (Strong et al., 1997). The intrinsic view is concerned with "agreement between the data values presented by an IS and the actual values the data represents in the real world" (Nelson et al., 2005). In comparison, the contextual view emphasizes information quality in relation to the context such as user, task, and application where the information is used (Lee et al., 2002). Finally, the representational view defines information quality as the degree to which the format facilitates interpretation and understanding of the information (Wang and Strong, 1996).

Studies on information quality in e-channels generally take the intrinsic view, examining the "the degree of relevant, timely, secured and well-designed information presented on the website" (Chiu et al., 2005). However, the intrinsic view does not adequately address the unique aspects of e-commerce systems (Kim et al., 2005). For example, accuracy is important in the intrinsic view of information quality, but e-channel consumers seeking product information cannot easily appreciate the agreement between the presented value and the actual value. Consumers tend to interpret the information to react to a problem or a task (Ungson et al., 1981). Therefore, they are interested in whether the information will help find and evaluate a product during purchasing. In this sense, information quality in e-channels should not be defined "in isolation of the context to which it is applied" (Nelson et al., 2005; Kim et al., 2005; Orr, 1998).

Nelson et al.'s (2005) definition, "the degree to which the information is helpful in completing a particular task", reflects this contextual conception. This view is based on the idea that the perception of information attributes, rather than the absolute attributes of information (Miller, 1996). Also, Wang and Strong's (1996) definition from the representational view is based on the idea that people perceive good quality when they can easily understand and evaluate the information. With these in mind, we combine the contextual and representational views. This combination reflects the situation of consumers who want to evaluate products before purchase. Consequently, we define information quality in e-channels as the degree to which information in e-channels facilitates consumers' evaluation of products to complete the purchasing tasks.

1.3 Dissertation Objectives

In this study, we examine why consumers who seek information in e-channels often turn to physical channels to buy products. We investigate information quality as a core determinant of e-commerce success. Scant research investigates whether, and how, information quality influences the choice of e-channels as a point of purchase, and explains what affects information quality that consumers perceive. However, information quality has been the least examined facet of e-commerce (Delone and McLean 2004). Thus, we consider (1) what determines the choice of electronic over physical channels as purchasing places, (2) how information quality influences the consumers' choice of e-channels when they want to purchase products, and (3) what factors shape consumers' perception of information quality in e-channels.

This dissertation unfolds as follows. First, to better understand information quality, a broad picture is identified under the framework of the motivation systems and an e-commerce success model. Second, the effect of information quality on e-channel choice is assessed. Finally, factors that determine information quality in e-channels are examined.

1.4 Dissertation Contributions

This study extends beyond the prevalent TAM theoretical lens. Instead, research on e-channel choice is theoretically integrated into a nomological network, focusing on information quality's influence on online consumers' behaviors. This approach explains why consumers use e-channels most frequently as an information source rather than as a

purchasing channel. Information quality in the e-commerce context reveals its unique aspects in this dissertation, and is defined differently from traditional information systems studies. This study further directs practitioners' attention to whether, and how, information quality is important, and how to increase the information quality in e-channels as a means to attract more online purchase.

1.5 Summary and Organization

In summary, existing studies have equivocally defined e-channel choice and pay little attention to the different assumptions about the roles of e-channels. This inconsistent description of the e-channel choice as well as paucity of coverage of the choice issue necessitates a comprehensive model that can predict e-channel choice as an information source or as an information source and purchasing channel.

This chapter presented an introduction to the motivation and purpose of this dissertation. Then, e-channel choice and information quality were briefly discussed. Chapter 2 presents the theoretical framework guiding this dissertation and a review of the relevant literature. In Chapter 3, the research model is developed upon the theoretical framework described in Chapter 2. Chapter 4 presents the research method used to test the research model. In Chapter 5, the results of the data analysis are presented. Finally in Chapter 6, discussion, implications, and limitations of the dissertation are followed by future research directions.

CHAPTER 2

THEORETICAL FRAMEWORK

A variety of information channels for purchasers exist, including physical stores, the Internet, catalogs, home shopping TVs, and phones. This dissertation focuses on what encourages or discourages consumers' switching from traditional purchase channels that use physical stores to electronic purchase channels that use the Internet. To identify what we know and do not know about e-channel choice, this chapter first reviews the e-commerce literature. Then, relevant theories are discussed, which guide the development of this dissertation to extend our understanding of information quality and its impact on electronic purchase channels. Figure 2.1 illustrates the organization of chapter 2.

2.1 Channel Functions 2.2 E-Channel Choice	Literature review on e-channel choice
↓	

2.3 E-Commerce Success
    Model
2.4 Motivation Theory
	Theoretical framework
	 - A broad picture regarding the
	   issue of e-channel choice
	 - Identification of the construct
	   'information quality'

↓	
2.5 Information Quality On E-Channels 2.6 Product Characteristics	Literature review on product information & information quality
↓	
2.7 Communication Theory 2.8 Media Richness Theory 2.9 Cognitive Load Theory 2.10 Halo Effect & Cognitive Consistency Theory	Theories to support the research model
↓	
2.11 Summary	

Figure 2.1 Organization of chapter 2.

2.1 Channel Functions

The general process of consumer transactions proceeds by 1) sellers and consumers exchanging information about products and services, 2) sales transactions being carried out, followed by, 3) the products and services physically being delivered to the consumer. Traditionally, these three processes have been viewed to be functionally independent, and have been completed separately through communication, transaction, and distribution channels (Peterson et al., 1997). However, with the rapid development of information technologies, the boundaries between the different functional channels have become blurred as these processes now co-mingle and overlap (Stewart et al., 1996; Li et al., 1999). For example, a consumer that once acquired information about a product through a newspaper (communication function) and bought it at a store (transaction function) now can either search for information on the Internet and/or purchase on an e-channel.

Electronic channels can be used for carrying out both communication and transaction functions for most products, and electronic channels can even perform the distribution function for information goods. Indeed, electronic channels "offer additional information-based value and change the nature of the relationship from a supplier-focused mentality to a problem-solving, buyer-focused mentality" (Christiaanse and Zimmerman, 1999). Therefore, consumers' information search, an issue once constrained to the communication function of a channel, warrants a new investigation in the e-channel context where both communication and transaction functions can be carried out together.

2.2 E-Channel Choice

Researchers have studied what attracts consumers to use e-channels through a variety of dependent variables (DVs) including incentives, intentions, buying online, electronic purchasing, adoption, and commitment. These variables have been frequently used in diverse contexts and with different foci leading to an ill-defined concept of e-channels choice, and to confusion about a clear definition of "choice" in the e-commerce literature. Consequently, this dissertation categorizes studies of e-channel choice into three perspectives: (1) choice among individual websites, (2) choice to use e-channels as an acceptable purchase channel, and (3) choice of e-channels over traditional (physical) channels for purchase. The choice of e-channels has been explained primarily through attitude-behavior frameworks such as the technology acceptance model (TAM) and the theory of reasoned action (TRA). While the variables used for the three distinctive perspectives are very similar, their contexts reveal three different foci based on different choice intentions as seen in Table 2.1.

Table 2.1 Three major perspectives on e-channel choice in the literature.

Perspective	Fundamental Question	Major factor
(1) Choice among individual websites	Select a website over other web vendors?	Website quality
(2) Choice to use e-channels as one of acceptable purchase channels	Accept the e-channel as one of usable channels?	Consumers' resistance to the computer and e-commerce technologies
(3) Choice of e-channels over traditional (physical) channels for product purchases	Select the e-channel over physical channels?	Comparative encouraging and absolute discouraging factors

In the first perspective, choice among individual websites, web vendors compete with each other for customers. While studies on this perspective have underlying assumptions on the competition with sellers on physical channels, competition among web vendors is the main concern in this stream of research. Within this perspective, trust (Hassanein and Head, 2005; Hsieh et al., 2005; Pennington et al., 2003; Bhattacherjee, 2002), media coverage (Drèze and Zufryden, 2004; Nikolaeva, 2005), website quality (Cao et al., 2005; Chiu et al., 2005; Koufaris et al., 2001; Huizingh, 2000), and hedonic factors (Hassanein and Head, 2005; Chiu et al., 2003; Koufaris et al., 2001; Liu and Arnett, 2000) are especially emphasized to capture and prevent consumers from leaving for other web vendors. Behavioral studies interested in how to increase website traffic belong to this perspective in that they focus on competing websites (Nikolaeva, 2005;

Drèze and Zufryden, 2004). Typically, studies in this perspective do not explicitly distinguish the website visits between for product purchases and for information search. They focus on general factors that attract consumers' attention to a website whether for information search or for product search.

This perspective of choice among individual websites identifies factors that attract consumers to a single instance of e-channels over other instances, focusing on the choice within e-channels rather than across physical and electronic channels. While attraction factors of choice within e-channels might be relevant in this dissertation, the known factors in this perspective have to be re-examined in the context of choice across channels. Further, purchase intention is either vendor-specific, or not explicit in most of the studies in this perspective. To summarize, because of the different focus and context of the choice that is not specific to product purchase situation, this perspective does not describe the focal issue of this study well, the choice of e-channels as a purchasing place. Table 2.2 summarizes this perspective.

Table 2.2 Studies on choice among individual websites.

Authors	Variables	DV	Focus	Purchase intention
Barnes & Vidgen (2001)	Tangibles, reliability, responsiveness, assurance, emphathy	Website quality	Choice across websites	Not explicit
Bhattacherjee (2002)	Familiarity, trust	Willingness to transact	Choice across websites	Explicit
Cao et al.(2005)	Website quality	Belief, intention to revisit a website	Choice across websites	Not explicit
Chiu et al. (2005)	Website quality (connectivity, playfulness, information quality, interactivity, learning).	Customers' behavioral intention	Choice across websites	Not explicit
Drèze & Zufryden (2004)	Advertising, media coverage, and portal alliances	A company's online site visibility	Choice across websites	Not explicit
Hassanein & Head (2005)	Trust, enjoyment, social presence, usefulness, ease of use	Attitude for websites selling products	Choice across websites	Not explicit
Hsieh et al. (2005)	Financial, social, structural bonds	Customer commitment in a virtual environment	Choice across websites	Not explicit
Huizingh (2000)	Content, design	Website quality	Choice across websites	Not explicit

Table 2.2 Studies on choice among individual websites (Continued).

Authors	Variables	DV	Focus	Purchase intention
Koufaris et al. (2001)	Perceived control, shopping enjoyment	Intention to return	Choice across websites	Explicit
Koufaris (2002)	Concentration, usefulness, ease of use, perceived control, shopping enjoyment	Intention to return	Choice across websites	Explicit
Liu & Arnett (2000)	Information quality, service quality, playfulness, system use, system design quality	Website success	Choice across websites	Not explicit
Nikolaeva (2005)	E-tailer features (multichannels, product type, assortment), site visibility enhancers (media coverage, portal alliances)	Website traffic	Choice across websites	Not explicit
Pavlou & Gefen (2005)	Psychological contract violation	Transaction intention	Choice across websites	Explicit
Pennington et al. (2003)	Attitude toward vendor (vendor trust)	Purchase intent	Choice across websites	Explicit
Ratchford et al. (2001)	Skill to search, ease of use, income, prior information	Consumer choice of the Internet as an information source	Choice across websites	Not explicit

The second and most prevalent perspective is choice to use e-channels as an acceptable purchase channel. TAM, including TRA, has been the dominant framework to describe this perspective (Gefen et al., 2003; Chen et al., 2002; Heijden et al., 2001; O'Cass & Fenech, 2003). Since this perspective is concerned with individual intention to accept e-commerce systems, various constructs centered on the salient beliefs such as ease of use and usefulness have been identified. Trust (Pavlou, 2003; Torkzadeh and Dhillon, 2002; Gefen et al., 2003; Suh and Han, 2003) and perceived risk (Bhatnagar et al., 2000; Heijden et al., 2003; Pavlou, 2003) are popular constructs discussed within and in relation to the TAM framework.

The TAM framework necessarily invites the consideration of the pleasure-oriented hedonic aspects of e-commerce systems (Hijden, 2004). In the marketing literature the categorization of utilitarian factors and hedonic factors has contributed to understanding of consumers' purchase intention (Chaudhuri and Holbrook, 2001). In the e-commerce literature this dualistic approach has been closely related to TAM/TRA in that the explanation of both categories is based on beliefs such as usefulness and ease of use. The two approaches differ in that utilitarian factors such as convenience are instrumental and hedonic factors such as playfulness are affective. While both utilitarian and hedonic factors have played important roles in the perspective of choice among individual websites (Koufaris, 2002; Koufaris et al., 2001; Chandon et al., 2000; Chiu et al., 2005), only utilitarian factors have been shown to affect consumers' choice to use e-commerce systems for purchasing tasks.

Other factors that affect consumer acceptance in this perspective include compatibility (Chen et al., 2002; O'Cass and Fenech, 2003), virtual reality (Suh and Lee, 2005), and security (Suh and Han, 2003; Swaminathan et al. (1999). Demographics have been another source used to explain the acceptance of e-commerce systems. Gender, experience, income, and education are such examples (Bhatnagar et al., 2000; Buroughs and Sabherwal, 2001; Fram and Grady, 1997). Table 2.3 summarizes this perspective.

While TAM provides the theoretical support to this perspective, it does not offer a persuasive explanation of channel-choice behaviors. TAM is mainly concerned with resistance to information technologies. Therefore, it suggests that usefulness and ease of use of an information system decrease resistance and encourage use of the system. However, people compute gains and losses regardless of the personal preference or resistance when confronted with a choice situation (Abdellaoui et al., 2005). Consumers who are open to e-commerce technologies for purchase may not choose electronic channels depending on the balance of the computation. Therefore, this perspective's explanatory power is limited to an absolute level within electronic channels while the 'choice' demands comparative explanations about advantages and disadvantages across electronic and physical channels.

Table 2.3 Studies on intention to choose to use e-channels.

Authors	Variables	DV	Focus	Theoretical framework
Bellman et al. (1999)	Online behavioral characteristics	Buying online	Accepting e-channels as one of usable purchase channels	-
Bhatnagar et al. (2000)	Convenience, risk, and demographic factors (age, experience, gender)	Internet shopping decision	Accepting e-channels as one of usable purchase channels	-
Buroughs & Sabherwal (2001)	Income, education, Internet use/search experience, security	Retail electronic purchasing	Accepting e-channels as one of usable purchase channels	Innovation diffusion theory, TAM implicitly
Chen et al. (2002)	Compatibility, usefulness, ease of use	Intention to use, actual use of virtual store	Accepting e-channels as one of usable information channels	TAM, Innovation diffusion theory
Chu et al. (2005)	Retailer brand, infomediary reputation	Intention to purchase online	Accepting e-channels as one of usable channels for purchase and information	Intrinsic/extrinsic cue, Confirmation effect, Search cost theory
Fram & Grady (1997)	Gender	Internet shopping	Accepting e-channels as one of usable purchase channels	Contingency factors for female online consumers

Table 2.3 Studies on intention to choose to use e-channels (Continued).

Authors	Variables	DV	Focus	Theoretical framework
Gefen et al. (2003)	Trust, usefulness, ease of use	Intended use	Accepting e-channels as one of usable purchase channels	TAM
Heijden et al. (2003)	Perceived risk, ease of use	Intention to purchase online	Accepting e-channels as one of usable purchase channels	TAM
Liang & Huang (1998)	Uncertainty, asset specificity, transaction cost	Customer acceptance of products in electronic markets	Accepting e-channels as one of usable channels for purchase and information	Transaction cost theory
Mahmood et al. (2004)	Trust, and economic conditions	Online shopping	Accepting e-channels as one of usable purchase channels	Transaction cost theory
O'Cass & Fenech (2003)	Opinion leadership, impulsiveness, web shopping compatibility, Internet self-efficacy, perceived web security, satisfaction with websites, and shopping orientation	Adoption of web for shopping	Accepting e-channels as one of usable channels for purchase and information	TAM

Table 2.3 Studies on intention to choose to use e-channels (Continued).

Authors	Variables	DV	Focus	Theoretical framework
Pavlou (2003)	Trust, perceived risk, ease of use, usefulness	Intention to transact	Accepting e-channels as one of usable purchase channels	TAM
Suh & Lee (2005)	Strength of virtual reality interfaces (media richness, interactivity, telepresence); product types as a moderator	Consumer learning (knowledge, attitude, purchase intentions)	Accepting e-channels as one of usable channels for purchase and information	Theory of cognitive fit
Suh & Han (2003)	Customer trust, perception of security control	Acceptance of e-commerce	Accepting e-channels as one of usable channels for purchase and information	TAM
Swaminathan et al. (1999)	Vendor characteristics, security of transactions, concern for privacy, customer characteristics	Likelihood of electronic exchange	Accepting e-channels as one of usable channels for purchase and information	TAM implicitly
Torkzadeh & Dhillon (2002)	Means objective(online payment, Internet product choice, vendor trust, shopping travel), fundamental objective(convenience, ecology, customer relationship, product value)	success of Internet commerce	Accepting e-channels as one of usable channels for purchase and information	-

Table 2.3 Studies on intention to choose to use e-channels (Continued).

Authors	Variables	DV	Focus	Theoretical framework
Yoh et al. (2003)	Beliefs and attitude, social support and acceptance, prior experience	Consumer adoption of the Internet for apparel shopping	Accepting e-channels as one of usable purchase channels	TRA, Innovation diffusion theory

Finally, the third perspective considers choice of e-channels over physical channels for product purchases. Table 2.4 summarizes e-commerce studies that explicitly compare electronic channels with physical channels. This perspective considers comparative advantages and disadvantages of electronic channels over physical channels.

Many factors that influence e-channel choice have been identified from various disciplines. The most common factors in the IS, marketing, and consumer psychology literature are convenience (Chiang and Dholakia, 2003; Li et al., 1999), broad selection (Keeney, 1999), and low price (Gupta et al., 2004; Janssen et al., 2002), product characteristics (Ba et al., 2005; Chiang and Dholakia, 2003), risk (Gupta et al., 2004), and e-security (Alba et al., 1997; Keeney, 1999). Unlike the second perspective of choice to use e-channels which have been mostly driven by TAM, variables in this perspective have diverse foundations such as transaction cost theory, consumer decision process, game theory, and channel theory.

This perspective offers a useful lens to look at e-channel choice, but it still has a limitation. Studies in this perspective rarely consider consumers' perception of e-channels' role. If consumers perceive the e-channel as a purchasing place, they become cautious in deciding to use e-channels because they have to expose private information such as credit card numbers on the Internet. However, if consumers use e-channels exclusively to browse and acquire product information, different factors will influence their sensitivity about using e-channels. Therefore, the consequent determinants of the channel choice may vary depending on whether consumers regard the Internet as an information source or a purchasing place or both. However, studies that distinguish

between a purchasing place and an information source are rare. Researchers in the last two perspectives[3] either perceive e-channels only as purchasing places, or do not explicitly understand and/or investigate the different effects resulting from the different roles of the e-channels.

---

[3] (2) choice to use e-channels as one of acceptable purchase channels, and (3) choice of e-channels over physical channels for product purchase

Table 2.4 Studies on choice of e-channels over traditional channels.

Authors	Variables	DV	Focus	Theoretical framework
Alba et al. (1997)	Vast selection, screening, reliability, product comparisons, personal security	Incentive to participate in electronic marketplaces	E-marketplaces vs. traditional retail format	Transaction cost theory
Ba et al. (2005)	Product characteristics, learning paradigm (natural selection, best reply)	Choice of transaction channels	Choice across transaction channels	Game theory
Chiang & Dholakia (2003)	Inconvenience of offline shopping, product type, perceived price of the product	Intention to shop online	Online vs. offline shopping	Consumer decision process
Donthu & Garcia (1999)	Internet users' demographics and characteristics	Internet shopping	Internet vs. non-Internet shopping	TAM implicitly
Gupta et al. (2004)	Channel-risk perceptions, price-search intentions, search/evaluation effort (product attribute), and waiting time	Consumer switching from off-line to online shopping.	Offline vs. online shopping	Purchase decision process

Table 2.4 Studies on choice of e-channels over traditional channels (Continued).

Authors	Variables	DV	Focus	Theoretical framework
Keeney (1999)	Means objective (reliable delivery, better purchase choice, system security, etc), fundamental objective (convenience, safety, shopping enjoyment, cost, etc)	Value of Internet commerce to the customer	Internet vs. conventional methods	Value-focused thinking
Li et al. (1999)	Perceived channel utilities, shopping orientations (convenience, experiential), accessibility, demographics	Consumer's online buying	Online vs. non-online buyers	Channel theory
Ramaswami et al. (2000)	Motivation(willingness to use e-channel, knowledge of the products), ability (income), opportunity (time availability)	Online information search, online purchase	Online vs. offline agent	MAO (motivation-ability-opportunity) framework

Another limitation of the previous three perspectives is that while various factors have been identified on different theoretical foundations, these factors are scattered in isolated pockets and sometimes overlap. Thus, there is a need to establish a model that will integrate these factors through a consistent nomological network. Table 2.5 shows the summary of the literature gap.

Table 2.5 Literature gap in the studies of e-channel choice.

Issue	Literature gap
Multi-meaning concept of 'choice'	Purchase intention is a primary DV across the three perspectives of e-channel choice studies whether implicitly or explicitly. However, it has multiple meanings depending on each researcher's focus, which causes inconsistent descriptions of the channel choice issue.
Lack of a broad picture	It's too restrictive to see the e-channel choice issue only through the prevalent 'resistance to technology' perspective. A comparative component of investigation across e-channels and physical channels is missing. Also, integration of known factors within a consistent nomological network is needed.
E-channels' roles	Choice factors have to be examined with the consideration of the assumption about the e-channel' roles. There exists a missing explanation about the linkage between the information source and the purchasing place roles.
Lack of studies on information quality	A critical issue in e-channel choice is the evaluation of product quality and value, which is facilitated by high-quality information. However, the quality of information in e-channels is the least examined facet of e-commerce (DeLone & McLean, 2004).

With this gap in the literature in mind, this dissertation develops an integrative framework that incorporates search and purchase phases. It also considers benefit-seeking choice at a comparative dimension and resistance to use at an absolute dimension. To that purpose, a detailed absolute dimension of e-channels is introduced in the next section. This dimension is explained through the e-commerce success model, which represents

DeLone and McLean's (2004) extension of their IS success model to e-commerce. Then, motivation theory is used to describe and explain both of the above dimensions in consumers' online behaviors.

2.3 DeLone and McLean's E-Commerce Success Model

DeLone and McLean's (2004) e-commerce success model (Figure 2.2) identifies problems in e-channels that discourage consumers from using them to complete purchases. This model is based on the updated model of their original IS success model. DeLone and McLean's original model (1992) adopted dual dimensions of system and information quality to capture the fundamental characteristics of information systems. In the updated model, they incorporate the demand of IS services. To the e-commerce success model, DeLone and McLean extend the same logic found in the IS success model. Thus, looking at e-commerce systems as information systems, they argue that the success of e-commerce originates from system quality, service quality, and information quality. The metrics of these dimensions are described from the perspective of online consumers.
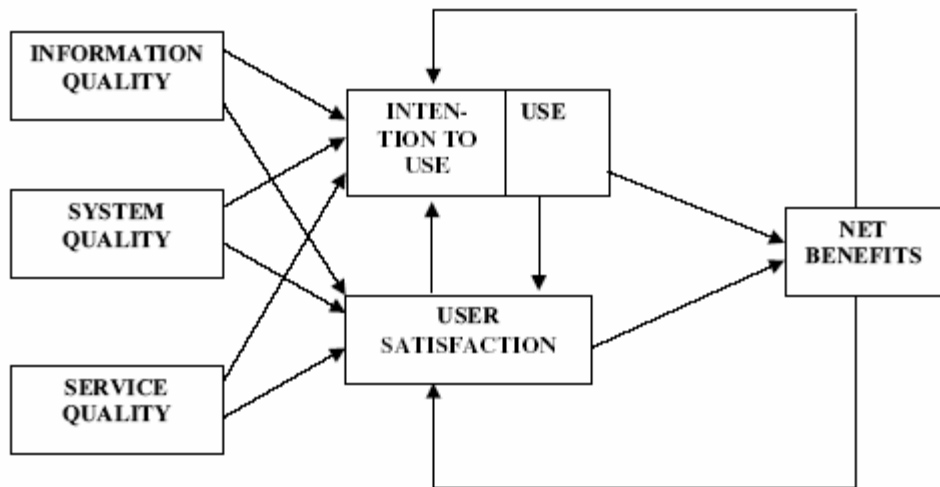
Figure 2.2 E-commerce success model.

2.3.1 System quality

System quality is the quality of technological characteristics of online stores (DeLone and McLean, 2004). The key measure of system quality of electronic commerce systems consists of security, reliability, and responsiveness (DeLone and McLean, 2004). When the e-commerce system shows poor quality in these measures, consumers might be discouraged from choosing to use this system because the realization of the expected benefits is not likely.

2.3.2 Service quality

Service quality is defined as the quality of the overall support delivered by online stores (DeLone and McLean, 2004). Service quality can be measured by the effectiveness of online support capabilities (DeLone and McLean, 2004). Consumers who seek benefits from online purchase can incur indirect costs such as time and effort for product delivery and maintenance. These costs are not likely to occur in physical stores and have to be curbed to encourage online shopping. Order-tracking, online product support, and free express delivery are such tools to curb indirect costs, thereby increasing service quality in e-commerce. Poor service quality will discourage consumers from choosing to use the e-commerce system.

2.3.3 Information quality

Researchers recently created various measures of information quality in the e-commerce systems using information quality dimensions identified in the traditional IS literature. Relevance, depth/breadth, and reliability are such key measures of information quality (Agarwal and Venkatesh, 2002; McKinney et al., 2002). However, there is a paucity of research on the effects and the antecedents of information quality in the e-commerce field (DeLone and McLean, 2004). Considering that many consumers turn to the Internet for information search because of the ease and convenience of the search, information quality remains to be studied further in regard to the issue of e-channel choice (See 2.5 information quality in e-channels).

2.4 Motivation Theory

To better understand consumers' choice behavior, we examine motivation theories. Motivation has been known as a building block of human behaviors. There are a number of theories of motivation such as Maslow's (1943) hierarchy of human needs theory, and Herzberg's Two-Factor Theory (Hertzberg et al., 1959; King, 1970). Among various motivation theories, Konorski's (1967) general theory that postulates two central motivation systems shed light on the study of consumers' channel choice behaviors.

Motivation theories posit that the expectation related to the outcome of events determines the behavior to be initiated. Talcott Parson's theory of motivation posits that two possible stimuli to human behaviors are expectations of gratification and deprivation. People tend to move or act in a particular way to gratification-producing situations, and to withdraw or avoid deprivation-producing situations (Wilburn, 1970). In line with these two situations, Konorski (1967) identified two mutually antagonistic motivational components in the brain: the appetitive motivation system and the aversive motivation system. The appetitive motivation system lets a person seek benefits while the aversive motivation system leads a person to avoid negative affects or risk. These two components reciprocally inhibit one another (Dickinson & Pearce, 1977). For example, a 'safety' signal that inhibits the aversive system activates appetitive system. Thus, an individual's behavioral choice is encouraged either by the activated appetitive motivation system or by the deactivated aversive motivation system. Likewise, the behavioral choice is discharged either by the deactivated appetitive motivation system or by the activated aversive motivation system. That is, these two comparable components are

33

motivationally equivalent irrespective of whether these affective states are derived from repelling or attractive circumstances (Weiss et al., 1996).

This stream of research suggests that individuals' choice behavior is a direct result of the attempt to find a balance by optimizing their gratification and minimizing their deprivation (Wilburn, 1970). Therefore, consumers' choice of channels for product purchases would be also an issue of balancing between the appetitive motivation seeking benefits over an alternative channel, and aversive motivation avoiding uncertainty and risk arising from the choice.

2.4.1 Appetitive motivation for the choice of e-channels

What makes consumers, who seek information via e-channels, stay online to purchase the products can be explained through Konorski's (1967) theoretical framework of appetitive and aversive motivation systems. The literature in IS and marketing is replete with explanations based on the appetitive motivation for this question. Factors from this approach are described in terms that compare e-channels with physical channels. Lower search costs and price (Chiang and Dholakia, 2003), convenience such as open 24/7 and travel-time saving (King et al., 2004), better accessibility to the products chosen in the information search stage (Mahajan et al., 2002), and broader selection (Jarvenpaa and Todd, 1997) are acknowledged as such factors. These motivators are known to attract benefit-seeking consumers to stay online for product purchases. This appetitive motivation is collectively itemized as comparative benefit, which is used as a control variable in this dissertation.

2.4.2 Aversive motivation for the choice of e-channels

The other side of motivation is aversive motivation, which guides people's risk avoidance behaviors. Consumers, who are initially attracted to e-channels by the comparative benefits of buying through e-channels, may hesitate to actually buy online because of the risk arising from the peculiar characteristics of e-channels. Recent studies especially see perceived risk as a key barrier to e-commerce success (Liebermann and Stashevsky, 2002; Palmer et al., 2000; Bhatnagar et al., 2000).

Six types of risk in traditional retail channels have been identified in the literature. These include financial[4], source, performance, physical, social, and psychological risks[5] . Financial risk is a consumer's concern about any overpayment for a product, especially because of hidden costs associated with receiving, returning, and maintaining products (McCorkle, 1990; Settle and Alreck, 1989). Source risk is a consumer's concern about whether a seller or a retail channel is reliable enough to do business together (McCorkle, 1990). Since this dissertation focuses not on individual sellers, but on a collective channel, this type of risk is primarily a function of the reliability and security of the retail channel.[6] Performance risk is defined as a concern about whether a purchased product will perform as expected and satisfy the consumer's requirements (Nöteberg, 2003). Physical risk pertains to a concern about one's physical health and well-being (Kaplan et al., 1974). Social risk arises from compliance pressure and thus, is concerned with others' opinion about the product one will buy (Gupta et al., 2004; Bearden et al, 1989).

---

[4] A time-loss risk from McCorkle's (1990) article is incorporated into a financial risk because an express delivery is possible by paying a higher delivery fee.

[5] Javenpaa and Todd's (1996) economic risk and personal risk correspond to McCorkle's financial risk.

[6] Individual sellers' effects are held constant because data for individual sellers are pooled together for analysis.

Psychological risk is defined as a concern about the individual's self-image that is reflected on the purchased product (Jacoby and Kaplan, 1972). Among these, physical risk is minimal in online shopping (Gupta et al., 2004), and social risk and psychological risk are not critical because online consumers don't buy products in public as they do in physical stores. Thus, the first three (financial, source, and performance) types of risk are pertinent to the studies of e-commerce.

Risk shapes discouraging factors to online transactions while factors in the appetitive motivation systems encourage online purchase. Alleviating perceived risk will decrease the influence of factors that discourage consumers from staying online for product purchase. To choose e-channels on the base of comparative benefits in online product purchases, the risk that a consumer is exposed to has to be around the optimum level. The optimal level means the level at which "a consumer will be indifferent" between shopping via e-channels and via physical channels (Bhatnagar et al., 2000). Otherwise, she will be likely to avoid e-channels. The efforts to avoid risk within online consumers' aversive motivation system can be well addressed by DeLone and McLean's (2004) e-commerce success model.

In the e-commerce literature, financial risk represents cost-overrun risk resulting from return costs, delivery delays, maintenance, etc. Online consumers are the main users of the e-commerce system, and they should not be disadvantaged by the extra costs which they would not pay in physical channels. Thus, high-quality service such as free express delivery, order tracking, and online customer support can reduce the financial risk. Source risk reflects on the concerns about unsafe and unresponsive transactions in e-

channels in the e-commerce literature. In e-channels, there exist a lot of concerns about such risk as hackers' abuse of private information, security, unsafe transactions on the system, unreliability of the e-channel system, identity theft, and slow download speed (Burroughs and Sabherwal, 2001; Berghel, 2000). These concerns can be addressed by high system quality sustained by technological treatments incorporating prevention efforts (Li et al., forthcoming). Web vendors' policy and guarantee for security and privacy, and secure transaction mechanism such as PayPal are those examples. In the literature studies have demonstrated the importance of service quality (Gupta et al., 2004; Torkzadeh and Dhillon, 2002; Keeney, 1999) and system quality (Ba et al., 2005; Suh and Han, 2003; O'Cass and Fenech, 2003; Keeney, 1999) in consumers' choice of e-channels. Therefore, this study holds service quality and system quality constant. Finally, problems with performance risk in e-commerce can be addressed by providing high quality information, with which consumers' purchasing tasks are facilitated as much as they are on physical channels. Then, consumers will have sufficient and appropriate information about what to expect from the products that they are about to purchase. Figure 2.3 illustrates the types of risk and their corresponding factors for the theoretical development of this dissertation.
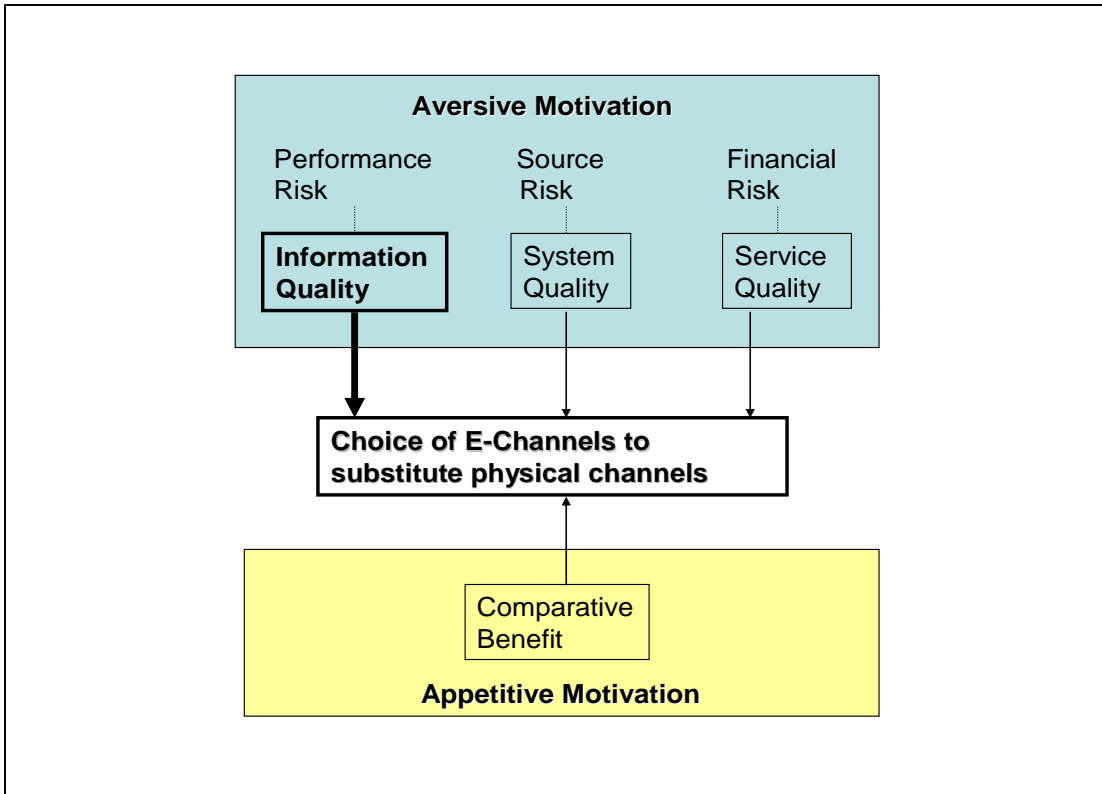
Figure 2.3 Theoretical framework.

Of these three factors, information quality has been the least examined facet of e-commerce (DeLone and McLean 2004). In the e-commerce literature, researchers who studied information quality have either focused on measurement issues such as dimensions of information quality, or acknowledged information quality as a factor that influences the use of e-channels only as an information source. There is little study about the nomological network of information quality in the e-commerce context. Thus, in the

next sections this dissertation presents theoretical foundations to answer the questions if and how information quality leads to the e-channels' substitution of physical channels for product purchase.

2.5 Information Quality in E-Channels

In the traditional IS literature, studies of information quality have been of two types. First, the influence of information quality on individuals and organizations (DeLone and McLean, 1992) has long been studied. Information quality's relationship with system use (Teng and Calhoun, 1996) and satisfaction (Nelson et al., 2005; Etezadi-Amoli and Farhoomand, 1996), and its impacts on data warehousing success (Wixom and Watson, 2001) are such examples. Second, the measurement of information quality has been another stream. Information must be of high quality to be valuable to its users. Many criteria for quality information have been developed. Since Zmud's (1978) seminal article about the dimensions of information quality, the coverage of the dimensions has been expanded by several researchers. O'Reilly (1982) used six dimensions of information quality to examine its impact on decision-makers' use of information sources. Miller (1996) identified ten dimensions of information quality such as relevance, accuracy, timeliness, completeness, coherence, format, accessibility, compatibility, security, and validity. Wang and Strong (1996) examined the attributes of information quality from the perspective of information consumers, and Strong et al. (1997) presented fifteen dimensions of information quality through intrinsic, accessibility, contextual, and

representational categories. They found that accuracy is the most important of all dimensions.

In the e-commerce literature, studies on information quality have focused mostly on measurement and have been built on the dimensions of information quality in traditional information systems. Studies of information quality in e-channels need to incorporate those aspects unique to the Internet context such as interactive information extraction and limitations of audio-visual illustration (Xu and Koronios, 2004), and the aspects of presentation and delivery of online information (Kim et al., 2005). Information quality in e-channels can be measured by quantity, variety (Palmer 2002), relevance, depth/breadth, timeliness (Agarwal and Venkatesh 2002), understandability, reliability, usefulness (McKinney et al. 2002), accuracy, currency, and accessibility (Molla & Licker, 2001; DeLone and McLean, 2004). However, the e-commerce literature offers little to explain what affects the information quality and what the role of information quality is in the e-commerce environment (Xu and Koronios, 2004; DeLone and McLean, 2004).

The primary goal in this study is to complete the nomological network of the e-channel choice for purchasing products through the investigation of information quality. Therefore, what information is needed and what is the level of information quality required for online product purchase are the focal concerns. Since product characteristics are the raw materials for product information, it is important to consider product characteristics first.

2.6 Product Characteristics

To understand the information required for product evaluation, different characteristics of products need to be considered. Categorizing products according to their characteristics has a significant meaning in the study of online consumer behaviors. It helps examine how consumers comprehend product information and judge the value and quality of a product (Sujan and Dekleva, 1987; Meyers-Levy and Tybout, 1989). There have been a number of categorization schemas for products in the marketing literature (Bucklin, 1963; Peterson et al., 1997) such as high-low value, degree of perishability (Berman, 1996), frequency and size of purchase (Black et al., 2002). Among these, Nelson's (1970, 1974) categorization by the experience/search attributes of goods seems to be especially relevant for the current research dealing with consumers' behaviors since the categorization is based on consumers' perception.

Using the attributes of products as a criterion, Nelson (1970, 1974) distinguishes between search goods and experience goods. Nelson declares a good as a search good if full information about the quality and value can be obtained before consumers buy and use it, while an experience good is one of which quality and value are difficult to evaluate until consumers purchase and use it. Three-hole binders and books are popular examples of search goods in the literature. Consumers do not need to experience search goods before they decide to purchase them. A good example for an experience good is a car. A consumer would want to test-drive a car before she makes the decision to buy one. This classification of goods represents a spectrum of experience and search attributes of a product rather than a distinctive unit of each types of attributes. Consequently, Klein

41

(1998) defines experience goods as one that is "dominated by attributes for which information search is more costly and/or difficult than direct product experience". Therefore, every product can be said to have some extent of both experience and search attributes (Shapiro and Varian, 1999), and a product would be called an experience good only if it is believed to have more experience attributes than search attributes. Another type of good in terms of experience attributes is referred to as a credence good that possesses credence attributes. A product is a credence good if it is too costly, if not impossible, to evaluate its quality even after consumers use the product (Darby and Karni, 1973). Vitamin supplements, medical service and car repair service are well-known credence goods. For example, an average customer of the car repair service would not be able to evaluate whether a removal or a replacement of a part was appropriate or not (Hahn, 1998). Since credence goods are mostly services, they will not be further considered in this dissertation.

In the literature, experience goods are known to demand physical examination and not particularly suitable for online shopping whereas search goods are actively traded via e-channels (Gupta et al., 2004; Burroughs et al. 2001). Since we are concerned with the reasons why products are not actively traded over the e-channels, this dissertation uses experience goods as the focal products to study. The information needed to evaluate search goods is simple and so, the quality of information does not usually matter for search goods. However where experience goods are concerned, consumers need detailed information for evaluation before they make a purchasing decision, and the quality of information would matter. Therefore, if high-quality information that compensates for

physical examinations is offered to consumers, they are expected to actively trade experience goods online just as they do search goods. To achieve high-quality information to substitute physical examinations, the information has to be communicated well from sellers to buyers. Therefore, communication theory and its dimensions are expected to guide ways to investigate the transfer and the quality of information. Given this, the next sections summarize communication theory and its derivatives.

2.7 Communication Theory

Given that communication is defined as "a process by which information is exchanged between individuals" (Merriam-Webster's online dictionary http://www.webster.com/)[7], the exchange process and the quality of information can be well-understood under the framework of communication theory. Various sets of dimensions or elements have been introduced in communication models since Aristotle's[8] model of communication suggested three dimensions: speaker, subject, and person addressed (Roberts, 1946). Each model selectively includes dimensions depending on the focus and the context of the study. Two representative theories are Shannon and Weaver's and Schramm's.

Shannon and Weaver (1949) introduce five elements intended for the telecommunication field: information source, transmitter, channel, receiver, and destination. Schramm (1955) proposes a three-dimension model with source, message,

---

[7] Communication may be defined as "an attempt to establish a commonness or a relationship between source and destination" (David, 1963).
[8] in his "*The Rhetoric*"

and receiver. Although the term used for each dimension and the number of elements varies among researchers, three elements are core dimensions of communication – Message, Receiver, and Sender. Considering the fact that information search or transfer is an important communication process between consumers and sellers, information quality may be well explained through the three dimensions of communication theories: message, receiver, and sender (Figure 2.4).

The message dimension can be elaborated through media richness theory, and the receiver dimension can be explored through cognitive load theory. Finally, the sender dimension can be explained through halo effects and cognitive consistency theory. The next sections cover these theories respectively.
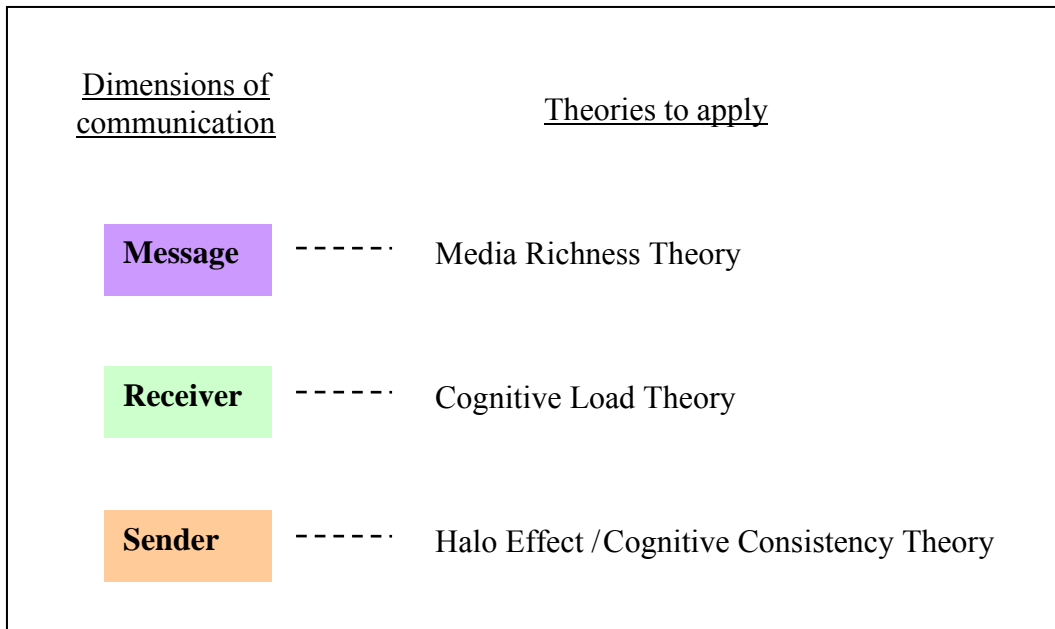
Figure 2.4 Theories to support the research model.

2.8 Media Richness Theory

Media richness theory provides a theoretical description of the message dimension of communication. Media richness theory was developed at the organization level, but it has been applied to the individual level. The theory originates from the concept of contingency theory, in which two contingencies, uncertainty and equivocality, affect the choice of media used to process information. Uncertainty refers to 'the absence of information' (Tushman and Nadler, 1978). Equivocality means 'the existence of

multiple and conflicting interpretations' about a specific situation (Daft and Macintosh, 1981).

Daft and Lengel (1986) ask and answer why information has to be processed. One reason is to reduce the uncertainty of information. For example, Galbraith (1973) and Lowrence and Lorsch (1967) emphasized effective processing of the information, suggesting the manipulation of organizational structures for that. Therefore, more information is demanded to reduce uncertainty and to contribute to the goal of information processing. Another reason for information processing is to reduce equivocality, which can be also done through organizational structuring (Weick, 1979; Putnam and Sorenson, 1982). In terms of structuring the communication paths, media richness theory suggests that richness is the key to address these two informational aspects of uncertainty and equivocality, and that media differ in terms of the extent to which it can process rich information. This implies that the well-processed or high quality information ought to be rich.

In the telecommunication field, it is known that a true voice is not conveyed on a telephone line because the telephone line does not pass the whole frequency range of the human voice. Poor quality of voice over the telephone line arises from this lack of data-processing capability. Likewise, information is doomed to be of poor quality if a media cannot process the rich aspects of information. Therefore, information has to be processed to reduce uncertainty and equivocality (Daft and Lengel, 1986), and its quality depends on the richness allowed by the medium.

2.9 Cognitive Load Theory

The receiver dimension of communication can be described using cognitive load theory. Cognitive load theory (Sweller, 1988; 1994) was developed in the education field. It describes learning structures in terms of an information processing system that involves three types of human memory systems. First, sensory memory collects information through the human senses: sight, smell, sound, taste, and touch. Second, working memory processes the information that the sensors take in. Finally, long-term memory stores the processed information. Since working memory is very limited in both capacity and duration, it rapidly passes processed information to long term memory. Otherwise, it builds up cognitive overhead, residing primarily in the working memory.

The primary cause of cognitive overhead is known to be the 'disorganized information' or 'noise' such as too much information, distraction, interruption, and multi-tasking (Kirsh, 2000). In general, people can process seven chunks of information at once (Miller, 1994), and people who are provided with 10 or more alternatives at a time tend to show dysfunctional effects (Malhotra, 1982). When confronted with overwhelming amount of information, people suffer from information anxiety, which results in their inability to interpret the information (Kirsh, 2000). Another example is that people in the middle of a task frequently incur unwanted or unintended distraction such as telephone calls and door bell ringing, which are not related to a given task (Kirsch, 2000). The consequence of the distraction is charging working memory with mental activities that are non-relevant to the main task. Lastly, modern people live in fast-changing environments, which makes multi-tasking inevitable (Davidson, 1996). A multi-tasking

environment forces people to shift from one working space to another working space. In each shift people have to exert start-up efforts to recover the status where they left off. Therefore, constant interruption caused by multi-tasking leads to cognitive overhead. High cognitive overhead overwhelms and frustrates learners (Herrod, 2000). This frustration caused by poor information presentation has a negative effect on consumers' perception of information quality.

2.10 Halo Effects and Cognitive Consistency Theory

The source or sender of information deserves researchers' attention in relation to consumers' perception of information quality. The Halo effect and cognitive consistency theory help explain the influence of the sender-dimension in communication.

According to Thorndike's (1920) experiment to let officers rate their soldiers, officers tend to answer either positively or all negatively to all the questions about a soldier. People seem to rarely express mixed signals. This psychological phenomenon of human beings is called a halo effect. Leuthesser and Kohli (1995) defined a halo effect as "a rater's failure to discriminate among conceptually distinct and potentially independent attributes, with the result that ratings for individual attributes co-vary more than the ratings otherwise would". According to their illustration, if a person is good at 'X', then people expect her to be good at 'Y' even if 'X' and 'Y' are not related.

Another interesting theory to look at in relation to the communicative aspect of information is cognitive consistency theory. Frey (1986) finds in his study that people selectively accept information that is consistent with their own views. Thus, cognitive

consistency theory states that people tend to ignore or distort incompatible elements to arrive at a consistent view, or to eliminate them with some objective means (Selvarajan, 2006). Therefore, a positive perception about a vendor will trigger and uphold another positive perception about the vendor's behavior or the output of the behavior.

2.11 Summary

In the literature, the channel choice issue has been discussed predominantly within a narrow realm focusing on the TAM framework, and the e-commerce literature lacks a comprehensive and consistent view. However, two components of motivation theory may offer new lens to view the channel choice issue. Appetitive motivation system addresses the perspective of comparative benefits, and aversive motivation system support the application of the three major dimensions of e-commerce success model. Among the three dimensions, information quality associated with performance risk has been the least studied aspect, which is further investigated in chapter 3 along three major dimensions of communication theory.

To describe the communicative aspect of information, relevant theories such as media richness theory, cognitive load theory, cognitive consistency theory and halo effects have been introduced in this chapter. They constitute the theoretical foundations to explain how to increase information quality in e-channels in the next chapter.

CHAPTER 3

RESEARCH MODEL

Researchers have expected flourishing use of e-channels for retail sales. However, people tend to use e-channels mainly for information search and continue to choose physical channels over e-channels for product purchases (U.S. Census Bureau, 2006). The previous chapter described the e-channel choice issue based on motivation theory and the e-commerce success model. Among the factors influencing e-channel choice, information quality associated with performance risk, has drawn little attention in the e-commerce field of research. Further, there have been fewer studies investigating the determinants and effects of information quality. This chapter develops a theoretical model that predicts e-channel choice focusing on the importance of information quality along three major dimensions of communication theory. Figure 3.1 illustrates the organization of Chapter 3.

```
┌─────────────────────────────────────────────────────┐
│ 3.1 Choice of E-Channels - Switching from Physical to │
│      Electronic Channels                              │
└─────────────────────────────────────────────────────┘
                          │
                          ▼
┌─────────────────────────────────────────────────────┐
│ 3.2 Factors Affecting Information Quality in E-Channels│
│      3.2.1 Telepresence and screening capability      │
│      3.2.2 Cognitive overhead of consumers            │
│      3.2.3 Channel trust                              │
└─────────────────────────────────────────────────────┘
                          │
                          ▼
┌─────────────────────────────────────────────────────┐
│ 3.3 Four Ways to Increase Telepresence                │
└─────────────────────────────────────────────────────┘
                          │
                          ▼
┌─────────────────────────────────────────────────────┐
│ 3.4 Control Variables                                 │
└─────────────────────────────────────────────────────┘
                          │
                          ▼
┌─────────────────────────────────────────────────────┐
│ 3.5 Summary                                           │
└─────────────────────────────────────────────────────┘
```
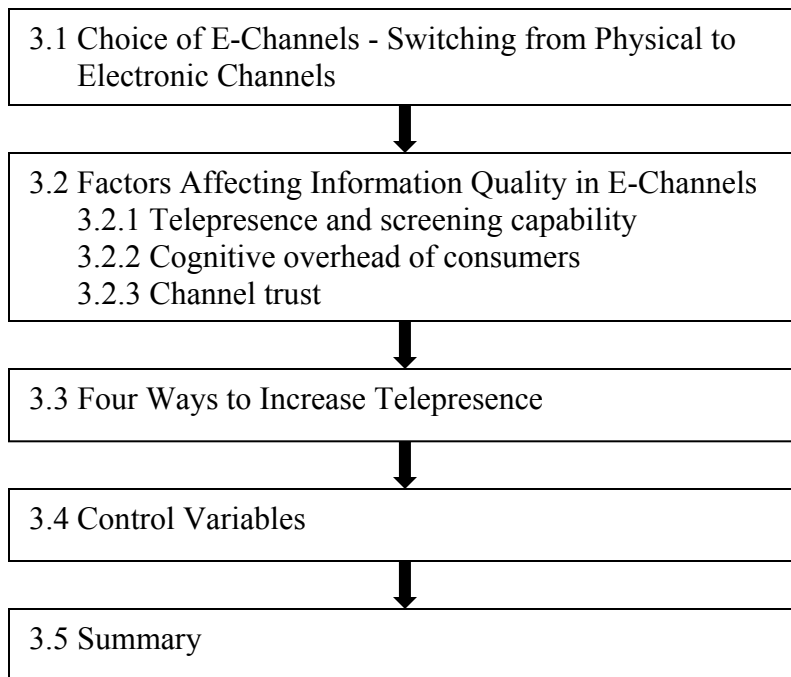
Figure 3.1 Organization of chapter 3.

3.1 Choice of E-Channels - Switching from Physical to Electronic Channels

Among the basic components of the product-purchasing task, the importance of information search activities in the consumer decision process has been highly emphasized in the literature (McColl-Kennedy and Fetter, 2001; McCall and Kaplan, 1985). The information search activities are directly related to reducing performance risk. This suggests that web vendors need to be aware of the quality of product information being displayed to, and searched for by consumers.

The importance of information quality is well-established in studies which investigate the factors affecting website traffic in the consumer decision process. Studies on website traffic focus on what attracts consumers to a website during their initial information search (Sparrow 2003; Ilfeld and Winer 2002). These studies find that to attract consumers, they must first be aware of the existence of a product, and then learn about the product (Vakratsas and Ambler, 1999). Consequently, it is product information that draws consumers to e-channels[9]. Consumers may be satisfied with high-quality information in e-channels that offer the required product experience. However, if consumers are not captured by high-quality information in the e-channels during the information search stage, a path-dependent 'hierarchy of effects'[10] (Lavidge and Steiner, 1961) from awareness of a product to buying decisions will occur outside the e-channels or within conventional channels. Bellman et al. (1999) uphold this idea, and conclude "looking for product information on the Internet is the most important predictor of online buying behavior".

Conventional physical channels are burdened by limitations such as convenience in terms of time and travel for product evaluations, slow pace of shopping, and availability (or lack thereof) of resourceful aids. In these aspects, e-channels may offer an advantage, and provide a better channel to purchase products. However, the biggest source of consumer dissatisfaction in both channels is the unavailability of required information, which increases perceived performance risk of consumers (Burke, 2002). If

---

[9] Seventy seven percent of Internet population used the Internet to search for product information (US Census Bureau, 2006).
[10] Another name is a 'persuasive model'. The six stages of it are Awareness, Knowledge, Liking, Preference, Conviction, and Purchase.

web technologies resolve this issue by enhancing the quality of information through various electronic tools and provide better information, then consumers will be less likely to require the physical experience of products currently needed to reduce performance risk. Then, consumers in the information search stage will be more likely to purchase in e-channels. Findings by Pavlou and Fygenson (2006) support this view finding high information quality of an e-vendor positively influences purchasing decisions on the online vendor's website. Therefore, we posit that information qualify has a critical influence on the consumer decisions to buy products online. Consequently,

P1a: Information quality in e-channels has a positive effect on consumers' choice of e-channels over physical channels for product purchase.

While higher information quality reduces performance risk, consumers may feel more performance risk when buying high-priced products (Chiang and Dholakia, 2003). Product price is defined as the perception of a high price of a product (Lichtenstein et al., 1991) that an individual consumer would have to pay given her financial situation. Since the same amount of money will be perceived differently depending on each consumer's financial situation, perceived price level rather than absolute price level will matter. Therefore, as the perceived price of a product increases, the influence of high information quality on the consumers' performance risk will decrease. The above discussion leads to the following proposition.

P1b: Product price negatively moderates the relationship between information quality in e-channels and consumers' choice of e-channels over physical channels for product purchase.

Consumers who want to buy products can easily go to physical stores to evaluate the products' value and quality. Accordingly, online consumers are more prone to performance risk. Independent of why consumers come to e-channels, they need to know if a chosen product will perform as expected and satisfy their requirements (McCorkle 1990). Therefore, the reduction of performance risk is a primary key to reducing barriers to e-commerce (Palmer et al., 2000). Consistent with this reasoning, conventional wisdom states that experience goods demand physical examination and are not suitable for online shopping while search goods are amenable to e-commerce (Mahajan et al., 2002; Burroughs et al., 2001). Further, McCabe and Nowlis (2001) find that the consumer's choice of channel depends on the difference of product attributes. Despite this prevalent view about the inappropriateness of experience goods for electronic transactions, online consumers of experience goods turned out to have no preference for physical experience of products (Poon, 1999). This finding implies that some vendors have provided consumers with ways to reduce performance risk other than physical examination.

A product cannot be easily converted from an experience good to a search good. However, if the experience attributes of a product can be converted into search attributes through higher quality information, a seller would benefit making the product

information available to consumers before they purchase it. Therefore, what's important in consumers' decision about e-channel choice is not the product type itself, but the quality of the given product information.

High information quality can be achieved by satisfying consumers' information requirements for product evaluation by converting need-to-know experience attributes into search attributes. Then, the 'dominance' of experience attributes in a product, may wane out as Klein (1998) suggested, and the search attributes will become more salient in the same product. Therefore, we define search saliency of a product as the extent to which a consumer knows the value and quality of a product before buying and experiencing the product. For example, a personal computer (PC) has many properties that need to be experienced before purchase. However, if a consumer is provided with high-quality information that is developed along the standardized specifications such as RAM size, hard drive capacity, and CPU type, she will be able to determine the quality of the PC without physically experiencing it. In this case, the PC's search salience increases and it can be perceived as a search good with high-quality information. Figure 3.2 summarizes this conversion mechanism.
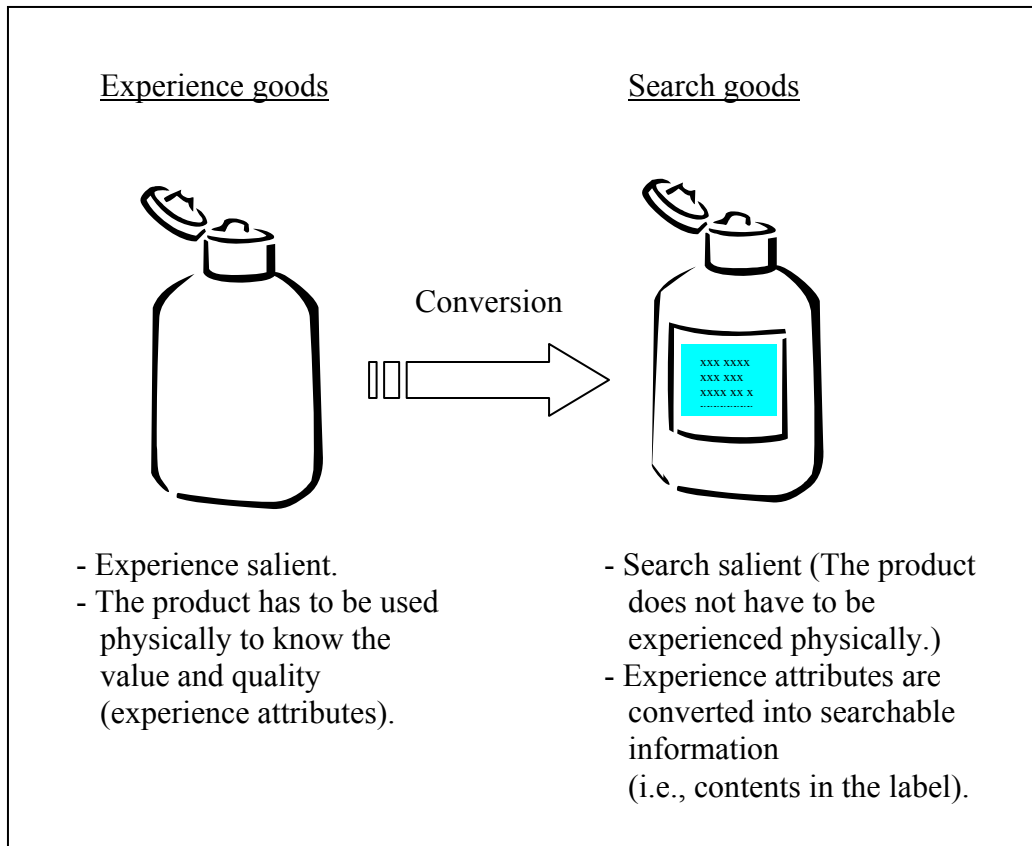
Figure 3.2 Conversion of experience goods into search goods.

Products with search saliency are known to be appropriate for e-commerce because the required information is simple, and consumers know what information to look for or already have sufficient information (Barron and Saharia, 1990). When a product is perceived as a search good, the product information will give consumers the similar experience to physical goods without having to physically experience the product

before purchase. Then, online consumers of the product will have fewer concerns about whether it will perform as expected and satisfy the consumer's requirements. Through this transformation, performance risk in e-channels can be reduced. If a product is perceived as an experience good, consumers become uncomfortable buying the product online because of the performance risk. Consumers will eventually return to physical channels if it is difficult to evaluate the product through e-channels because of the saliency of its experience attributes. Thus, as the quality of information provided by the e-channels increases, a product's search saliency increases. Then, consumers do not have to physically experience the clearly demonstrated value and quality of a product. In summary, high-quality information reduces experience saliency and increases the search saliency of a product by facilitating consumers' indirect experience (Chiang and Dholakia, 2003). The increased search saliency will reduce performance risk, which then encourages consumers to choose e-channels to substitute physical channels for product purchases. If the information quality is not high enough, consumers will have to check the product physically and e-channels' role will remain as a complementary information source. Therefore, we expect a mediating relationship of search saliency of a product.

P2: The search saliency of a product positively mediates the relationship between information quality in e-channels and consumers' choice of e-channels over physical channels for product purchase.

3.2 Factors Affecting Information Quality in E-Channels

Information is a tool to help consumers understand and evaluate a product's attributes and values. This includes a product's experience attributes that are converted into searchable information and transferred to consumers. However, if not effectively communicated, the information is destined to be considered poor quality by the consumer. Considering the importance of communication in this exchange, the research model is based on three major dimensions of communication theory: the message, receiver, and sender. These dimensions are used to identify the factors that affect a consumer's perception about information quality on products being sold on the Internet. Specifically, "telepresence" and "screening capability" reflect message dimension, cognitive overhead reflects the receiver dimension, and trust in an e-channel reflects the sender dimension.

To illustrate these dimensions, consider a cellular phone for example. The quality of the cellular phone is perceived and determined through the experience of the consumer related to the cell phone's content and functionality, the manufacturer's credibility, and the consumer preference of the appearance. Similarly, the quality of information can be perceived by the degree of telepresence and screening capability (information content and functionality), channel trust (credibility of the information producer), and cognitive overhead (the personal preference of the information format).

3.2.1 Telepresence and Screening capability

Media richness theory posits that people require rich information under uncertain and equivocal situations (Daft and Lengel, 1986). While media richness is known to have

a close link with media choice, that relationship is moderated by perceived uncertainty and equivocality (D'Ambra et al., 1998). This implies that consumers seek a medium that conveys high-quality information to reduce performance risk arising from high uncertainty or equivocality. This high-quality comes from information richness rather than the amount of information (Daft and Lengel, 1986). Since purchasing products through e-channels is accompanied by uncertainty and equivocality problems (Dennis, 1999), rich product information is needed to facilitate a consumer's evaluation efforts and leads to the perception of high information quality. Richness can be achieved in two dimensions: depth and breadth. The richness in terms of depth can be represented by telepresence, and the richness of in terms of breadth may be represented by screening capability.

Telepresence is the experience of one's physical environment perceived through the mediation of a communication medium (Steuer, 1992) or the presence which is "an illusion of being there in a mediated environment" (Li et al., 2002). A high degree of perceived telepresence comes from the medium that "brings the experience and objects closer to us, allowing us to indirectly meet and experience other objects" (Li et al., 2001). Since experience goods are characterized by the dominance of experience attributes, telepresence should be a salient factor for experience goods. If the experience mediated by an e-channel is not sufficient to evaluate a product as well as in a conventional physical channel, the quality of the information is considered lower because the information does not help the consumer adequately search and evaluate products. Information available in e-channels is enabled by web technologies that can provide vivid

experiences through such tools as virtual reality and easy access to expert or third party opinions. Thus, the perceived quality of information that is needed to evaluate a product will be significantly affected by the perceived telepresence in e-channels.

P3: Telepresence in e-channels has a positive effect on information quality.

Screening capabilities offer customized information needed to search for products. Information on search goods is relatively simple to format and consumers know what information they are looking for (Barron and Saharia, 1990). This leads to easy digitization of the information, which enables a vast selection of information in e-channels. However, the usefulness of a vast selection of information available in e-channels is dependent on a consumer's ability to sort and manipulate the information so that the desired information can be accessed (Alba and Lynch, 1997). Therefore, to the consumers who want to purchase search goods through e-channels, meaningful information may be given by screening the immense amount of information available in e-channels. The screening issue can be solved by an electronic search agent that behaves in accordance with a consumer's preference (Maes, 1994).

A consumer's desire to compare products and vendors, however, is not limited to just search goods. Although the experience attributes of an experience good are mostly intangible and so not easily searchable, once the experience attributes are digitalized, this digitized information too becomes searchable information. This means that as must-be-experienced attributes are converted into searchable information, the weight of search

attributes increases dramatically and thus, the experience good begins to be perceived as a search good (see Figure 3.2 above). That is, the immense amount of information about the experience attributes of a product can be digitalized and be available in e-channels. Like the above-mentioned case of search goods, the quality of this information can be improved through filtering and sorting capabilities of consumers. Therefore, the better screening capability e-channels support, the more effective facilitation e-channels can offer for consumers' evaluative activities. This will lead to the perception of high-quality information, and suggests the following proposition.

P4: Screening capability in e-channels has a positive effect on information quality.

3.2.2 Cognitive overhead of consumers

Cognitive overhead can be defined as the amount of mental activity imposed on a person's memory at an instance in time before processing a main task of information search (Sweller, 1988). In the context of purchasing on the Internet, cognitive overhead is the additional mental work due to making decisions as to which links to follow and which to abandon, given a large number of choices.

Cognitive load theory (Sweller, 1988; 1994) explains how cognitive overhead influences the perception of information quality. Today's Internet consumers are easily distracted by disorganized information that is caused by bombarded information, choices, as well as noise offered through pop-ups, cascading windows, inconsistent configurations, and small packed letters often encountered during the purchasing task.

These distractions impose a high level of mental activity or overhead on a person's working memory even before the needed information is interpreted, bringing about negative perceptions of information quality (Kirsh, 2000). This suggests the following proposition.

P5: The cognitive overhead of consumers has a negative effect on information quality.

3.2.3 Channel Trust

Many researchers consider trust as an important component of an online exchange relationship (Jarvenpaa et al., 2000; Lee & Turban, 2001; McKnight et al, 2001). Trust is asserted to be one of the important enabling forces of online exchanges under uncertainty, lack of control, and anonymity of virtual shopping (Bhattacherjee, 2002; Hoffman et al. 1999). In the e-commerce context, institutional and interpersonal trust has been more emphasized among the several types of trust. Institutional trust is "the set of beliefs an individual holds about a specific context" (McKnight et al., 2004). Within e-purchasing, structural assurances such as security are essential to attract consumers to conduct e-channel transactions. This type of trust is closely related to system quality, which is controlled for within this research.

For a specific transaction to be completed, interpersonal trust is also important. Interpersonal trust refers to a willingness to become vulnerable to complete the transaction (Rousseau et al., 1998). Interpersonal trust in a channel (a store) can be established as consumers accumulate successful transaction experience with the channel

(McKnight et al., 1998). In our context, this means that consumers are cognitively affected by the experience with web channels. In this regard, channel trust is defined as beliefs about a specific web store, beliefs comprising a willingness to become vulnerable to that store. Halo effects and cognitive consistency theory can make a valuable contribution to the understanding of the relationship between interpersonal trust and perceived information quality.

Cognitive consistency theory and halo effects direct attention to the importance of trust in an e-channel. In the initial relationship the perception of a website (McKnight et al. 1998), vendor and/or brand image (Boulding and Kirmani 1993; Kirmani and Rao 2000; Tsao et al. 2006), and/or vendor reputation (Pennington et al. 2003) can engender interpersonal trust. This trust for a web vendor (or a web store) brings forth halo effects by rendering positive impressions for the information that the e-channel presents. Also once trust is established, cognitive consistency theory suggests that a consumer will strive to maintain a consistent set of beliefs in accordance with her experience with a web store. This way, information from trusted web stores is regarded as more valuable and reliable. Therefore, we expect a positive relationship between channel trust and information quality.[11] This discussion leads to the following proposition.

P6: Channel trust has a positive effect on information quality.

---

[11] In the e-commerce literature, the causal relationship between vendor trust and purchase intention is well-known. Reduced risk in that context is source risk. Our study deals with a causal relationship between trust in a Web store and information quality, and so, the reduced risk in this context refers to performance risk.

Figure 3.3 presents the proposed research model, and Table 3.1 shows the definitions of the constructs used for this study.
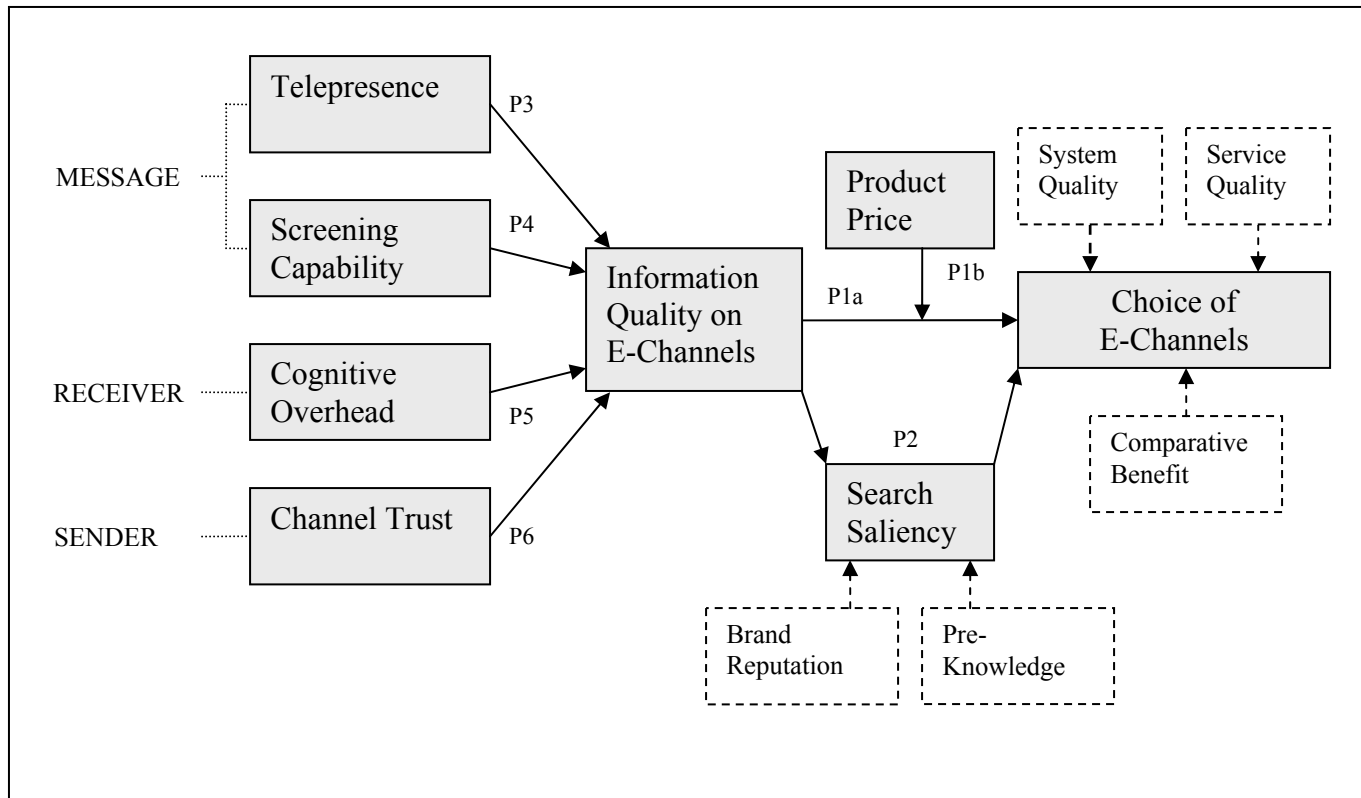
Figure 3.3 Proposed research model.

Table 3.1 Construct definitions.

Construct	Definition
Choice of E-Channels	A consumer's decision to use e-channels as a purchasing place beyond an information source, substituting physical channels.
Information Quality in E-Channels	The degree to which the information facilitates consumers' evaluation of products to complete the purchasing tasks.
Search Saliency of a Product	The extent to which a consumer can know the value and quality of a product before physically experiencing the product.
Product Price	The perception of high price of a product that an individual consumer has considering her financial situation.
Telepresence	The extent to which one can experience one's physical environments through the mediation of the Internet.
Screening Capability	The ability of the search agent to sort and filter the vast amount of information based on the given criteria.
Cognitive Overhead	The amount of mental activity imposed on a person's working memory at an instance in time before processing a main task of information search.
Channel Trust	Beliefs about a specific web store comprising a willingness to become vulnerable to that store.

3.3 Four Ways to Increase Telepresence

This study further investigates how to enhance telepresence particularly for experience goods. Media richness theory implies that a high degree of presence can be achieved through providing rich product information. The Internet is a medium that allows multiple ways of providing rich experiences. Drawing on Struthers et al.'s (2005) classification of information processing, this study extracts four primary variables that

would increase telepresence: standardization of specifications to enhance cognitive processing, sensory descriptiveness for affective processing, feedback quality for cognitive/affective processing, and interactivity for behavioral processing. Table 3.2 summarizes the definitions of the constructs.

Table 3.2 Definitions of the antecedents.

Construct	Definition
Standardization of Specification	The degree of formalization of a detailed product description in text-based forms according to a rule set by authority for measures such as quantity, weight, extent, value, functionality, or quality.
Sensory Descriptiveness	The degree to which the information is grounded on visual or auditory trial.
Feedback Quality	The degree to which information is consistent and useful in enabling indirect experience of the performance through the direct experience of other existing users or the evaluation of experts.
Interactivity	The degree to which consumers can manipulate or adjust the product information based on their preference, creating dialogues between consumers and web vendors.

Most companies are selective in providing information, making a value estimation or comparison of products a difficult task as consumers search for product information. Thus, the standardization of the performance measures is desirable for consumers, and it will help consumers experience products cognitively. Standardization is defined as "to bring into conformity with something established by authority, custom, or general consent as a model or example…" (Merriam-Webster's online dictionary), or as "a system of identification that describes products by their quality" (American Marketing Association Dictionary, 1988). Reflecting these ideas into the e-commerce context, this dissertation defines standardization of specification as the degree of formalization of a detailed product description in text-based forms according to a rule set by authority for measures such as quantity, weight, extent, value, functionality, and quality. Two primary components of standardization are consistency and comparability (Hopkinson et al., 1999). Some product information including functionalities can be standardized across vendors and manufacturers so that complex products can be easily understood by consumers. For example, the standardized specification of a PC such as RAM size can replace the consumers' experience of a specific computer's capability and capacity. Another example is men's shirts, of which size can be standardized in the industry. With standardized sizes for neck, sleeves, etc., consumers are less likely to need to try a shirt on before purchasing. Thus, the cognitive dimension of standardization increases "the extent to which information about products enhances consumer comprehension" (Suh and Lee, 2005). Therefore, standardization of product specification will lead to the perception of high telepresence.

Sensory descriptiveness is another characteristic that should influence telepresence. Sensory descriptiveness is the degree to which product information is grounded in Aristotle's five human senses. Because current web technologies do not support the human senses of taste, smell, and touch (Biocca et al., 1995), in this study sensory descriptiveness is defined as the degree to which the information is grounded in visual experience or auditory trial. While the text-based standardization of specification appeals to the cognitive processing mechanism of an individual, sensory descriptiveness facilitates affective information processing in parallel with the cognitive processing. Photo views of a product through various angles such as front, rear, and side views can play the same role as the consumer observation in a physical store. A trial version of software with limited functionalities is a popular way for companies to let consumers experience information goods, while a free sample of a music or movie clip provides an alternative descriptive experience. Thus, a high degree of sensory descriptiveness will help consumers perceive high telepresence.

Third, feedback is information which enables indirect experience through the testimonials and knowledge of other existing users or the evaluation of experts (Steelman et al., 2004). If an inspection of a specific product's quality and value requires professional knowledge, experts' reviews would offer richer and more effective evaluations to match consumer's needs than the consumer's own experience (Kamp, 1998). Thus, feedback such as critic reviews and word of mouth help consumers evaluate the experience attributes of a product (Neelamegham and Jain, 1999). Ford, Smith, and Swasy (1988) note that third-party information such as consumer reports and feedback

can serve as a replacement for direct experience. The quality of feedback is known to depend on two primary aspects: consistency and usefulness of the information in enabling indirect experience (Greller, 1980; Hanser and Muchinsky, 1978; Herold, Liden, and Leatherwood, 1987). Therefore, high-quality feedback will help consumers perceive a high degree of telepresence, rendering vivid indirect experience.

Finally, in general interactivity is "the degree to which users can manipulate the form and content of a mediated environment in real time" (Steuer, 1992). In the e-commerce context, Sullivan (1999) defined interactivity as the extent to which dialogues can be generated between the site's owner and visitors. In this dissertation it is defined as the degree to which consumers can manipulate or adjust the product information based on their preference, creating dialogues between consumers and web vendors. Interactivity includes virtual interaction with the technological tools such as interactive digital trial, 3-D experience, and online customization (Li et al., 2001). This type of web-enabled interactivity make "virtual experience" possible in that consumers may rotate, zoom in and out, and change properties such as the color of a simulated 3-D product (Li et al., 2001). In this sense, interactivity allows behavioral processing of information. It allows consumers to be exposed to most of the experience attributes of a product before they buy and use the real product (Klein, 1998). Also, a customization function offers another alternative experience to consumers. Consumers do not need to experience a product passively if they can configure or create an experience of a product's properties that meet their needs (Grenci & Todd, 2002). Another example is online chatting between consumers and a customer service representative, which enables real-time, rich, and clear

communication of product information (Kahai and Cooper, 2003; Dennis and Kinney, 1998) as if they were communicating face-to-face in a physical store. Thus, a high degree of interactivity will help consumers perceive high degree of telepresence.

Given the discussion above, we propose the following four determinants of telepresence.

P7: The standardization of specification has a positive relationship with telepresence in e-channels.

P8: Sensory descriptiveness has a positive relationship with telepresence in e-channels.

P9: Feedback quality has a positive relationship with telepresence in e-channels.

P10: Interactivity has a positive relationship with telepresence in e-channels.

Figure 3.4 summarizes the proposed causal relationships of these constructs.
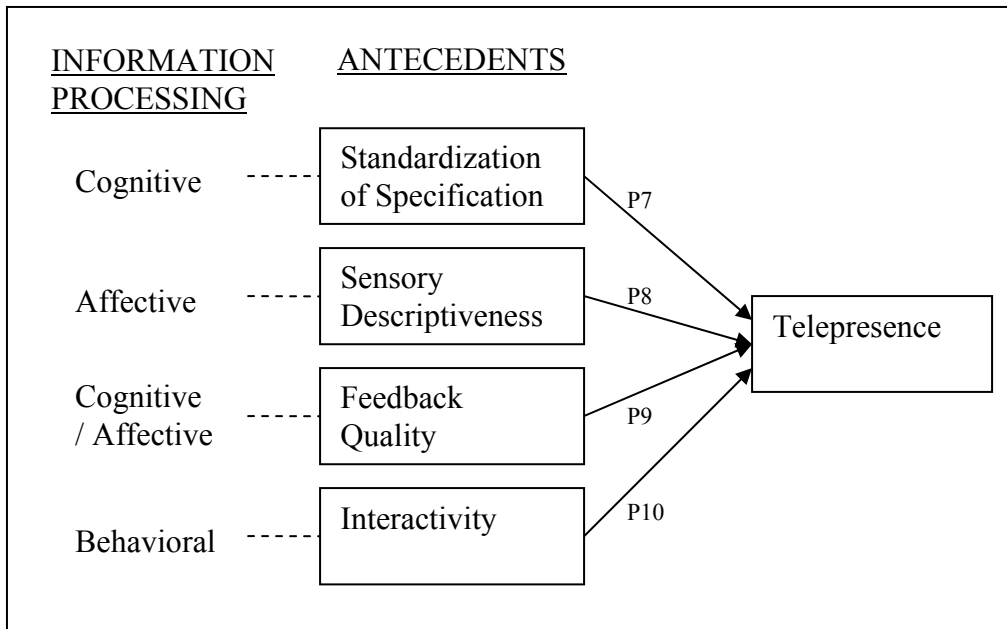
Figure 3.4 Antecedents of telepresence.

3.4 Control Variables

As explained in Chapter 2, three important motivational factors of e-channel choice are held constant to effectively investigate the impact of information quality. They are system quality, service quality, and comparative benefit. E-commerce system quality such as responsiveness, reliability, security, and ease of use (DeLone and McLean,2004) is asserted to be one of the important enabling forces of online exchanges under uncertainty, lack of control, and anonymity of e-channel transactions (Nelson et al. 2005). System quality operates through the aversive motivation system because these are

hindrance factors that may discourage the use of e-channels over conventional channels. Service quality is also one of consumers' primary concerns when they consider purchasing products online. Consumers may demand a certain level of online service to avoid hidden costs associated with receiving, returning, and maintaining products (Settle and Alreck, 1989). Thus, high service quality provided by support such as on-time delivery (Jedd 2000) and order tracking (Molla and Licker, 2001) will keep consumers from being discouraged when purchasing products online. Molla and Licker (2001) even argue that consumers may choose e-channels over conventional channels, expecting better services such as order tracking. The truth of this case will be contingent on the consumers' situation. However, generally the best express delivery service in e-channels will be only equivalent to the routine immediate-delivery on physical channels. Comparative benefit is the extent of relative rewards that a consumer can get from the purchase in e-channels compared to those from the purchase on physical channels. It is a collective cost advantage in terms of time, convenience, and price over physical channels. Time saving, low price, and savings of travel costs over physical channel are prevalently accepted as major motivating factors to the choice of e-channel (King et al., 2004; Chiang and Dholakia, 2003; Devaraj et al., 2002; Steinfield et al., 2002; Bhatnagar et al., 2000). We hold these three factors constant to find how perceived information quality affects the channel choice for purchasing products.

While we argue that high information quality in e-channels increases search saliency of a product, search saliency is known to increase with brand reputation and pre-knowledge of a product. Sometimes experience goods cannot be experienced in the

73

physical stores; for example when a product can be displayed with a sealed wrapping. Consumer-based branding research and signaling theory assert that this information asymmetry between consumers and sellers can be solved by signaling the 'missing' value information in a market interaction (Boulding and Kirmani 1993; Kirmani and Rao 2000). One solution for sellers in this situation is to "send prepurchase signals" about the product's value or quality using branding (Nelson, 1974). Tsao et al. (2006) asserts that "Brand name can convey information about unobservable quality ... Brand can therefore serve as an effective signal of unobserved quality". Therefore, brand reputation simplifies the consumer evaluation of the complicated experience attributes, and facilitates the conversion of experience attributes into search attributes. Pre-knowledge is another factor to search saliency of a product. It is the extent to which a consumer knows a product with familiarity gained through previous experience or association. If a consumer has knowledge or experience about a product, the product's attributes become simple search attributes and she can easily evaluate the value of the product (Ramaswami et al., 2000). Therefore, we hold brand reputation and pre-knowledge constant to focus on information quality's unique effect on search saliency. Table 3.3 shows the definitions of control variables.

Table 3.3 Definitions of control variables.

Control Variable	Definition
System quality	The quality of technological characteristics of online stores.
Service quality	The quality of the overall support delivered by online stores.
Comparative Benefit	The extent of relative rewards that a consumer can get from the purchase in e-channels compared to those from the purchase on physical channels.
Brand Reputation	Overall quality of a firm's products judged by people in general.
Pre-knowledge	The extent to which a consumer knows a product with familiarity gained through previous experience or association.

3.5 Summary

This chapter developed a theoretical model that predicts the e-channel choice, centering on information quality and a nomological network along three major dimensions of communication theory.

Whether a product is appropriate for transactions in e-channels depends on whether the experience attributes of the product are well converted into the searchable information and transferred to consumers rather than absolute product characteristics. If the quality of the converted information is high enough to replace physical experience, consumers may not suffer from performance risk prevalent in e-channels. This fills up an unexplained portion of consumers' choice of e-channels for product purchase.

Further in this chapter, how to improve information quality has been explained drawing on communication theories. Along the three dimensions of communication theory, telepresence, screening capability, cognitive overhead, and vendor trust are extracted as influential factors to information quality in e-channels. Information technologies for the web can improve these factors. Based on information processing types, four determinants that can enhance telepresence were also articulated in this chapter. Table 3.4 summarizes the propositions.

Table 3.4 Summary of propositions.

No.	Propositions
P1a	Information quality in e-channels has a positive effect on consumers' choice of e-channels over physical channels for product purchase.
P1b	Product price negatively moderates the relationship between information quality in e-channels and consumers' choice of e-channels over physical channels for product purchase.
P2	The search saliency of a product positively mediates the relationship between information quality in e-channels and consumers' choice of e-channels over physical channels for product purchase.
P3	Telepresence in e-channels has a positive effect on information quality.
P4	Screening capability in e-channels has a positive effect on information quality.
P5	The cognitive overhead of consumers has a negative effect on information quality.
P6	Vendor trust has a positive effect on information quality.
P7	The standardization of specification has a positive relationship with telepresence in e-channels.
P8	Sensory descriptiveness has a positive relationship with telepresence in e-channels.
P9	Feedback quality has a positive relationship with telepresence in e-channels.
P10	Interactivity has a positive relationship with telepresence in e-channels.

CHAPTER 4

RESEARCH METHOD

This dissertation examines the influence of information quality on the choice between physical and electronic channels, and the determinants of information quality in e-channels. Recognizing that this study requires perceptual data about various information facets, there are at least three ways in which the data could be collected. A popular approach is a field survey in which researchers have participants imagine a website that they recently patronized and answer the survey questions (Chiu et al., 2005). However, this data collection approach could be potentially biased by vendor effects. In addition, researchers may not be aware of what extraneous factors the survey participants are dealing with because there are too many contingencies. The second approach is a laboratory experiment, which allows a high degree of manipulability and control of extraneous factors (Li et al., 1999; 2003). The laboratory experiment typically involves a non-real (i.e. researcher-developed) business website in an isolated environment, but consumers' actual perception in the real world might be very different from that in the controlled environment.

An alternative approach is to combine the above two types of approaches. This dissertation seeks general perceptions about e-channels rather than vendor-specific perceptions, and requires a minimum level of outside interference. Also, the measured perception of consumers should reflect on the actual electronic business-to-consumer environment. Considering these requirements, we employ a methodology in which we

combine a survey and a quasi-experiment where several important parameters of the experiment are controlled to assess the research model. This way, we could collect data about consumers' real perceptions while adopting several tools to secure reasonable control of extraneous factors. Chapter 4 describes this combined methodology and the process for data collection. Figure 4.1 shows the organization of Chapter 4.

```
┌─────────────────────────────────────────────────────┐
│ 4.1 Unit of Analysis                                │
└─────────────────────────────────────────────────────┘
                          │
                          ▼
┌─────────────────────────────────────────────────────┐
│ 4.2 Refining the Parameters of the Design           │
│     - 4.1.1 Participants                            │
│     - 4.1.2 Product selection                       │
│     - 4.1.3 Website selection                       │
│     - 4.1.4 Measures                                │
└─────────────────────────────────────────────────────┘
                          │
                          ▼
┌─────────────────────────────────────────────────────┐
│ 4.3 Sample Size and Power Analysis                  │
└─────────────────────────────────────────────────────┘
                          │
                          ▼
┌─────────────────────────────────────────────────────┐
│ 4.4 Biases and Extraneous Factors to Be Controlled  │
└─────────────────────────────────────────────────────┘
                          │
                          ▼
┌─────────────────────────────────────────────────────┐
│ 4.5 Main Experiment and Survey                      │
└─────────────────────────────────────────────────────┘
                          │
                          ▼
┌─────────────────────────────────────────────────────┐
│ 4.6 Summary                                         │
└─────────────────────────────────────────────────────┘
```
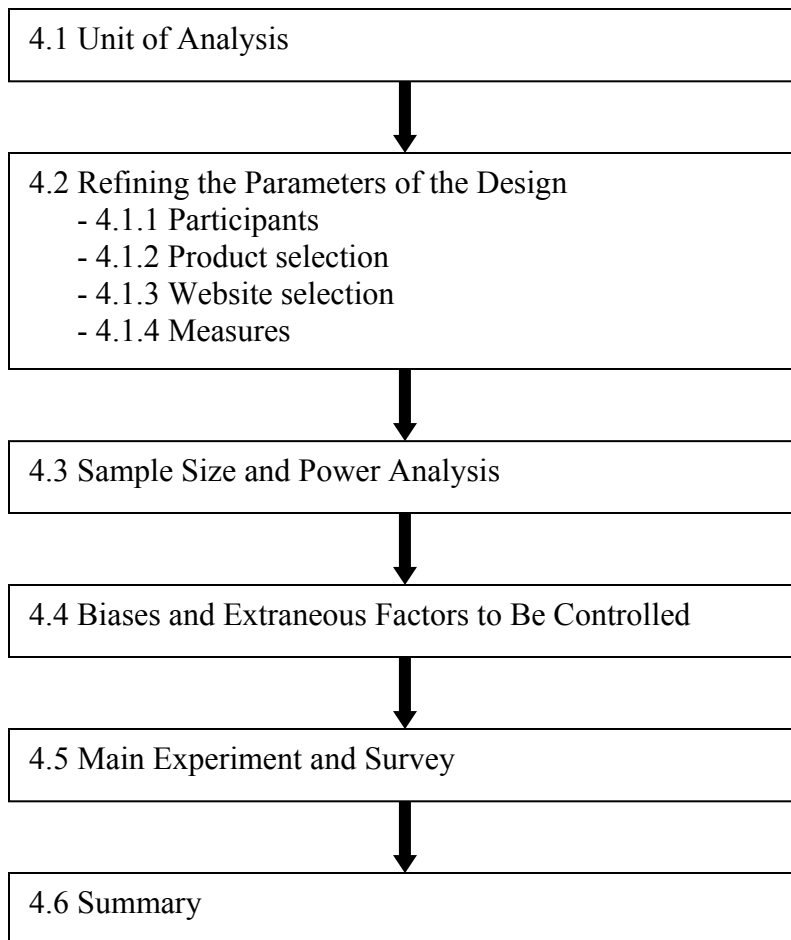
Figure 4.1 Organization of chapter 4.

4.1 Unit of Analysis

Because information quality in e-channels, by definition, relates to perceived information about a product on a website, the research model necessitates the setting of the following three entities: people (consumers), product, and website. Consequently, the unit of analysis for this study is determined as a consumer who searches for information about a product on a website.

4.2 Refining the Parameters of the Design

The parameters to be pre-determined in investigating the research model concern participants, selections of product and websites, and instruments. A panel of experts, followed by pilot tests was used to set and refine these parameters. There were important reasons for using a panel of experts. First, in this dissertation, the research model is tested through structural equation modeling (SEM), in which estimations are based on a series of comparisons of covariance matrices. Therefore, a reasonable amount of variance in each construct is necessary for researchers to be able to determine if any causal relationship exist. Indeed, it is especially important to make sure sufficient variance of information quality exists, since information quality is the core construct that interconnects the constructs in the research model. This variance can be created by manipulating parameters for products and websites. Panel members can check to see if the prepared sets of products and websites are likely to produce variance, and whether these parameters are set in accordance with the logic of the research model. Second, scale items are mostly extracted from the literature, but adapted to the context of the study.

Therefore, it is imperative for experts to check the face validity of the scale items based on each construct's domain before the main survey. Four faculty members in IS and statistical methodology, and two IS doctoral students from the Southeastern region of the United States were recruited as panel members.

After the panel members' examination of the parameters, there emerged a need for pilot tests, to ensure the appropriateness of the parameters and take opportunities to refine the meaning of each scale item. For each of four[12] qualitative pilot-test runs, we recruited different sets of about 30 college students in order to avoid learning effects. Students' feedback in each pilot test was reflected in the next pilot-test run. The process used for designing data collection is outlined in Figure 4.2. In the next subsections, we explain how the parameters were set, starting with participant selection.

---

[12] We ran pilot test B twice: one with a original set, and the other with a different set of websites after reflecting the result of the original set.
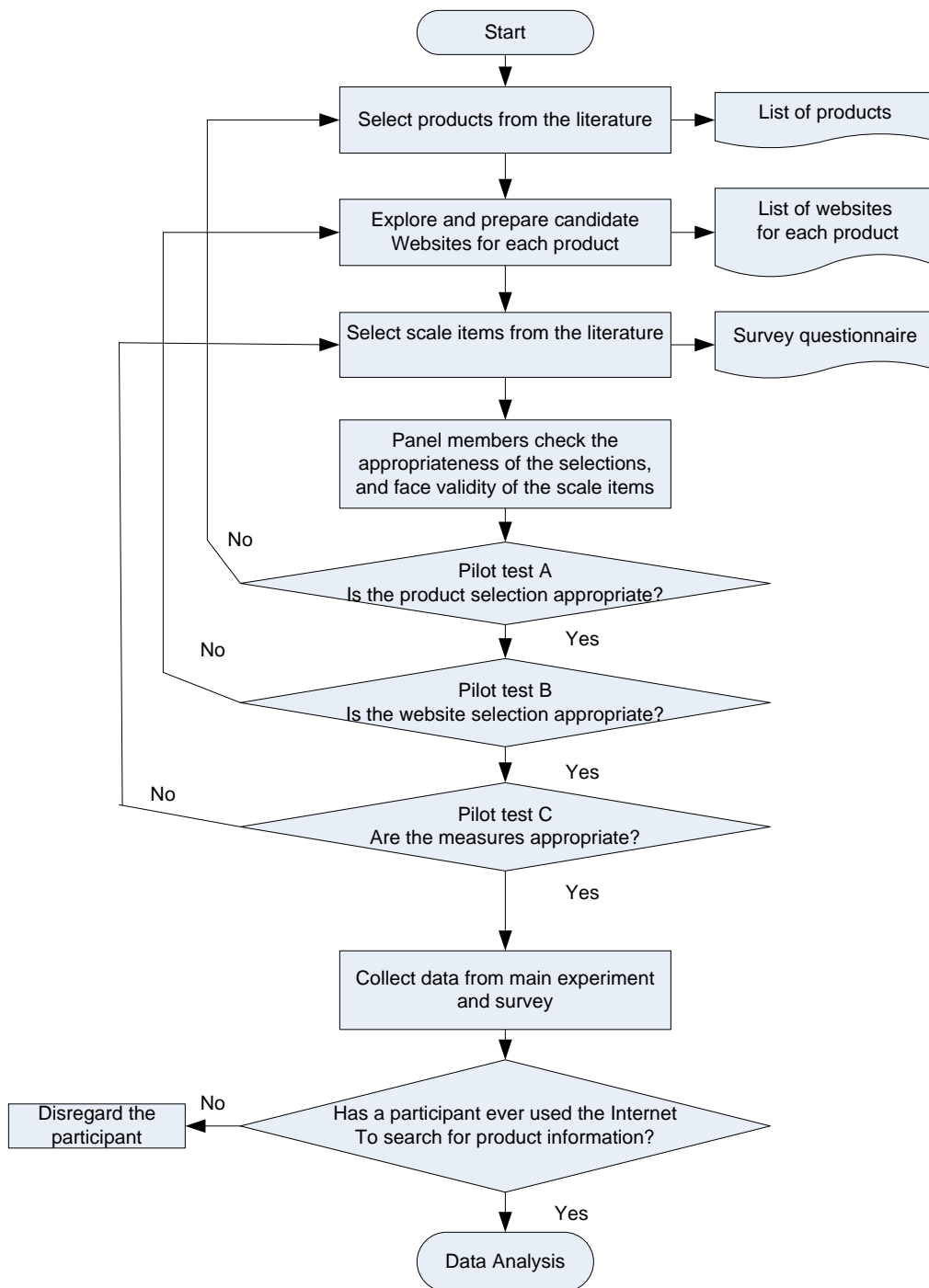
Start

Select products from the literature → List of products

Explore and prepare candidate Websites for each product → List of websites for each product

Select scale items from the literature → Survey questionnaire

Panel members check the appropriateness of the selections, and face validity of the scale items

Pilot test A
Is the product selection appropriate?
No
Yes

Pilot test B
Is the website selection appropriate?
No
Yes

Pilot test C
Are the measures appropriate?
No
Yes

Collect data from main experiment and survey

Has a participant ever used the Internet To search for product information?
No → Disregard the participant
Yes

Data Analysis

Figure 4.2 Design process for data collection.

4.2.1 Participants

Two criteria were prepared for our participant selection. First, the participants must represent potential online consumers. Undergraduate and graduate students in the Southeastern region of the United States were selected for our study. While using college students as participants is often questioned for studies with managerial contexts (Miranda and Saunders, 2003), researchers who study online behaviors find undergraduate and graduate students active participants in e-channel transactions, and represent the "next generation of e-commerce users" (Rifon, LaRose and Choi, 2005). Previous studies have found online purchasers tend to be more educated and younger (Kovar et al., 2000; Kotkin, 1998). Consequently, students in many ways offer advantages for studying online consumer behaviors than employees in the business field (McKinney et al., 2002; Suh and Lee, 2005; Palmer, 2002; Odom et al., 2002).

Another criterion is that participants should have experience in purchasing or at least searching for product information online. This factor was used to filter out participants that do not serve the objectives of this research. To those who have never used the Internet, even for searching product information, the primary issue might be computer anxiety or Internet anxiety rather than information quality. Further, people who have never used the Internet to search for product information are expected to be rare (U.S. Census Bureau, 2006). Therefore, we limit our focus on the majority of consumers, and those rare cases do not constitute the target of this study. Participants with little experience using the Internet will be identified through an upfront questionnaire about each participants' purchasing experience and eliminated from the study.

4.2.2 Product selection

Information quality on experience goods is the target product type for this study (as explained in Chapter 3). Products on the list perceived as search goods in the pilot study are eliminated from the study. In addition, multiple products are selected and data collected about these products are pooled together for analysis to reduce product-specific effects on channel choice. Finally, a range of products are offered for purchase to secure price variance among product items, and avoid the situation where a consumer may choose e-channels only because there is no brick-and-mortar vendor who sells the specific product.

Pilot test A: A list of six experience goods was initially prepared from the e-commerce literature: 1) digital cameras, 2) apparel, 3) books, 4) external hard drives, 5) flat-panel LCD monitors, and 6) movie DVDs. Each participant chose two products from the list. Then, following Chiu et al.'s (2005) procedure, participants were asked before intent to purchase, to evaluate the performance of each product using a seven-point Likert scale, ranging from 'not at all' (score 1) to 'very much' (score 7). Participants were then surveyed about their ability to judge the performance after use. If a product scored low on the first scale and high on the second scale, the product was regarded as an experience good. If a product scored high on both scales, the product was regarded as a search good. A pilot test with thirty-seven students was conducted to assure the appropriate selection of experience goods.

Final selection: The scores on books and external hard drives were high on both scales in the pilot test. Being perceived as search goods, both were eliminated from the

list. The final list of the representative experience goods consisted of movie DVDs (Neelamegham and Jain, 1999; Reinstein and Snyder, 2005), apparel (Fiore et al., 2005; Coia, 2003; Yoh et al., 2003), digital cameras (Jiang et al., 2005), and flat panel monitors (computer products; Chiu et al., 2005).

4.2.3 Website selection

Two criteria for website selection were developed. First, a website should be an actual B2C site that consumers encounter when searching or buying products. Second, to make sure of variance in information quality, two websites were selected for each product; one with high information quality, and the other with poor information quality. The distinction was made based on the definition of information quality. However, this decision of high-quality and poor-quality may be subjective. Therefore, the potential variance of perception scores across websites, and the appropriateness of the website selection were assessed by panel members. The assessment was concentrated on variance of information quality in the research model of this dissertation. Then, the selected eight websites were tested for their score variance in pilot test B.

The 1st run of pilot test B: Two websites for each of the four products, one with high information quality and the other with low information quality, were pre-selected. Then, thirty students in an undergraduate class at a Southeastern college in the United States were randomly divided into eight groups, with each group consisting of 3-4 members. A single product on a single website was randomly assigned to each group. Each student was instructed to navigate the designated website to search for product

information for about 5 minutes, and then fill out the survey about their perception and intention for about 25 minutes. The survey administered used a seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree).

The goal of this pilot test was to find a score variance of at least one between the scores of the high and the poor-quality websites for each product[13]. The result was that two pairs of websites[14] out of the four pre-selected pairs of websites showed sufficient variance in perceived information quality. The four websites with little variance were dropped. After exploring websites for a replacement, pilot test B was run again with a different set of websites.

The 2nd run of pilot test B: A website from the four websites with sufficient variance in the 1st pilot test B later displayed 'out of stock' for the target product. Also, the description of another product was changed to 'refurbished' during the preparation for the 2nd pilot test B. These websites were also replaced. Overall, six websites were replaced and tested again for the variance of information quality. The 2nd pilot test was run with thirty students of three to five respondents grouped together. Each of the eight groups was assigned a website and each participant reported her/his perception using the same process as the 1st pilot test B.

Final selection: The four pairs of websites tested in the 2nd pilot test B showed the average variance difference of more than one between high-quality and poor-quality sites. Also, the tests of the mean difference within each pair of websites associated with a

---

[13] We adopted a qualitative test. The average variance difference of 1 between high-quality and low-quality websites were accepted as sufficient unless the statistical t-test for two population means said otherwise. T-tests for two population means were used only as a reference because of the insufficient power with small sample sizes of the groups.
[14] Websites for movie DVDs and for flat-panel LCD monitors

product resulted in the final eight websites, two for each product. The final selection of websites for each product, and screen-shots of the sites are shown in Appendix A.

4.2.4 Measures

This section describes the approach to operationalizing the constructs. Most of the scale items were drawn from the literature. The items for product price, search saliency, standardization of specification, and sensory descriptiveness either did not exist, or the existing scales did not fit the construct definitions in this study. Consequently, items were developed for each of these constructs. The development followed Nunnally's (1978) 'domain sampling' method, which recommends the predefined domain of a construct and the selection of candidate items that represent this domain. Participants were asked to indicate their agreement to each questionnaire using a seven-point Likert scale from 'Not at all' (1) to 'Very much' (7), from 'Strongly disagree' to 'Strongly agree', or 'Very unlikely' (1) to Very likely (7).

Pilot test C: The two objectives of pilot test C were to make sure of the content validity of the initial scale pool, and to refine individual items if needed. After panel members initially checked the face validity of the items and their conformity to the domain of each construct, thirty college students were recruited for a pilot study. They were divided into eight groups and filled out the survey in the same manner as in pilot tests A and B. In addition, respondents were asked to note ambiguity in item wordings with recommended changes if necessary. Item reduction and refinement were based on the comments and scores reported by the respondents, all of whom had experience with

88

online product-information search and purchase. Items with poor correlations in this pilot test were discarded or reworded. As a result, sixty nine items were used to measure the seventeen variables of the research model. The description of these scale items follows below.

Choice of e-channels: Consistent with the definition, choice of e-channels was operationalized as the willingness of a consumer to substitute physical channels with electronic channels for product purchase. Indicators were adopted from Chiu et al. (2005) and adapted to our context.

Information quality: Information in e-channels is a tool with which consumers perform a purchasing task. According to Zmud (1978), information quality's various dimensions tend to be perceived as a whole by consumers, and information quality in a specific context may be better measured by the overall relevancy of the information to the context. Thus, information quality in this dissertation was measured by perceived relevancy of product information in e-channels, which is consistent with the definition of information quality as mentioned in Chapter 1 of this dissertation. Items were adopted, with slightly modified wording from Xu and Koronis (2004), Palmer (2002), and McKinney et al. (2002).

Product price and search saliency: Product price is used as a moderator, and search saliency of a product is used as a mediator in the study. We operationalized product price as the perceived expensiveness of a product. Search saliency of a product was measured in terms of the extent to which a consumer needs to physically experience the focal product. Established items that reflect the definitions of these constructs are rare

in the literature. Therefore, three items for product price, and five items for search saliency of a product were developed by the author.

Telepresence: Consistent with our conceptualization of telepresence as the extent to which one can experience one's physical environments through the mediation of the Internet, telepresence was operationalized as perceived vividness of the product description in e-channels. Items were adopted from Klein's (2001) instruments. They were reworded and adapted to the context of this study.

Screening capability: We measured screening capability in terms of the perceived degree of product-search facilitation in e-channels. Four items were driven from Kim et al.'s (2002) instruments.

Cognitive overhead: Cognitive overhead was measured in terms of the extent to which a consumer perceives mental overload arising from poorly organized information. This poor organization is commonly due to the combination of information overload and noise, such as crowded contents, including small letters, and inconsistency of the site structure. Items that reflect these facets were adapted from the instruments of Strong et al. (1997), and Xu and Koronis (2004).

Channel trust: Channel trust was measured in terms of a consumer's perception of the level of trust with the interfaced web store. Four items were drawn from Pennington et al. (2003).

Standardization of specification: The standardization of specification is operationalized in terms of the extent to which a consumer perceives the following two aspects of the product specification in e-channels: (a) consistency of product description,

and (b) compatibility of the description methods across other vendors. Since measures that fit the definition of standardization of specification were rare, five items were developed along the above two aspects.

Sensory descriptiveness: Sensory descriptiveness was measured in terms of the degree of product descriptiveness that a consumer experiences through their eyes or ears in e-channels. This reflects the fact that current web technologies support only those two human senses (Biocca et al., 1995). Since measures for sensory descriptiveness were rare in the literature, we developed items along the above two sensory dimensions.

Feedback quality: We measured feedback quality as the extent to which a consumer perceives the following two aspects of the third-party feedback in e-channels: (a) consistency, and (b) usefulness. Along these two aspects of the feedback quality, three items were adopted from Steelman et al. (2004) and adapted to the context of this study.

Interactivity: Interactivity was measured in terms of Yadav and Varadarajan's (2005) four aspects of interactivity: bidirectionality, mutual controllability, timeliness, and responsiveness. Reflecting these aspects, items were driven from Yadav and Varadarajan (2005), and adapted to the context of this study.

Control variables: System quality was operationalized as perceived effectiveness of technologies in online stores. Four items were adapted from McKnight et al. (2004), and DeLone and McLean (2004). Service quality was measured by perceived effectiveness of customer support of online stores during and after purchase. Items from Kim et al. (2002), and Burroughs and Sabherwal (2002) were adapted for the survey. Consistent with the definition, comparative benefit was operationalized as the perceived

91

advantage of online shopping. Items were extracted from Gupta et al. (2004), Li et al. (1999), and Torkzadeh and Dhillon (2002). Brand reputation was measured by perceived reliability of the manufacturer. Items were adapted from Low and Lamb (2000). Pre-knowledge was operationalized as the degree of pre-experience of a product. Since scales that fit the description of the construct are rare, we developed four items for this study.

The multi-item scales and definitions for all seventeen constructs are summarized in Table 4.1.

Table 4.1 Scale items of the survey.

Construct	Coding	Questionnaire
Choice of e-channels	Definition: A consumer's decision to use e-channels as a purchasing place beyond an information source, substituting physical channels.	
	CHOICE1	If you need to buy this product, are you willing to buy it on the website rather than at a physical store?
	CHOICE2	Will you choose the website over conventional stores if you need to buy this product?
	CHOICE3	Are you comfortable with buying this product on the website rather than at a physical store?
Telepresence	Definition: The extent to which one can experience one's physical environment through the mediation of the Internet.	
	TELE1*	Does the computer-generated product seem to have shown you 'something you saw in the store'?
	TELE2*	Did you forget your immediate surroundings when you were navigating the website?
	TELE3	Does the website enable you to find information about the product as if you are in a physical store?
	TELE4	Can you evaluate the product on the website as you do in the physical store?
	TELE5	Does the website depiction of the product make you feel like you are looking at it in a physical store?
Screening capability	Definition: The ability of the search agent to efficiently sort and filter the vast amount of information based on the given criteria.	
	SCR1	Does the website allow you to compare the product with others?
	SCR2	Does the website allow you to organize comparisons across products by price?
	SCR3	Does the website enable you to effectively filter information needed if you were searching for products?
	SCR4*	Does the website allow you to sort information needed if you were searching for products?

Table 4.1 Scale items of the survey (Continued).

Construct	Coding	Questionnaire
Channel trust	Definition: Beliefs about a specific web store comprising a willingness to become vulnerable to that store.	
	TRUST1*	Do you feel that this online store cares about customers?
	TRUST2	Based on the appearance of this website, do you believe this store is legitimate?
	TRUST3	Do you believe the information that this store provides you?
	TRUST4	Do you find no reasons to be cautious with this store?
Cognitive overhead	Definition: The amount of mental activity imposed on a person's working memory at an instance in time before processing a main task of information search.	
	OVH1*	The amount of information on the website is more than I can use.
	OVH2*	The website is crowded with content.
	OVH3*	There are distractions such as advertisements or blinking banners on the website.
	OVH4	On this website, it is NOT easy to find the necessary information for purchase.
	OVH5	The information provided by the website is NOT well organized.
Product price	Definition: The expensiveness of a product that an individual consumer feels considering her financial situation.	
	PRICE1	This product is expensive considering my financial situation.
	PRICE2	Considering the price of other products that I have purchased, I feel that this product is expensive.
	PRICE3	In general, this product is costly to me.

Table 4.1 Scale items of the survey (Continued).

Construct	Coding	Questionnaire
Search saliency of a product	Definition: The extent to which a consumer can know the value and quality of a product before physically experiencing the product.	
	SALIEN1*	I think that I am able to evaluate this product without buying and using it.
	SALIEN2	I am able to see the value of this product without physically experiencing it.
	SALIEN3*	I am able to see the quality of this product without physically experiencing it.
	SALIEN4	I do NOT have to see the product in a physical store to know the value of it.
	SALIEN5	I do NOT have to physically see the product in a store to know the quality of it.
Standardization of specification	Definition: The degree of formalization of a detailed product description in text-based forms according to a rule set by authority for measures such as quantity, weight, extent, value, functionality, or quality.	
	STAN1*	The characteristics of the product are described similarly to other sellers' websites.
	STAN2*	The text information about the product can be easily compared to that of similar products of other brands.
	STAN3	Information on the product is described in standard categories.
	STAN4	The specification of the product information on the website is consistent with other retailers.
	STAN5	The characteristics of the product are described in a standardized way.
Information quality in e-channels	Definition: The degree to which the information facilitates consumers' evaluation of products to complete the purchasing tasks.	
	IQ1	The information given on the website helps me evaluate the product.
	IQ2	The quality of product information on the website is enough for my purchasing decision.
	IQ3	In general, information about the product is relevant to my purchase decision.

Table 4.1 Scale items of the survey (Continued).

Construct	Coding	Questionnaire
Sensory descriptiveness	Definition: The degree to which the information is grounded on visual or auditory trial.	
	SENS1	The website shows various images of the product using different angles.
	SENS2	The website shows detailed views for a certain part of the product.
	SENS3	The website enables me to sense the product through audiovisual trials such as sounds or 3-D views.
Feedback quality	Definition: The degree to which information is consistent and useful in enabling indirect experience of the performance through the direct experience of other existing users or the evaluation of experts.	
	FDB1	The website gives me useful testimonials (e.g., experts, other consumers) about the product performance.
	FDB2	The performance testimonials (e.g., experts, other consumers) I get from the website is helpful.
	FDB3	The performance testimonials (e.g., expert, other consumers) I receive from the website is generally consistent.
Interactivity	Definition: The degree to which consumers can manipulate or adjust the product information based on their preference, creating dialogues between consumers and web vendors.	
	INT1	The website allows me to interact with a person to get information on the product.
	INT2	It is easy to manage the communication process on the website.
	INT3	The website allows prompt responses to give information on the product.
	INT4*	The website allows me to customize the product such as changing colors or certain components.
	INT5*	The website allows me to simulate 3-D views for product experience.

Table 4.1 Scale items of the survey (Continued).

Construct	Coding	Questionnaire
Brand reputation (control variable)	Definition: Overall quality of a firm's products judged by people in general.	
	BRAND1	I think that the brand of the product is reliable.
	BRAND2	I think that the brand represents high quality.
	BRAND3	I think that the brand is good.
	BRAND4	I think that the brand is popular.
Pre-knowledge (control variable)	Definition: The extent to which a consumer knows a product with familiarity gained through experience or association.	
	PREK1*	I have experienced a similar type of product before.
	PREK2	I was knowledgeable about this product before I navigated the website.
	PREK3	I was familiar with this type of product.
	PREK4	I had essential information to evaluate this product before I looked at the website.
System quality (control variable)	Definition: The quality of technological characteristics of online stores.	
	SYSQ1	Online stores have enough safeguards to make me feel comfortable when using it to transact personal business.
	SYSQ2	I feel assured that web technologies adequately protect me from problems at online stores.
	SYSQ3	In general, online stores now have a reliable environment in which to transact business.
	SYSQ4*	Online store systems are generally responsive.
Service quality (control variable)	Definition: The quality of the overall support delivered by online stores.	
	SERVQ1*	Online stores provide the function to track delivery status.
	SERVQ2	Refunds are easy with online stores.
	SERVQ3*	Returns are easy with online stores.
	SERVQ4	Online stores provide good after-sales support.
	SERVQ5	It is easy to cancel orders placed with online stores.

Table 4.1 Scale items of the survey (Continued).

Construct	Coding	Questionnaire
Comparative benefit (control variable)	Definition: The extent of relative rewards that a consumer can get from the purchase in e-channels compared to those from the purchase on physical channels.	
	CB1*	Buying at online stores allows more convenience than at offline conventional stores.
	CB2	In general, online prices are lower than those at the offline conventional stores.
	CB3	Buying online minimizes personal hassle.
	CB4	Buying online minimizes time pressure when shopping.

* Items dropped in measurement validity tests during the final analysis (See details on Table 5.3 in Chapter 5). The final instrument for this dissertation is in Appendix A.

4.3 Sample Size and Power Analysis

To achieve a sufficient power level on the data analysis, an appropriate sample size should be determined. Several criteria have been developed and used in the literature. A common rule of thumb is that the ratio of sample size (N) to the number of predictor variables in a multiple regression analysis should be at least 10:1 (Harris, 1985). However, it has been criticized for underestimating the required sample size to achieve sufficient power to test the significance of individual predictor variables (Maxwell, 2000). For structural equation modeling, researchers equate the required sample size to 10 times

the number of free parameters (Klein, 2005; Mueller, 1997), but this idea has not been empirically supported yet (Jackson, 2003).

An advanced approach is calculating sample size based on a target power level and the estimate of partial effect size, which can be calculated through correlation estimates. This approach has been accepted as reasonable in the psychological methodology literature (Maxwell, 2000). To estimate the correlations, studies similar to our study in investigating online behaviors were examined in the e-commerce literature. Ten random articles that reported correlation matrix were sampled, and both ρ^2_{xy} and ρ_{xx} were conservatively estimated as .4. The result shows that the required sample size to achieve a power of .80 is 235 for the research model, which is less than our final sample size (N= 309). This sample size was also tested for MacCullum et al.'s (1996) power analysis for testing SEM models, and the expected power level approximated 1, which triangulates the adequacy of the sample size of this study.

4.4 Biases and Extraneous Factors to Be Controlled

In the data collection procedure, participants first navigated designated websites, and then reported their perception in this experiment. While this experimental setting provides a limited control over variables, which is important for producing strong causal evidence (Nicolaou and McKnight, 2006), there still exists a possibility of several types of bias. Table 4.2 explains the steps taken in this study to alleviate or curb potential biases.

The methods adopted against non-response bias (seen in Table 4.2) focus mostly on how to decrease non-response rate (Rogelberg and Stanton, 2007). However, a recent study of Rogelberg et al. (2003) reveals that the vast majority of non-response is passive in nature, and the passive non-response[15] does not create bias unless "the survey assesses constructs that are indeed related to the reasons that passive non-respondents fail to return the survey"[16]. Items of this study measure participants' intention and perception rather than their laziness or busyness. Therefore, non-response bias would not be as probable in this study.

To avoid common method variance, which is frequent in studies that measure self-reported perception, we followed the recommendations of Podsakoff et al. (2003). First, three different types of anchors were used for measurement (i.e. strongly disagree, Not at all, Very unlikely). Second, scale items were parsed out through the entire instruments. Additionally, discriminant validity was measured later in the data analysis. Finally, comparative fit index difference between a model with a method factor and without a method factor was evaluated following Little's (1997) criterion to test the common method bias.

Other extraneous factors were also controlled for through this quasi-experiment setting. Factors affecting e-channel choice other than information quality were measured and statistically controlled for the factors: service quality, system quality, and

---

[15] Passive non-response might occur when non-respondents do not have access to survey tools, forget about it, are ill ,or busy (Peiperl and Baruch, 1997), but they are not intentionally committed to no-participation (Rogelberg and Stanton, 2007).

[16] Rogelberg and Stanton (2007) illustrate an example case when passive non-response could present a problem – "when the survey topic in question is related to workload, busyness, or excess demands".

comparative benefit. Factors affecting search saliency other than information quality were also measured and statistically controlled through such factors as manufacturer brand reputation, and pre-knowledge of a product.

Table 4.2 Adopted methods to curb potential biases.

Potential Bias	Adopted Methods
Product specific effects	- Data for four different types of products were pooled together to avoid the significant influence of a specific product.
Effect of personal characteristics	- The effect was minimized because the measuring instruments are based on individual perception.
Non-response bias	- Participants were pre-notified of the survey. - The wording of questionnaires and the physical structure of the survey were carefully designed in a way to help easy reading and not to lead opinions. - Online survey pages were managed in a way to not include too many contents in each webpage. - An incentive for participation (extra credit points) was provided. - Everyone is given the opportunity to participate in the survey at her/his convenient time and place. Two weeks were given for them to fill out the survey.
Common method bias	- Three different types of anchor were used for the instruments. - Scale items were parsed out throughout the survey. - Discriminant validity was checked. - CFI difference test was conducted in the data analysis

4.5 Main Experiment and Survey

Participation was voluntary, with the addition of extra credit points to the respondent's final score in the respective course as an incentive. Participants were given a week to participate in this process so that they could choose a time and place for participation in the survey at their convenience. Thirteen class sections were recruited, and each of the classes was used as a unit group. Thirteen groups were randomly assigned to one of the eight websites for navigation. Next, each participant was instructed through email to navigate the designated website for at least five minutes and to look for the product information as if she/he was interested in buying the product. Data were collected when participants filled out survey questionnaires on a privately hosted website[17] after navigating the designated website. Figure 4.3 illustrates the data collection process in the main experiment and survey.

---

[17] http://www.surveymonkey.com

```
                    ┌─────────────────────────────┐
                    │ Main Experiment and Survey  │
                    └──────────────┬──────────────┘
                                   │
                                   ▼
        ┌──────────────────────────────────────────────────┐
        │   Decide on duration and place for the experiment │
        └──────────────────────────┬───────────────────────┘
                                   │
                                   ▼
        ┌──────────────────────────────────────────────────┐
        │  Request instructors' cooperation for the         │
        │  experiment, and decide on an incentive to        │
        │  students                                         │
        └──────────────────────────┬───────────────────────┘
                                   │
                                   ▼
        ┌──────────────────────────────────────────────────┐
        │  Randomly assign each class section to one of the │
        │  eight websites                                   │
        └──────────────────────────┬───────────────────────┘
                                   │
                                   ▼
        ┌──────────────────────────────────────────────────┐
        │  Instruct each participant through email to       │
        │  navigate the designated website and to fill out  │
        │  the survey after the navigation                  │
        └──────────────────────────┬───────────────────────┘
                                   │
                                   ▼
        ┌──────────────────────────────────────────────────┐
        │         Collect data and clean them up            │
        └──────────────────────────┬───────────────────────┘
                                   │
                                   ▼
                    ┌─────────────────────────────┐
                    │        Data Analysis        │
                    └─────────────────────────────┘
```

Figure 4.3 Flowchart for data collection in the main experiment and survey.

4.6 Summary

In this chapter, we described the research methodology and data collection processes for the dissertation. The adopted method is a quasi-experiment combined with a survey, which enables collecting data about consumers' real perception, while controlling extraneous factors. The unit of analysis for the research model is a consumer

who wants to buy a product on a website. Primary parameters were set along the three major entities in the model, those being participant, product, and website. First, college students were selected as representing the population. Second, four experience goods were selected through the literature review, panel discussion, and a pilot test. Finally, four pairs of websites were chosen in such a way to maximize the variance of information quality.

In addition, a reasonable sample size to achieve a power of .80 was investigated. The result showed that a minimum sample size of 235 participants was required for the research model. Also, scale items were adapted from the literature, and went through content validity checks and refinement by panel members and pilot participants. Finally, potential extraneous factors in the research, including non-response and common method biases were examined, and the ways in which we controlled them were described.

The next section presents the description of the collected data and the results of data analysis.

CHAPTER 5

DATA ANALYSIS AND RESULTS

Overall, 341 students in thirteen junior/senior level courses of a college in the Southeastern region of the United States participated in the quasi-experiment and survey. Thirteen incomplete cases and four cases with zero variance across all the indicators were deleted. Additionally, eighteen outlier cases were detected and deleted using the cutoff value of Mahalanobis distance (significance at 0.001 level). This resulted in a total usable sample size of 309. This chapter describes and analyzes these data to empirically test the research model. Figure 5.1 illustrates the organization of Chapter 5.

```
┌─────────────────────────────────────────────────┐
│ 5.1 Descriptive Statistics                       │
└─────────────────────────────────────────────────┘
                         │
                         ▼
┌─────────────────────────────────────────────────┐
│ 5.2 Assessment of the Measurement Model          │
│    - 5.2.1 Model specification                   │
│    - 5.2.2 Common method variance check          │
│    - 5.2.3 Convergent validity                   │
│    - 5.2.4 Discriminant validity                 │
└─────────────────────────────────────────────────┘
                         │
                         ▼
┌─────────────────────────────────────────────────┐
│ 5.3 Assessment of the Structural Equation Model  │
│    - 5.3.1 Model specification                   │
│    - 5.3.2 Multicollinearity check               │
│    - 5.3.3 SEM results                           │
└─────────────────────────────────────────────────┘
                         │
                         ▼
┌─────────────────────────────────────────────────┐
│ 5.4 Additional analyses                          │
└─────────────────────────────────────────────────┘
                         │
                         ▼
┌─────────────────────────────────────────────────┐
│ 5.5 Summary                                      │
└─────────────────────────────────────────────────┘
```
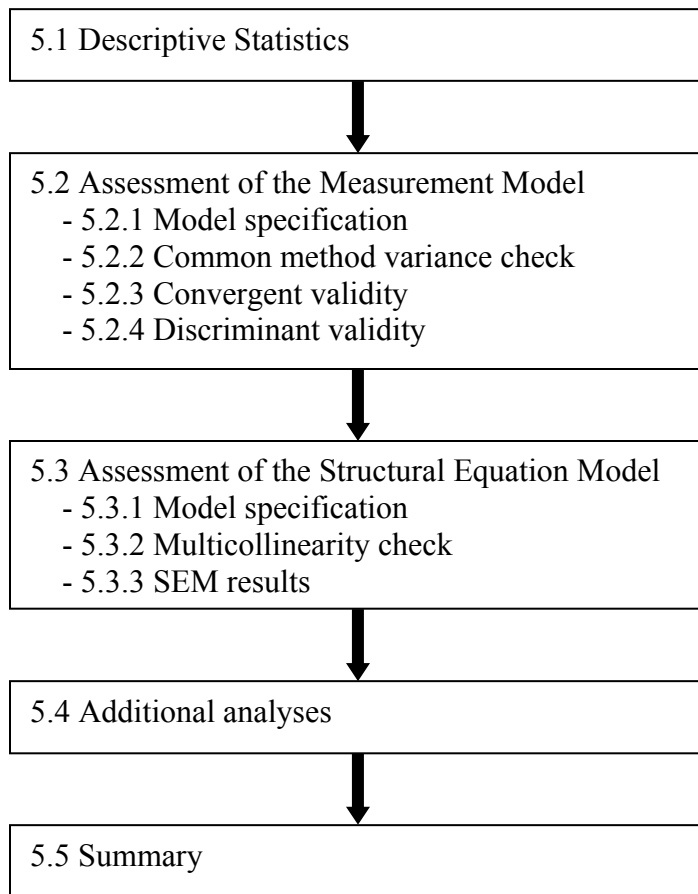
Figure 5.1 Organization of chapter 5.

5.1 Descriptive Statistics

As seen in Table 5.1, initial data show that most participants have experience in using the Internet for product purchase, and only 3.9 percent of the participants have used the Internet only for searching for product information. Since this study is concerned with the behavior of those who have ever experienced the Internet either for information search or purchase, all the participants are qualified for our analysis.

Participants' Internet experience ranges from 3 to 13 years with the mean of 9.1 years, and their ages range from 18 to 35 years old with the mean of 21.3 years old. Most of the participants are undergraduate students, and female students constitute 40.1 percent of the total participants (Table 5.2). This description of the actual participants meets the requirement of young educated college students, which is set and explained in Chapter 4.

Table 5.1 Description of e-channel experience.

Self-description	N	%	Cum. %
I have previously used the Internet to search for product information, and I have experience buying a product on the Internet.	220	71.2	71.2
I have previously used the Internet to search for product information, but I have NEVER purchased a product on the Internet.	12	3.9	75.1
I have NEVER used the Internet to search for product information, but have purchased a product on the Internet.	0	0	0.0
I have NEVER used the Internet to search for product information, and have NEVER purchased a product on the Internet.	0	0	0.0
I frequently use the Internet to search for product information and purchase products on the Internet.	77	24.9	100.0
Total	309	100.0	

Table 5.2 Description of the participants.

Gender			Degree Sought		
	N	%		N	%
Female	124	40.1	Bachelors	294	95.1
Male	185	59.9	Graduate	15	4.9
Total	309	100.0	Total	309	100.0

Figure 5.2 shows the composition of products, which were the product items participants looked for information on while navigating the designated websites. Since each product is randomly assigned to groups of classes, and response rates for groups differ, sample sizes across the four types of products are uneven. This uneven composition might render a potential bias through product-specific effects. However, it turned out that there was little product-specific effect[18]. For perceived price of a product, it is subjective by definition in that it considers the personal financial situation and there is no objective cutoff value for perceived expensiveness. Therefore, through product and website selection processes in our pilot studies, we made sure that there would be a reasonable variance in the measured perceived product price, as described in Chapter 4. Price levels of the products range from US$ 20 (Movie DVD) to US$ 330 (Digital Camera).

---

[18] The evidence of little effect of this product effect is presented in 'additional analyses' in Chapter 6.
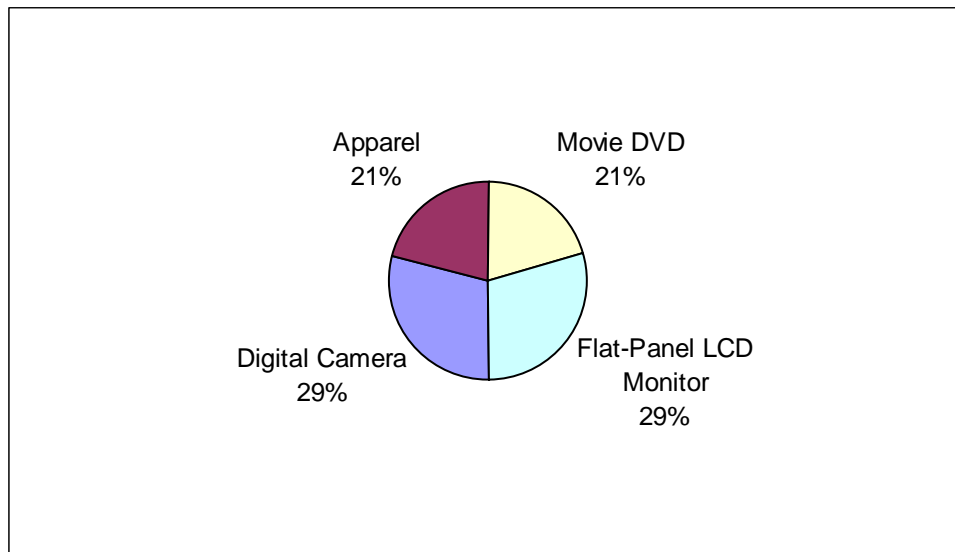
Figure 5.2 Description of the products.

5.2 Assessment of the Measurement Model

Although sixty-nine items for the whole seventeen variables of the research model were passed through panel reviews and a pilot study, a statistical test is needed for scale validation. Given that most of the items were adapted from the literature, we employed a confirmatory factor analysis (CFA) approach using EQS 6.1 to test construct validity, which is essential for the structural equation modeling (SEM) technique that we use to test the research model. All covariances among the 17 latent variables were included and estimated in the measurement model (for covariance estimates, see Table 5.3).

5.2.1 Model specification

The standard maximum likelihood (ML) estimation in SEM assumes multivariate normality. To check multivariate normality, Byrne (2006) recommends testing Mardia's statistic and the normalized estimate, which are based on functions of skewness and kurtosis. Mardia's statistic did not identify any outliers. For the assumption of multivariate normality to be accepted, the normalized estimate should be less than 3.0 (Klein, 2005) while there is less consensus about the cut-off value[19]. Observed data for each individual construct met univariate normality. However, when all constructs in the model were pooled together, the test showed multivariate non-normality in normalized estimate (=36.3). Byrne (2006) shows a way to deal with this non-normality. In her book (Byrne, 2006, p.167), she reports that "Bentler (2005) contends that the ROBUST methodology allows for the attainment of correct statistics, which are quite stable… The Satorra-Bentler scaled chi-square (S-B chi-square) and ROBUST standard errors provide trustworthy statistics." Therefore, the ROBUST ML method was used to test both the measurement model, and the structural equation model.

In the measurement model, each item was modeled as a reflective indicator of its latent construct, and all constructs were allowed to covary. To make sure that the research model adequately fit the observed data, we checked Lagrange Multipliers (LM) and item loadings. According to Klein (2005, p.148), "LM test produces a modification index estimates of the amount by which the overall model chi-square statistic would decrease" if a particular parameter is added. The nine item loadings belonging to the corresponding

---

[19] Bentler suggests 5.0 (Byrne, 2006)

constructs showed values far below Fornell and Larcker's (1981) criterion (<0.70), soliciting item drop. LM tests detected nine additional items to be dropped. These items have high loadings on corresponding constructs, but they cause significant increments in chi-square estimation, which indicates cross-loadings of each of these items on more than one construct, and consequently worsens the overall fit of the model. Dropping these items caused all latent variables except cognitive overhead to have 3-4 items (See Table 5.3), allowing reasonable coverage of the domain for each construct. However, cognitive overhead kept only two indicators, describing a perception of general disorganization of information. The other three dropped indicators of cognitive overhead were problematic due to having detailed descriptions of disorganization such as crowded content, blinking banner, or too much information, which can be applied only to selective websites. According to the 'two-indicator rule' represented by Bollen (1989), the model is identified with at least two indicators per factor when the model includes two or more factors. Especially because the sample size of our model is not small, the model is not prone to estimation problems (Klein, 2005, p.172). Therefore, with the general coverage of the domain and the large sample size, the measurement of cognitive overhead was regarded reasonable. The scale items with an asterisk (*) in Table 4.1 in the previous chapter represent dropped items.

Table 5.3 Dropped items.

Reason	Construct	Indicator	Loading	LM Test*
Low loading	Telepresence	TELE1	.595	20.854
		TELE2	.413	11.899
	Screening Capability	SCR4	.423	13.668
	Cognitive Overhead	OVH1	.357	91.555
		OVH2	.518	46.104
		OVH3	.569	6.107
	Channel Trust	TRUST1	.572	29.812
	Service Quallity	SERVQ1	.305	61.164
	Comparative Benefit	CB1	.500	33.101

Reason	Construct	Indicator	Cross-loading Construct	LM Test*
Cross-loading	Standardization of Specification	STAN1	Channel Trust	15.965
		STAN2	Screening Capability	10.250
	Interactivity	INT4	Feedback Quality	19.353
		INT5	Sensory Description	77.386
	Search Saliency	SALIEN1	Price	18.488
		SALIEN3	System Quality	16.449
	Pre-knowledge	PREK1	Brand Reputation	50.019
	Service Quality	SERVQ3	Channel Trust	16.674
	System Quality	SYSQ4	Comparative Benefit	13.025

* Significant univariate increment of χ^2

The final measurement model demonstrates an excellent model fit. Model χ^2 is 1659.78 (df = 1088). This makes the normed chi-square (NC = χ^2/df) 1.53, which is less than Klein's (2005) recommended value (less than 3.0 for a good fit). The rule of thumb for the parsimony-adjusted index of RMSEA is that RMSEA should be less than 0.05 for a model to be a close approximate fit (Browne & Cudeck, 1993). Also, if the lower bound of a 90% confidence interval (CI) of RMSEA is less than 0.05 and the upper bound is less than 0.10, good approximate fit is strongly affirmed (Klein, 2005). Our model demonstrates an RMSEA value of 0.041, which rests within 90% CI of 0.037 and 0.045. The comparative fit index (CFI) assesses relative improvement in fit of the research model with a null model, and values greater than 0.95 indicate a good fit of the model (Hu and Bentler, 1999). The CFI value of the research model is 0.94, which is close to the cutoff value. The standardized root mean square residual (SRMR) less than 0.10 are regarded as favorable (Klein, 2005). Our model shows 0.047, which is far less than the recommended value. Overall, the model demonstrates a good fit considering a very good fit indicated by SRMR and RMSEA and a marginal fit by CFI. A summary of the fit indices is in Table 5.7.

5.2.2 Convergent validity

The scale items' validity was tested through convergent and discriminant validity tests (Boudreau et al., 2001; Straub, 1989). Convergent validity checks to see if a factor captures the variance well in its indicators. Convergent validity is evaluated through three criteria recommended by Fornell and Larcker (1981): (1) all measurement factor loadings

exceed 0.70, (2) construct reliabilities exceed 0.80, and (3) average variance extracted (AVE) for each construct exceeds 0.50. First, as seen in Table 5.4, all factor loadings exceeded the recommended 0.70. Second, reliability measures show if the measurement scale is consistent. Cronbach's coefficient alpha and composite reliability are the most commonly used estimates for internal consistency of scale items (Klein, 2005, Fornell and Larcker, 1981). Both Cronbach's alpha and composite reliability demonstrated estimate values over 0.80. Finally, according to Fornell and Larcker (1981), AVE shows how much variance of the indicators is captured by the underlying factor. AVE for each factor of the research model ranged between 0.61 and 0.86 (see Table 5.5), which meets the required level (> 0.5) for convergent validity.

Table 5.4 Factor loadings and reliabilities.

Construct	No. of indicators	Loading	Cronbach's Alpha
Standardization	3	0.840-0.871	0.89
Sensory descriptiveness	3	0.862-0.904	0.92
Feedback quality	3	0.904-0.964	0.95
Interactivity	3	0.777-0.881	0.86
Telepresence	3	0.788-0.876	0.86
Screening capability	3	0.716-0.871	0.85
Cognitive overhead	2	0.879-0.912	0.89
Channel trust	3	0.808-0.880	0.88
Information quality	3	0.864-0.911	0.92
Search saliency	3	0.760-0.930	0.89
Brand reputation	4	0.843-0.960	0.97
Pre-knowledge	3	0.846-0.884	0.9
Choice of e-channel	3	0.839-0.871	0.89
Price	3	0.876-0.922	0.92
System quality	3	0.877-0.936	0.93
Service quality	3	0.747-0.832	0.82
Comparative benefit	3	0.753-0.927	0.88

5.2.3 Discriminant validity

Discriminant validity means that a factor is not highly correlated with the other factors that are designed to measure different domains. Discriminant validity can be assessed either by using the square root of AVE, which are the diagonal elements in the correlation matrices, or by checking multicollineartiy. If the values of each diagonal

element (square root of AVE) are greater than their corresponding horizontal and vertical correlation coefficients, discriminant validity is verified (Gefen et al., 2000). In Table 5.5, the off-diagonal elements show correlations among constructs, and diagonal elements show values of the square root of AVE. All diagonal elements in Table 5.5 are larger than their corresponding horizontal and vertical correlation coefficients. This indicates that all factors in the model show appropriate discriminant validity.

We further checked multicollinearity. Multicollinearity poses a potential threat in regression models. Multicollinearity means that intercorrelations among the independent variables (IVs) are so high that what seem to be separate factors actually measure the same concept. Multicollinearity causes unreliable assessments of explanatory variables' strength. Klein (2005) in his book recommended several cutoff values for multicollinearity tests. One way to test it is using intercorrelations. Intercorrelations among the independent variables above 0.80 may signal a problem. As seen in Table 5.5, all intercorrelations in the model are below 0.80, showing no indication of problematic multicollinearity in the model. Therefore, the discriminant validity of the factors in the research model is affirmed.

Table 5.5 Correlations and AVE.

	Mean	Std. Dev.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. standardization	4.92	1.24	0.85																
2. sensory description	3.64	1.90	0.48	0.89															
3. feedback quality	3.82	1.83	0.46	0.65	0.93														
4. interactivity	3.73	1.64	0.45	0.65	0.75	0.82													
5. telepresence	4.08	1.56	0.56	0.53	0.53	0.55	0.83												
6. screening capability	4.32	1.61	0.48	0.52	0.47	0.50	0.60	0.82											
7. cognitive overhead	3.39	1.60	-0.17	0.00	0.11	0.18	0.04	-0.02	0.90										
8. channel trust	4.71	1.42	0.67	0.46	0.40	0.40	0.49	0.42	-0.24	0.85									
9. information quality	5.10	1.45	0.65	0.50	0.44	0.44	0.62	0.52	-0.28	0.62	0.89								
10. search saliency	4.12	1.61	0.53	0.47	0.44	0.46	0.63	0.40	0.14	0.44	0.44	0.87							
11. brand reputation	4.98	1.52	0.59	0.51	0.40	0.37	0.41	0.40	-0.15	0.58	0.60	0.41	0.94						
12. pre-knowledge	4.49	1.75	0.50	0.48	0.36	0.41	0.52	0.42	-0.01	0.44	0.51	0.52	0.63	0.87					
13. choice of e-channel	4.37	1.67	0.53	0.45	0.40	0.41	0.59	0.34	0.07	0.45	0.44	0.70	0.47	0.50	0.85				
14. price	4.72	1.58	-0.07	-0.09	0.04	0.11	-0.08	0.00	0.27	-0.07	-0.11	-0.10	-0.06	-0.16	-0.11	0.90			
15. system quality	4.57	1.46	0.41	0.26	0.22	0.26	0.31	0.16	0.19	0.39	0.12	0.50	0.27	0.33	0.54	-0.09	0.90		
16. service quality	3.91	1.54	0.44	0.46	0.36	0.47	0.43	0.35	0.20	0.38	0.20	0.49	0.29	0.31	0.46	-0.08	0.52	0.78	
17. comparative benefit	5.07	1.38	0.35	0.18	0.16	0.17	0.22	0.08	0.09	0.29	0.13	0.33	0.28	0.15	0.45	0.07	0.46	0.42	0.85

* Each diagonal element is the square root of the average variance extracted (AVE) estimate for each factor.
** Off-diagonal elements are the correlations between the different factors.

5.2.4 Common method variance check

Data collected through self-reported perceptual measures commonly incur the risk of common method variance. Common method variance, or method bias, poses an issue to behavioral research because it constitutes the main source of measurement error, although its impact on the model estimation is known to be overestimated in the literature (Podsakoff et al., 2003). The chi-square difference test in the multitrait multimethod (MTMM) approach is a tool which is commonly used to find out the common method variance (Lance et al., 2002; Podsakoff et al., 2003). This approach compares one model without the common method factor and the other with a method factor. In the first model, all items load on to their respective latent factors. In the second model, all items load on to a common method factor in addition to their respective latent factors. Satorra-Bentler (S-B) chi-square difference was used for the test.[20]

The test resulted in χ^2 difference of 267 with 52 degree of freedom, which implies a significant improvement of fit and variance between the model with and without method factors. However, because of the test's high sensitivity to non-normality, it can be still misleading to base evidence of invariance on S-B chi-square difference (Byrne, 2006, p.247). Another issue in the S-B chi-square difference test is the scaling of the degree of freedom (Satorra & Bentler, 2001). An alternative criterion used in the behavioral research, even under non-normal data, is using the test of CFI difference between models. Given the large sample size of this study, CFI difference test is regarded more reliable

---

[20] S-B χ^2 difference = D/k, where D is Maximum Likelihood chi-square difference (MLχ^2) between models A and B. k = [(d$_A$)(ML χ^2_A / S-B χ^2_A) - (d$_B$) (ML χ^2_B / S-B χ^2_B) , where d is the difference of degree of freedom between models A and B.

(Satorra & Bentler, 2001). Little (1997) suggested that this difference be less than 0.05, while Cheung and Rensvold (2002) likewise arbitrarily suggested a stricter value of 0.01.

Following this alternative, two measurement models, one with a method factor, the other without any method factor, were compared (see Figure 5.3). The value of CFI difference between the two was .019 (= 0.959 - 0.940). This value is a little higher than the stricter rule that Cheung and Rensvold (2002) recommended, but far less than Little's (1997) criterion of 0.05 (Little, 1997). Therefore, we conclude that the two models are reasonably similar. Since a trait-model with an added method factor does not make a difference from a trait-only model without any method factor, the result support that the common method bias is not a serious issue for this study.

This study further investigated the potential method bias in the structural model. Table 5.6 presents loadings for latent factors (trait loading) and the method factors (method loading). The sizes of all trait loadings are bigger than those of the method loadings. The square root of trait AVE (=0.831) is also greater than the square root of method AVE (0.297). However, six[21] out of fifty one indicators show high loadings on a method factor as seen Table 5.6, which indicates that common method bias seems to exist. Therefore, following the recent trend in IS research (Liang et al., 2007), we partitioned out the method effect by modeling a latent method factor within the structural model and in all subsequent analyses in this study. In this way the method effect was controlled, and so causal relationships among constructs in the model could be tested with method effect being held constant.

---

[21] STAN5, SCR3, IQ1, IQ2, IQ3, and SALIEN2
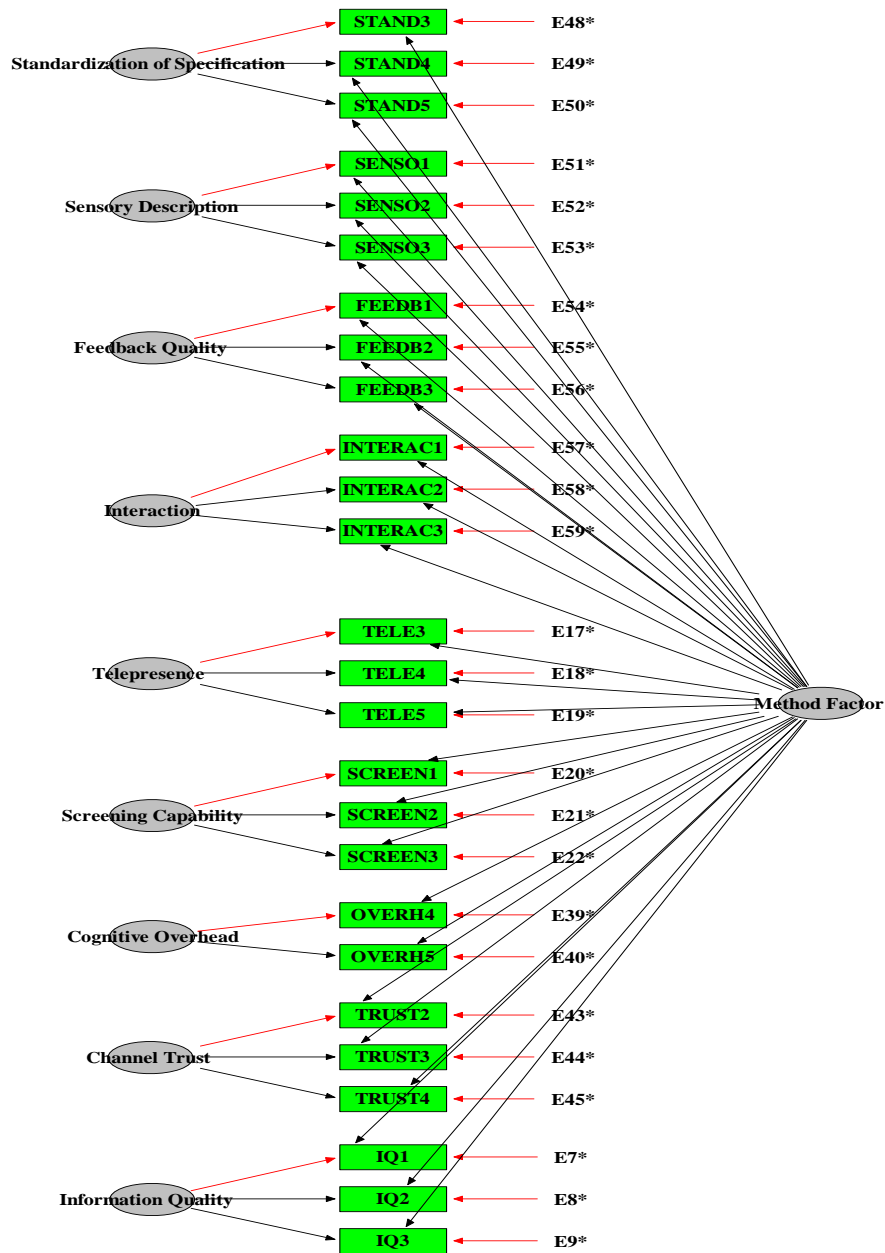
* Trait covariances are not shown.
** The remaining eight constructs and corresponding indicators connected to the method factor are not shown.

Figure 5.3 Measurement model with a method factor.

Table 5.6 Trait loading and method loading.

Factor (Trait)	Indicator	Trait Loading	Method Loading
1. standardization	STAN3	0.806	0.217
	STAN4	0.782	0.384
	STAN5	0.652	0.418
2. sensory descriptiveness	SENS1	0.849	0.285
	SENS2	0.870	0.251
	SENS3	0.778	0.420
3. feedback quality	FDB1	0.871	0.249
	FDB2	0.932	0.249
	FDB3	0.893	0.236
4. interactivity	INT1	0.674	0.458
	INT2	0.814	0.333
	INT3	0.756	0.227
5. telepresence	TELE3	0.786	0.447
	TELE4	0.842	0.470
	TELE5	0.805	0.450
6. screening capability	SCR1	0.849	0.097
	SCR2	0.875	0.196
	SCR3	0.697	0.636
7. cognitive overhead	OVH4	0.749	0.431
	OVH5	0.869	0.329
8. channel trust	TRUST2	0.852	0.122
	TRUST3	0.877	0.033
	TRUST4	0.807	0.136
9. information quality	IQ1	0.745	0.494
	IQ2	0.758	0.488
	IQ3	0.746	0.441
10. search saliency	SALIEN2	0.709	0.643
	SALIEN4	0.930	0.082
	SALIEN5	0.895	0.128
11. brand reputation	BRAND1	0.935	-0.128
	BRAND2	0.956	-0.068
	BRAND3	0.952	-0.115
	BRAND4	0.889	-0.039

Table 5.6 Trait loading and method loading (Continued).

Factor (Trait)	Indicator	Trait Loading	Method Loading
12. pre-knowledge	PREK2	0.855	-0.142
	PREK3	0.838	-0.324
	PREK4	0.856	-0.029
13. choice of e-channel	CHOICE1	0.833	0.042
	CHOICE2	0.816	0.271
	CHOICE3	0.869	0.039
14. price	PRICE1	0.910	0.137
	PRICE2	0.939	0.080
	PRICE3	0.726	0.138
15. system quality	SYSQ1	0.879	0.173
	SYSQ2	0.927	0.151
	SYSQ3	0.874	0.095
16. service quality	SERVQ2	0.675	0.364
	SERVQ4	0.783	0.287
	SERVQ5	0.703	0.323
17. comparative benefit	CB2	0.840	0.191
	CB3	0.905	0.218
	CB4	0.767	0.035

5.3 Assessment of the Structural Equation Model

In the structural equation model (SEM), covariances in the measurement model were replaced with causal relationships. Since the data demonstrated non-normality in the assessment of the measurement model, the ROBUST ML method was used to evaluate the structural model.

5.3.1 Model specification

The structural model demonstrates an excellent model fit, as manifested in Table 5.7. Model χ^2 is 1717.05 (df = 1089), which makes the normed chi-square (NC = χ^2/df) 1.58. This estimate is less than Bollen's (1989) recommended cutoff value (less than 2.0-5.0 to be a good fit). The RMSEA value is 0.043 [< 0.0500, and its lower and upper bounds of the 90% confidence interval (0.039 and 0.047)] are less than the recommended cutoff values of 0.05 and 0.10 respectively. Comparative fit index (CFI) shows 0.935, which indicates reasonably good fit of the model (Hu and Bentler, 1999). The standardized root mean square residual (SRMR) value is 0.066, which is considered favorable (Klein, 2005).

Table 5.7 Fit Indices.

Index	Measurement Model	Structural Model	Structural Model with method factor controlled
Chi-Square (df)	1659.78 (1088)	1840.34 (1129)	1717.05 (1089)
CFI	0.940	0.926	0.935
SRMR	0.047	0.075	0.066
RMSEA	0.041	0.045	0.043
90% confidence interval of RMSEA	(0.037, 0.045)	(0.041, 0.049)	(0.039, 0.047)

5.3.2 SEM results

To analyze the nomological network of e-channel choice centering on information

quality in the e-commerce context, all causal relationships in the research model were

estimated through structural equation modeling approach using EQS 6.1. All coefficients

including ones for five control variables were estimated together through the ROBUST

ML estimation. Figure 5.4 present the test results of the structural model.

Factors affecting e-channel choice: As presented in Chapter3, information

quality's effect on e-channels choice was tested with potential moderation and mediation

effects. The propositions are,

> P1a: Information quality in e-channels has a positive effect on consumers' choice
> of e-channels over physical channels for product purchase.
> P1b: Product price negatively moderates the relationship between information
> quality in e-channels and consumers' choice of e-channels over physical channels
> for product purchase.
> P2: The search saliency of a product positively mediates the relationship between
> information quality in e-channels and consumers' choice of e-channels over
> physical channels for product purchase.

The model explains 56.5 %[22] of the variance of choice e-channels over physical

channels. Information quality in e-channels does have a significant effect on choice of e-

channels (standardized coefficient: 0.224; $p < 0.01$), as theorized in Proposition 1a. To

test the moderation effect in the model, we follow Marsh et al.'s (2004) matched-pair

procedure. This procedure suggests that the mean scores of indicators of product price

and information quality be calculated, and each sample score for the indicators be

converted into a new score centered on the corresponding mean score. Then, an

---

[22] Including control variables.

interaction term is created by taking the product of the highest-loading indicators from each construct and by repeating this step for the 2nd-heighest and the third-highest indicators. The result does not support the moderation effect of product price in Proposition 1b with β coefficient of 0.003 for the interaction term. Proposition 2 predicts search saliency's mediation effect between information quality and choice of e-channels. Both information quality's direct effect on search saliency and search saliency's direct effect on choice of e-channels present significant relationships (coefficient: 0.223; p < 0.01 for the former, and coefficient: 0.519; p < 0.01 for the latter). This signals a strong indirect effect, but a Sobel test (Z-value = $a*b/SQRT(b^2*s_a^2 + a^2*s_b^2)$) = indirect effect/s.e. = 0.116/0.038 = 3.05) was conducted to verify the significance (see Sobel, 1982 for details). The Sobel test proved a significant mediation effect of search saliency on the relationship between information quality and choice of e-channels, supporting Proposition 2 (z-value =3.05).

Factors affecting information quality: Factors affecting information quality were tested through the following four propositions.

P3: Telepresence in e-channels has a positive effect on information quality.
P4: Screening capability in e-channels has a positive effect on information quality.
P5: The cognitive overhead of consumers has a negative effect on information quality.
P6: Vendor trust has a positive effect on information quality.

The four factors of telepresence, screening capability, cognitive overhead, and channel trust explain 59.6 % of the variance of information quality in e-channels. Two factors in the message dimension of communication theories are tested in Propositions 3 and 4. They turn out to have significant effects on information quality in e-channels.

Telepresence has a regression coefficient of 0.421, and screening capability has a regression coefficient of 0.170, both of which signal significant effects at the 1% level of alpha. Cognitive overhead in the receiver dimension demonstrates a significant negative influence on information quality as expected in Proposition 5 (coefficient: -0.128; p < 0.05). The positive relationship between information quality and channel trust in the sender dimension is also supported, as predicted in Proposition 6 (0.365; p < 0.01).

Factors affecting telepresence: Telepresence is further investigated as to its antecedents with the following four propositions.

P7: The standardization of specification has a positive relationship with telepresence in e-channels.
P8: Sensory descriptiveness has a positive relationship with telepresence in e-channels.
P9: Feedback quality has a positive relationship with telepresence in e-channels.
P10: Interactivity has a positive relationship with telepresence in e-channels.

The model explains 48.7 % of the variance of telepresence with four antecedents. Proposition 7 predicts a positive effect of standardization of specification on telepresence. The data shows a significant influence as predicted (coefficient: 0.340; p < 0.01). Proposition 8 about sensory descriptiveness' effect on telepresence is also supported, as the regression coefficient is estimated to be 0.125 (p < 0.05). However, the coefficient for the relationship between feedback quality and telepresence presents a non-significant value of 0.039. Thus, Proposition 9 is not supported, although the positive direction is as expected. Finally, Proposition 10 is supported at the 1 % level of alpha as the regression coefficient is estimated as 0.286.

* Significant at 1 % level
** Significant at 5 % level
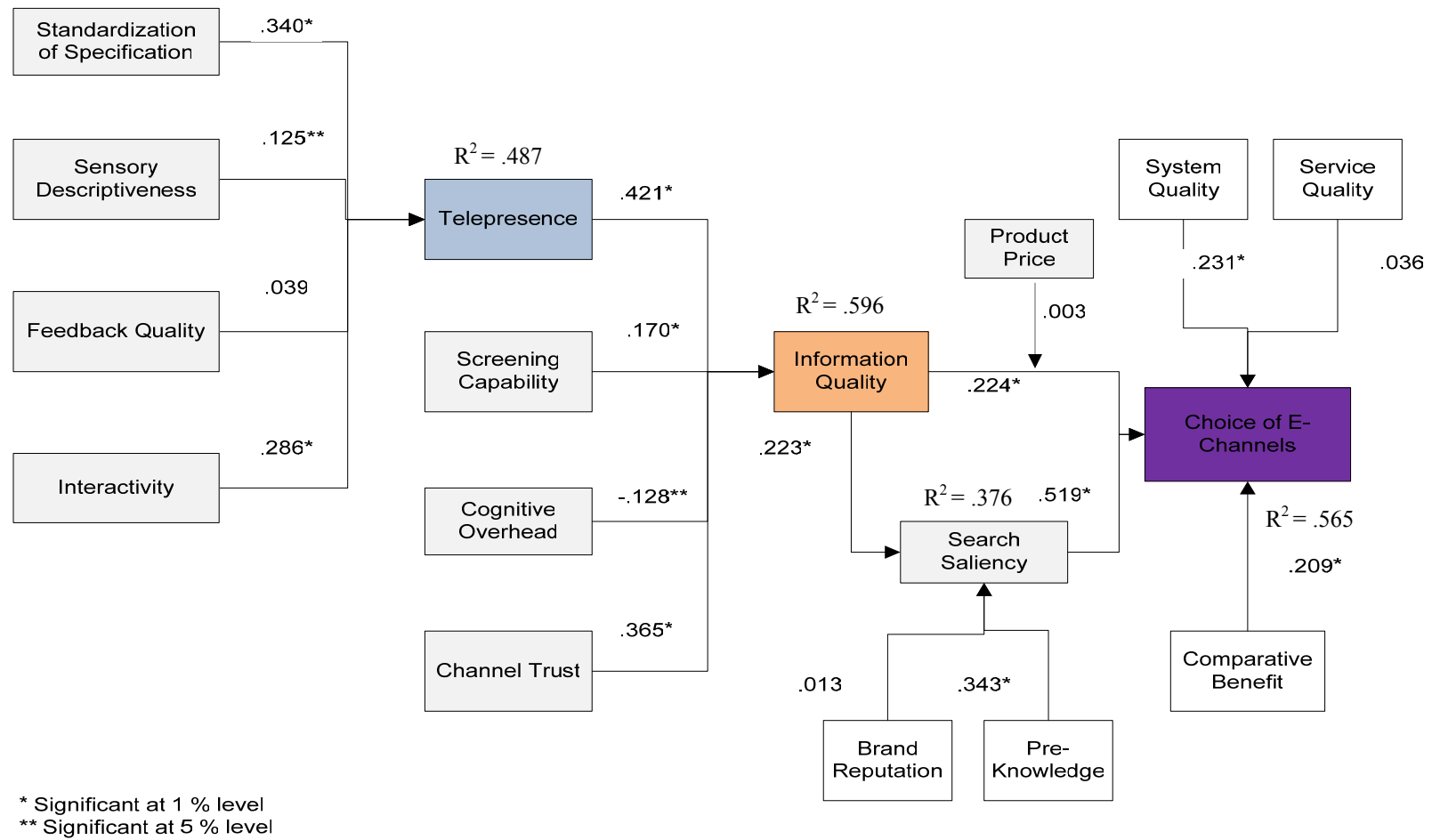
Figure 5.4 Regression results of the research model.

5.4 Post-hoc analyses

Although product type and gender are not in the research model, we further examined the possibility of biases caused by these two factors.

First of all, to test if any part of the overall research model is affected by the product-specific effect, all path coefficients in the model were tested with equality constraints using EQS6.1. One issue in this attempt is that the individual sample size for each of the four products is not sufficient enough to run a meaningful statistical test. However, combining product groups by multivariate kurtosis may increase the sample size. Kurtosis value of '0' represents a normal distribution. Positive kurtosis indicates a distribution curve of a sharp 'peaked' center with a wide bottom while negative kurtosis presents a flat top near the mean (Joanes and Gill, 1998). As seen in Table 5.8, it is noted that the datasets of groups 1 and 4 have a common 'peaked' distribution with a relatively low multivariate kurtosis, while the datasets of groups 2 and 3 (apparel and movie DVDs respectively) both have a flat top near the mean rather than a sharp peak. This means that groups 1 and 4 (digital cameras and flat-panel LCD monitors respectively) show a similar distribution pattern just like groups 2 and 3. Also, products of groups 2 and 3 are relatively cheap compared to products of groups 1 and 4. Therefore, we combined groups 1 and 4 into Group A, and groups 2 and 3 into Group B, which increased the sample sizes to enable the quantitative statistical test.

Lagrange Multiplier Test (LM Test) in EQS is commonly used to identify significant difference in causal relationships among groups (Byrne, 2006; Kline, 2005). While the model with equality constraints for all path coefficients between Group A and

B presented a good fit (see Table 5.9), LM test did not identify any potential inequality in all causal relationships in the model. This test attested to the little influence of product type on the model and the consistency of the model across different groups of products.

Table 5.8 Multivariate normality for each product group.

	Digital camera (group 1)	Apparel (group 2)	Movie DVD (group 3)	Flat-panel LCD monitor (group 4)
Normalized estimate for multivariate kurtosis	0.5711	-3.0171	-3.4546	1.6178
N	90	66	64	89

Table 5.9 Fit indices for the constrained and unconstrained models.

Index	Structural model with equality constraints	Structural model with no constraint
Chi-square (df)	3316.7 (2275)	3304.93 (2258)
CFI	0.901	.901
SRMR	0.088	.085
RMSEA	0.039	0.039
90% confidence interval of RMSEA	(0.036, 0.041)	(0.036, 0.042)

Another test was done on the gender effect. For demographic factors such as gender effects, there are mixed signals in the e-commerce literature. Donthu and Garcia (1999) and Li et al. (1999) posited a significant influence of demographics including gender on online shopping behaviors, but Gupta et al. (2004) demonstrated that demographics are not an effective basis for the choice between online and offline shopping channels. To investigate the gender effect, we divided the data into male and female groups, and ran a LM test with equality constraints on all causal relationships in the structural equation model.

The LM test did not signify any potential inequality in the structural model except for a control variable, pre-knowledge. The causal relationship between pre-knowledge and search saliency of a product showed a univariate increment of chi-square = 4.492 (p = .034). After releasing the equality constraint on this relationship, we re-ran the chi-square difference test. For both gender groups, all causal relationships were significant, and there is no significant difference between males and females. It is noted that the influence of pre-knowledge on perceived search saliency is bigger for male consumers than for female consumers (Female: standardized coefficient =.176, $p < 0.01$; Male: standardized coefficient =.386, $p < 0.01$). This basically means there is no significant difference between the constrained and non-constrained models except for the influence of pre-knowledge on perceived search saliency, and the result indicates that there is no significant gender effect on online consumer behaviors.

5.5 Summary

Since the multivariate non-normality was detected in the dataset, the data were analyzed through the ROBUST maximum likelihood method for both the measurement model and the structural equation model. The measurement model displayed an excellent model fit meeting the criteria for major fit indices, as did the structural equation model. Construct validity was demonstrated through convergent and discriminant validity tests. A method factor was included in the structural equation model to partial out the method effect identified in the method bias analysis.

The structural equation model was tested through the instruments validated in the estimation of the measurement model. Multicollinearity, which frequently becomes an issue in the analysis of regression models, was not found in our structural equation model. For causal relationships, information quality's positive effect on consumer choice of e-channels and search saliency's mediation effect were supported as proposed. The four factors of information quality in e-channels (telepresence, screening capability, cognitive overhead, and channel trust) were hypothesized based on communication theories, and their effects on information quality were all supported. Among those factors, the biggest impact on perceived information quality turned out to come from perceived telepresence. Since there exists a big potential that telepresence can be easily manipulated through web information technologies, telepresence was further investigated. Standardization of specification, sensory descriptiveness, and interactivity showed their significant influence on telepresence. Table 5.10 summarizes the results of all eleven propositions of the research model.

The next chapter proceeds with a discussion of what these supported propositions mean, and explanations about the reasons for the insignificance of the moderation effect of product price and feedback quality's effect on telepresence. Then, the implications of the findings for practitioners and research are presented.

Table 5.10 Test results of the propositions.

No.	Propositions	Supported?
P1a	Information quality in e-channels has a positive effect on consumers' choice of e-channels over physical channels for product purchase.	Yes
P1b	Product price negatively moderates the relationship between information quality in e-channels and consumers' choice of e-channels over physical channels for product purchase.	No
P2	The search saliency of a product positively mediates the relationship between information quality in e-channels and consumers' choice of e-channels over physical channels for product purchase.	Yes
P3	Telepresence in e-channels has a positive effect on information quality.	Yes
P4	Screening capability in e-channels has a positive effect on information quality.	Yes
P5	The cognitive overhead of consumers has a negative effect on information quality.	Yes
P6	Vendor trust has a positive effect on information quality.	Yes
P7	The standardization of specification has a positive relationship with telepresence in e-channels.	Yes
P8	Sensory descriptiveness has a positive relationship with telepresence in e-channels.	Yes
P9	Feedback quality has a positive relationship with telepresence in e-channels.	No
P10	Interactivity has a positive relationship with telepresence in e-channels.	Yes
Post-hoc	(1) Product effects on the research model (2) Gender effects on the research model	No effect No effect

CHAPTER 6

DISCUSSION AND CONCLUSIONS

Through the use of quasi-experiments and surveys, this dissertation found support for nine out of the eleven propositions regarding e-channel choice decisions. In the next section, the study is considered within the broad context of e-channels and the current level of understanding in this area. The theoretical contributions that this study brings to the field, as well as the results of the study are discussed, with separate sections showing implications for research and practitioners. The chapter concludes with the study's limitations and future research opportunities, followed by conclusions. Figure 6.1 shows the organization of Chapter 6.

```
┌─────────────────────────────────────────────────┐
│ 6.1 Discussion                                  │
│    - 6.1.1 Broad background and rationale       │
│    - 6.1.2 Discussion of results                │
└─────────────────────────────────────────────────┘
                        │
                        ▼
┌─────────────────────────────────────────────────┐
│ 6.2 Implications                                │
│    - 6.2.1 Implications for research            │
│    - 6.2.2 Implications for practice            │
└─────────────────────────────────────────────────┘
                        │
                        ▼
┌─────────────────────────────────────────────────┐
│ 6.3 Limitations                                 │
└─────────────────────────────────────────────────┘
                        │
                        ▼
┌─────────────────────────────────────────────────┐
│ 6.4 Future research                             │
└─────────────────────────────────────────────────┘
                        │
                        ▼
┌─────────────────────────────────────────────────┐
│ 6.5 Conclusions                                 │
└─────────────────────────────────────────────────┘
```
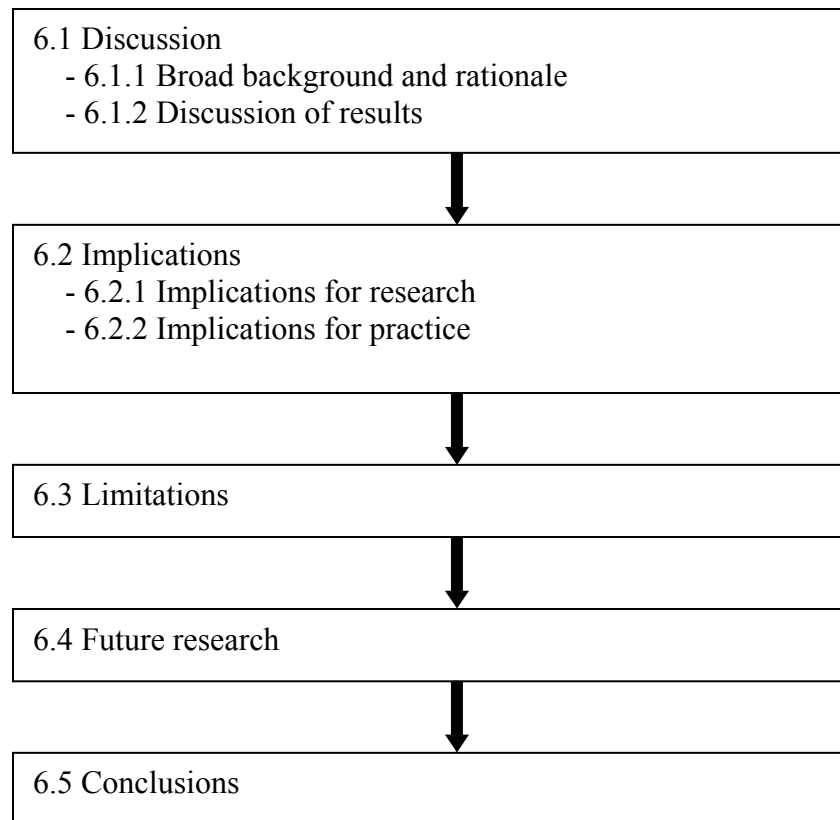
Figure 6.1 Organization of chapter 6.

6.1 Discussion

The issue of e-channel choice has not been systemically studied for several reasons, which include the inconsistent descriptions of the choice concept, little attention to information quality in e-channels, and the lack of a well-articulated nomological network. In addition, studies of information quality in the traditional IS literature have

136

mainly focused on the organizational users of information systems. However, the users of e-commerce systems have unique characteristics which differ from organizational IS users. Therefore, this study examined two questions (a) how information quality influences the consumers' choice of e-channels in purchasing products, and (b) what influences consumers' perception of the quality of information in e-channels. As a result, we developed a comprehensive model that extends DeLone and McLean's (2004) e-commerce success model. This model centers on e-channel choice and the importance of information quality in e-channels.

6.1.1 Broad background and rationale

The theories and framework applied to this study can be represented as a nomological network illustrated in Figure 6.2 that offers a fertile ground for the theoretical development for further work on e-commerce and information quality. Four points emerging from this figure are now discussed.

First, the domain of the e-channel choice has been considered through three different perspectives, using inconsistent descriptions of e-channel choice that have thwarted cumulative theory development. These perspectives are: 1) the choice among individual websites, 2) the choice of whether to accept the Internet as a purchasing channel, and 3) the choice between electronic and physical channels. Focusing on the third perspective, this research considers the choice of e-channels over physical channels: 'a consumer's decision to use e-channels as a purchasing place beyond its role as an information source, thereby *substituting* physical channels'. This clarification of e-

channel choice and the categorization of the research streams lay a foundation for future theoretical development on e-channel choice.

Second, this study supports a simultaneous decision model. The classic sequential decision model[23], suggests that one of the important decisions made in the choice stage, the selection of a purchasing channel, is isolated from the earlier information search stage. However, recent research suggests that processes such as information search and choice occur simultaneously (Martin and Kiecker 1990; Stewart et al., 1996). This study finds that choice of a purchasing channel is made as consumers are searching for product information, supporting the simultaneous occurrence of processes, especially in the network-enabled e-commerce setting. A critical issue in this argument is how consumers link the evaluation aspects of the information search to the choice aspects of purchasing channels when the two processes occur in parallel. This dissertation highlights information quality as the link between information search and choice of purchasing channels. This finding offers future research avenues that investigate other consumer decisions, such as time and product choices.

Third, this study suggests that online behaviors such as e-channel choice are determined by not only comparative benefits, representing appetitive motivation, but also perceived risk, representing aversive motivation. While perceived risk has long been acknowledged as a major impediment to e-commerce (Nöteberg, 2003; Bhatnagar et al., 2000), this study finds that three major types of risk - performance, source, and financial - are especially relevant to the aversive motivation systems of online consumers. This

---

[23] A widely accepted consumer decision model (Dewey, 1910) presents the five-stage decision process: Problem recognition, Information search, Alternative evaluation, Choice, and Outcomes.

aversive motivation system can be effectively curbed through information quality, system quality, and service quality, which is consistent with DeLone and McLean's (2004) model that predicts e-commerce success through these three factors. Among these factors, information quality in e-channels has been the least studied concept, thereby leading to this study's investigation of its central role in choosing e-channels as transaction channels.

Finally, this study introduced dimensions of communication theories as an effective theoretical approach to investigate information quality. Four factors – telepresence, screening capability, identified in this study have significant influence on information quality, which confirms the validity of the three major dimensions of communication theories in the study of information quality in e-channels. Consequently, the message, receiver, and sender dimensions successfully highlighted the effectiveness of the respective media richness theory, cognitive overload theory, and cognitive consistency theory in the development of the matrix of information quality in e-channels.
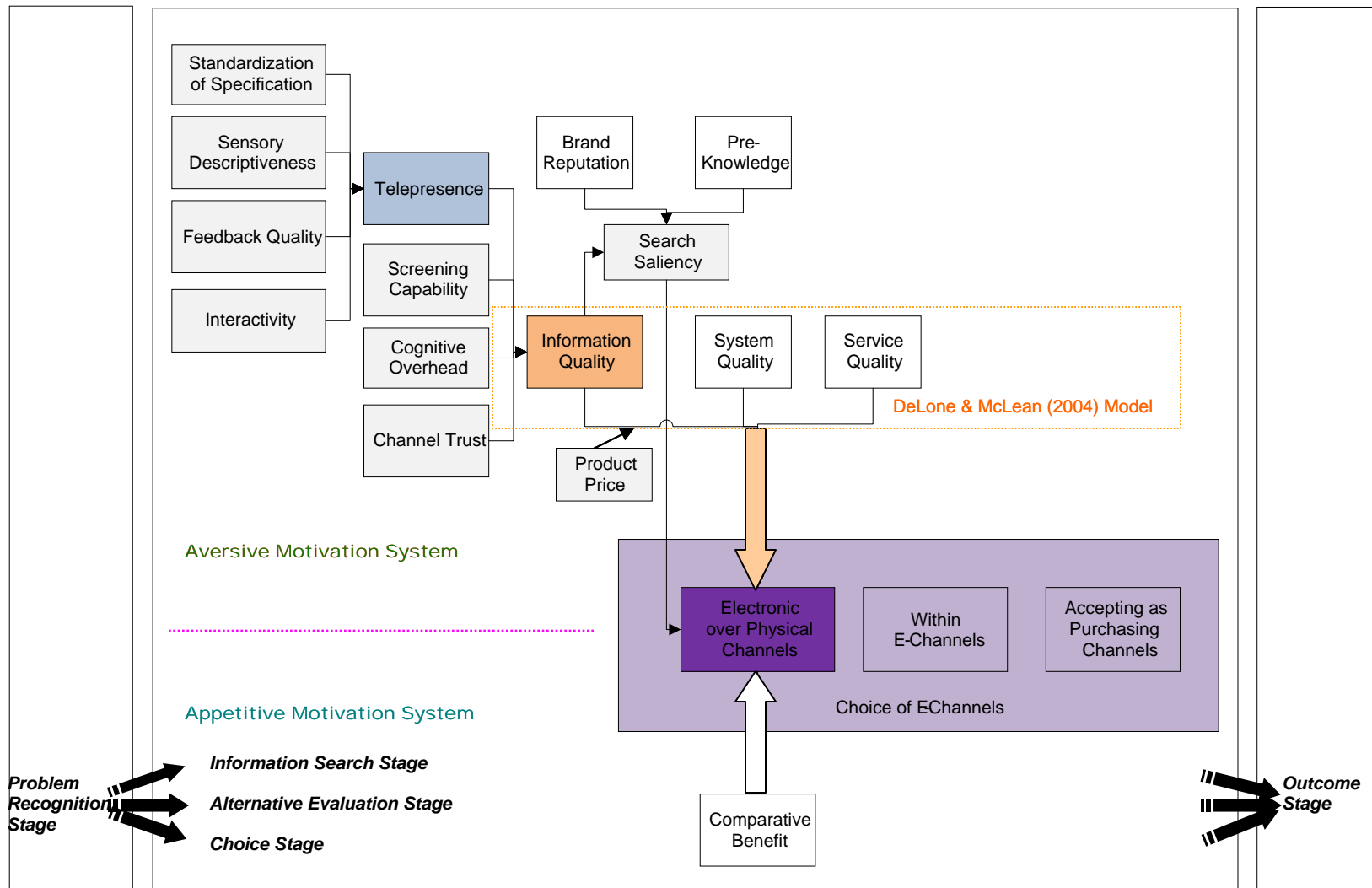
Figure 6.2 Nomological network of e-channel choice.

6.1.2 Discussion of results

Internet shopping has been projected to grow exponentially; however, growth of the use of e-channels as a purchasing conduit has been slower than projected. Prior research has suggested that poor product information over e-channels is a major barrier, making it difficult to inspect goods (Peterson et al., 1997), offering no physical interaction (Burke, 2002), and less knowledge than needed to purchase (Jiang and Benbasat, 2007), among others.

Ramaswami et al. (2000) found that consumers who use the online channel for information search tend to use it for purchasing transactions. Similarly, Black et al. (2002) argued that the informational aspect of a channel exerts a significant influence on the other channel functions (i.e., purchasing). However, Janssen (2002) found the opposite. That is, consumers who use the Internet to search for information do not necessarily buy on the Internet. The findings of this study support the views and findings of Ramaswami et al. (2000) and Black et al. (2002), but only when high-quality information is offered.

High information quality tends to lower performance risk, which is an important issue in remote purchase environments (Burke, 2002; Wood, 2001). This study's support for the direct effect of information quality and the mediation effect of search saliency on e-channel choice support the argument that experience attributes may be converted into search attributes in the form of digitized information, which reduces performance risk. This in turn makes an experience good be perceived as a search good that is better suited for online purchase transactions.

The e-commerce literature is replete with research that investigates the measurement dimensions of information quality (e.g., Palmer, 2002; Agarwal and Venkatesh, 2002; McKinney et al., 2002). However, this study is the first that examines the nomological network of information quality in e-channels by applying communication theory to the studies of online behaviors.

While most e-channels present picture-based information to complement text-based information about products (Lightner and Eastman 2002), this is insufficient to offer rich product information (Jiang and Benbasat, 2007). With the advent of the Internet, telepresence emerges representing the overall psychological response to interactive environments with richness and realism as core dimensions of the construct (Nelson et al., 2006). Consistent with these ideas, telepresence in our model, together with screening capability, represents the message aspect of communication. Telepresence's strong prediction of information quality in the study demonstrates that online consumers utilize vivid and rich information to simulate experiencing products and more fully processing product information.

However, Petty and Cacioppo (1986) contend, consumers may take 'peripheral routes' in receiving information that can involve cues such as low cognitive overhead imposed on online consumers, and source credibility such as channel trust in our study. Cognitive overhead is "the additional effort and concentration" required for maintaining a task (Conklin, 1987); consequently, a well-designed website minimizes cognitive overhead. When cognitive overhead is too high, even consumers who receive vivid messages may not be ready and/or able to comprehend those messages and appreciate the

high-quality of the information. Reasoning about channel trust is also corroborated by Spence's (2002) signaling model in that a positive perception about the information sender signals positive quality perception for the information they display, resolving information asymmetry. To increase channel trust, sellers in e-channels may initiate or signal the positive perception through reputation building tools such as advertising, warranties, or website design (Milgrom and Roberts, 1986; Grossman, 1981; McKnight et al., 1998).

Contrary to what was proposed, the moderation effect of product price on the relationship between information quality and e-channel choice (Proposition 1b; $\beta =$ 0.003) and feedback quality's effect on perceived telepresence (Proposition 9; $\beta = 0.039$) were not supported. To further investigate the effect of product price, we checked the main effect of product price on the choice of e-channels. The result shows a negative relationship with choice, but it signals a non-significant causality too. There are at least three possible explanations for this unsupported moderation. First, the effect of the perceived level of price on perceived performance risk might be offset by the general acceptance of e-channels' lower prices, which is reflected on the control variable of 'comparative benefit'. If perceived risk is not increased as expected earlier because of the offset effect, the effect of information quality on e-channel choice is not expected to decrease. Second, the upper bound of the price range (U\$330) for products chosen for this study might not be high enough to evoke the perception of increased risk. Finally, it is possible that participants were not sensitive to price levels since participants were in an experimental environment, they might not picture themselves to be in a real situation to

spend their personal money. This series of reasoning warrants a re-examination of the effect of product price in the future.

This dissertation further investigated how to increase the degree of telepresence, particularly for experience goods. The results of our model are consistent with Hassanein and Head's (2005) argument that presence can be manipulated by the design elements of a web interface. We posited four elements as antecedents to telepresence in line with Struthers et al.'s (2005) categorization of human information processing. The results here indicate that three primary information processing types such as cognitive, affective, and behavioral processing offer corresponding major levers to control the perceived telepresence. First, the standardization of specification codifies the quality and capability of a product, and contributes to the cognitive comprehension of consumers. Second, sensory descriptiveness offers contextual descriptions for consumers to easily evaluate the products through multimedia, stimulating human senses and appealing to the affective understanding of consumers. Finally, interactivity operates as a tool of behavioral information processing, enabling bi-directional conversation through 3-D experience, digital trial, chatting, etc.

The analysis indicated that feedback quality did not have a significant effect on perceived telepresence. After further thought and reflection, two potential explanations for this result are considered. First, the target population of the experiment was already familiar with the selected products for the experiment. Consequently, properties of the selected products [24] were not complicated enough for the young, highly-educated

---

[24] Digital camera, men's short, movie DVD, and flat panel LCD monitor

participants to require experts' testimonial or advice. Therefore, high-quality reviews of experts did not add to a participants' virtual experience of the products. Second, it might not be adequate to collect perceived feedback from the online store that is selling the product. Many researchers attest to the strong influence of electronic word-of-mouth such as peer feedback on consumers' indirect experience (Steelman et al., 2004). However, consumers' preferred communication media are mainly electronic discussion boards like those found on Google.com, Ebay.com, or intermediaries such as BizRate.com and Epinions.com, where consumers feel higher objectivity and independence from sellers (Fong and Burton, 2006; Smith et al., 2005). Therefore, consumers may be indifferent to the feedback on sellers' websites, which may be considered biased by a consumer. Consequently, consumers would disregard the feedback on sellers' websites, but may still depend on the feedback on seemingly neutral websites in their attempt to virtually experience and evaluate products. This means that in investigating general perceptions in e-channels, measuring feedback quality should not be restricted on the same site where telepresence is measured. However, in each sample of our study, feedback and telepresence were measured on the same shopping site. This may have resulted in the insignificant relationship between perceived feedback quality and telepresence. Future studies that include more sophisticated products and independent sites for feedback will reveal the true influence of feedback on telepresence.

6.2 Contributions and Implications

This study makes theoretical contributions to the field, and offers several implications for both research and practice. Past research on e-channel choice has suffered problems of the ambiguous domain and the missing link between information search and choice of transaction channels. Our study clarifies the domain of the e-channel choice issue, and underscores the importance of perceived information quality in e-channels by validating the central role of information quality in attracting more consumers to electronic transaction channels.

6.2.1. Implications for research

For academics, this study projects several important implications. First, this study introduces a new framework to observe online consumer behaviors. It sheds some light on the complex nature of the construct - choice of e-channels. By combining motivation theory and DeLone and McLean's (2004) e-commerce success model, online consumer behaviors regarding choice of e-channels are better understood. Whereas TAM is a prevalent logic in online behavior studies, our study especially emphasizes the comparative component that has been commonly overlooked. By decomposing causal effects in terms of appetitive and aversive motivation systems, our research model enables better understanding of consumers' benefit-seeking behaviors at a comparative level and risk-avoiding behaviors at an absolute level.

Second, this study clarifies the relation between three major types of consumer risk in e-commerce and e-commerce success factors. While perceived risk such as source,

financial, and performance risk is known to be a major barrier for consumers' online purchase, this study tied these risk types to DeLone and McLean's e-commerce success model. Research suggests that the perceived risk of a channel is transferable to a product sold in that channel (Hirsch et al., 1972; Spence et al., 1970). Reflecting this idea, this study further investigated how to cope with the common performance risk about products that are sold in e-channels performance risk. As Palmer et al. (2000) asserts, reducing performance risk is a primary key in a remote transaction context like e-commerce, and high-quality information can address the risk by enabling indirect experience. This projected 'information quality' into the central stage of our study. This study reveals that directly or indirectly by increasing search saliency of a product, information quality in e-channels reduces perceived performance risk of consumers, which leads to consumers' choice of e-channels for purchase. Consequently, for the studies of other types of online risk this line of theoretical development offers a new angle, through which future research may investigate e-commerce success factors and a clearly defined dependent variable of e-channel choice

Third, the result of this study shows that telepresence reveals the strongest effect on perceived information quality, which in turn reduces consumers' perceived performance risk. Nowadays products are so individualized and information-rich (Goldman et al., 1995) that it takes time and effort to offer sufficient information to consumers. While the IS literature is silent on testing the effect of telepresence on perceived information quality, and on providing web design guides to increase telepresence, this study presented four promising ways to improve telepresence based on

different human information-processing styles. The four variables, standardization of specification, sensory descriptiveness, feedback quality, and interactivity are easily manipulated with current web technologies. Therefore, this study presents information quality and telepresence as new windows of research, through which we might further investigate the virtual reality in terms of indirect experiencing of the physical world.

Finally, this study also contributes to the knowledge management literature. We show that high-quality information in e-channels successfully digitizes experience attributes of a product. Consequently, factors affecting the quality could be traced to communicative dimensions, and the determinants of information quality are extracted through the three core dimensions of message, receiver, and sender. This study finds that consumers tend to perceive high quality of information when the information in e-channels demonstrates high telepresence, internalizes high screening capability, imposes little cognitive overhead, or comes from a trusted vendor. Considering that these factors help in digitalizing intangible experience attributes into tangible product knowledge, this study shares the communicative aspects of information with studies of knowledge management. While knowledge management usually focuses on organizational activities, this study illustrates 'how' and 'what' of knowledge management at the individual consumer level. That is, consumers' desire to reduce risk in transactions demands tangible product knowledge. This tangibility can be facilitated by information technologies that structure e-commerce systems. Further, the study results imply that IT's role is more meaningful for experience goods than search or credence goods because IT provides only search help for search and credence goods. Our study proves that IT

facilitates the conversion of intangible experience attributes into tangible digitized information, and makes the search for experience goods easy for the consumers, as illustrated in Figure 6.4. These four implications for research are summarized in Table 6.1.
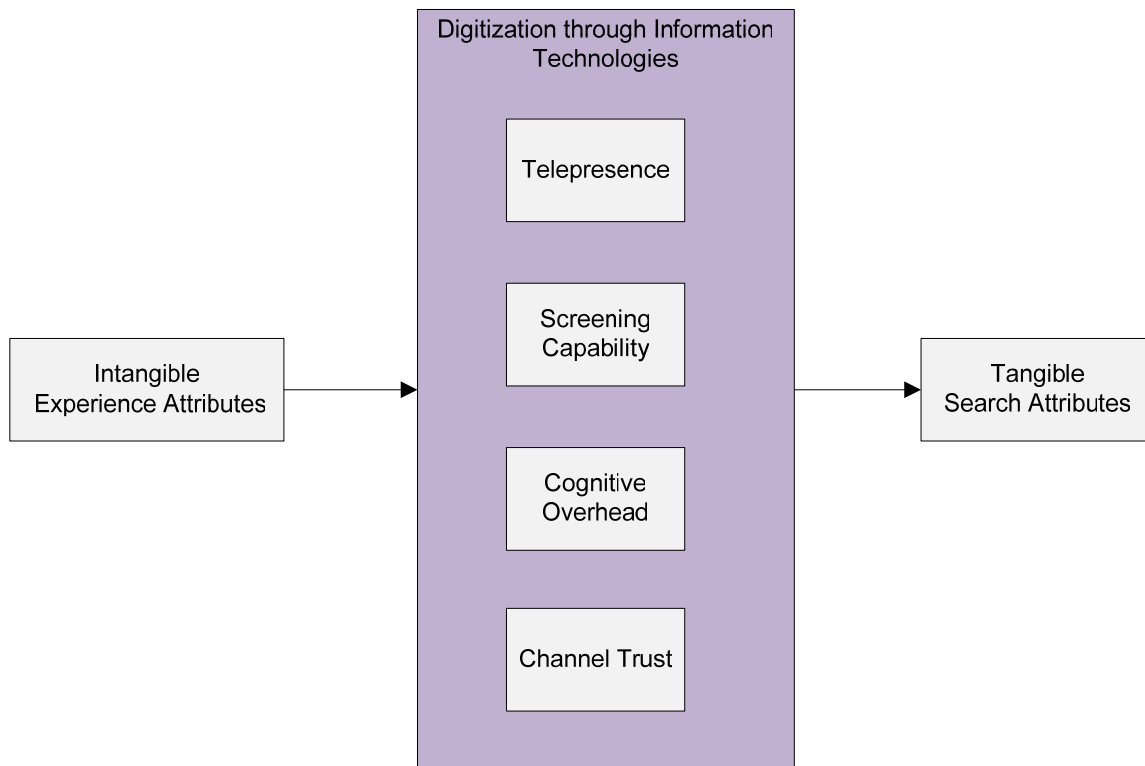
Figure 6.3 Conversion of experience attributes into search attributes.

Table 6.1 Summary of research implications.

No.	Implications for Research
1	This study establishes a nomological network of e-channel choice based on a new framework that combines motivation theory and e-commerce success model, thereby enabling better understanding of online consumer behaviors.
2	This study clarifies how three major types of risk in e-commerce may be effectively addressed, opening a new way to look at e-commerce success factors and e-channel choice.
3	This study, based on different human information-processing styles, presented four promising ways to improve telepresence, which revealed the strongest effect on perceived information quality.
4	The model of the study introduces a mechanism that converts intangible experience attributes of a product into search attributes, which shares a common ground with knowledge management.

6.2.2 Implications for practice

In general studies about consumers' choice of e-channels have important implications for practitioners. This study offers potential online sellers, as well as incumbents in e-channels several ideas on how to encourage consumers to switch from physical channels to their online shopping malls for purchase.

First, this study provides explanations for the question of why online sales account for only a small portion of U.S. retail sales in spite of the large Internet population. According to Klein's categorization of products, even products regarded as

search goods have experience attributes that causes online consumers to perceive performance risk, making the product pool for electronic transactions smaller. Rapidly increasing bandwidth of the Internet and easy access to the network promotes expanding online sellers' boundaries in terms of time, distance, and target consumers. To reverse the small volume of online transactions requires, (a) making sure potential consumers who search for product information on sellers' sites can be captured, or (b) expanding the pool of products that can be sold in e-channels. The results of our study corroborate the pivotal role of information quality in these solutions.

Online sellers' should make every effort to transform from being a mere information source, to be a place for purchase. High-quality information may encourage consumers on a site for information search to stay on the same site for purchase. Information source channels with poor information quality will find it difficult to keep consumers on the path-dependent 'hierarchy of effects' for eventual purchase (Lavidge and Steiner, 1961, Bellman et al.'s 1999). High-quality information not only draws consumers to e-channels, but also captures them to stay online for purchase. This consistent result corroborates the validity of our argument that information quality is a key to attracting consumers in both information search and purchase stages.

The product pool may be expanded through high-quality information that converts experience goods into search goods. Against the prevalent acceptance of the inadequacy of experience goods for e-commerce, our results show that experience goods are excellent candidates for electronic transactions with the help of web technologies. Klein (1998) argues that the categorization of search and experience goods only provides a

relative spectrum of search and experience attributes of a good. While admitting that search goods are suitable for electronic transactions (Gupta et al., 2004), this study's support for the effect of search saliency suggests that experience goods can be perceived by consumers as search goods through well-digitalized product information that reflects intangible experience attributes. That is, it is not the product type, but the quality of product information that determines the adequacy of online transaction. This way of reasoning fits well in Grover and Ramanlal's (1999) approach of "counter-myth" to the "myth of e-market". A common belief in the e-commerce field is that only search goods are appropriate for e-channel transactions. The counter-myth emerges when sellers are able to sell experience goods online with the help of high-quality product information, which eventually lowers sellers' costs and expands their market boundary, thereby granting online sellers better chances of business.

Second, online retailers need to not only recognize the distinctive role of information quality, but also know how to effectively enhance the information quality. Enhancing information quality can be achieved through four effective levers identified in this study. Sellers could make every effort to establish a good reputation so that consumers trust them, which will have positive effect on consumers' perception of information quality. Also, sellers could take advantage of web technologies that enhance telepresence such as virtual reality, which in turn increases perceived information quality. As more information is digitized through enhanced telepresence, corresponding enhancement of screening capability should accompany the information. However, the heightened telepresence might be meaningless if consumers become frustrated with

cognitive overhead from disorganization of the information as pointed out by McKinney et al. (2002). When sellers take the best advantage of these levers, the comparative benefit of e-channels, such as 24/7 open convenience, would encourage many busy contemporary consumers, who used to go to physical stores for information search and purchase, to switch to electronic channels.

Third, this study provides online sellers with practical guidelines. One is the design of online shopping sites where telepresence is enhanced through four technological design elements. The design elements are based on the three human information processing types proposed by Struthers et al. (2005). These elements: 1) standardization of specification for cognitive processing, 2) sensory descriptiveness for affective processing, 3) feedback quality for cognitive/affective processing, and 4) interactivity for behavioral processing serve as pivotal characteristics for effective website design. Online sellers must take advantage of these in order to create indirect product experiences that facilitate consumers' evaluation of products. Otherwise, tangible information will have to facilitate off-line experiences in public places to sell their products.

Finally, the results of this study offer a strategic option for vendors who pursue synergy between online and offline stores. While start-ups with limited resources and physical existence would be excited about the benefits of being online stores, trading partners' and/or government's pressure are the strongest factor for the drive for U.S. firms' e-business according to Hsu et al.'s (2006) study. Their study implies that most companies in U.S. are still not taking full advantage of e-transactions. However,

practitioners frequently report the inevitability of managing both online and offline presence because many vendors want to build synergy between their website and physical store (McKillen, 2007; Ashworth et al., 2006; Campanelli, 2005). Typically, web stores have been used to help consumers' information search, and physical stores have been places for the consumers' corresponding purchase. Given the findings of our study, a vendor may operate its web store as an expert service center, so that those who received the service may become loyal to the vendors as was proven effective in pharmaceutical product websites (McGuire, 2007; McKillen, 2007). Further, this situation is actually an excellent candidate for another potential application of our study in that physical stores can be reduced as pick-up locations or service branches if vendors can sell products online, thereby saving costs arising from physical stores and their required and resources.

These implications for practice are summarized in Table 6.2.

Table 6.2 Summary of practical implications.

No.	Implications for Practice
1	(a) High-quality information is the key to attracting consumers who visit a sellers' site for information search to remain on the site for actual purchase.
	(b) Against the common belief about the inadequacy of experience goods for electronic transaction, our results show that sellers can expand the pool of sellable goods through the conversion of experience attributes of products.
2	This study gives potential sellers and incumbents in e-channels four effective levers to increase information quality.
3	Telepresence is identified as a promising candidate for technical manipulation, and sellers can effectively facilitate consumers' information processing through four technological design elements for telepresence.
4	Applying this model, vendors can reduce their physical stores to pick-up locations or service branches, lowering their costs for rent and other resources.

6.3 Limitations

This study has several limitations that warrant further discussion. First, the reported results are limited by the type of subject. Our sample data were collected from a highly-educated population within a certain regional boundary. Although this subset encompasses the primary users of e-commerce systems, there might be variations in relation to the gender/product type interaction, or geographic limitation. This issue may

be resolved in an extended study that expands the boundaries of participants in terms of age, geographic regions, and target product type in the future.

Second, the issue of web vendor choice might arise for some purchase occasions. For example, a consumer's channel choice may be affected only by a web vendor's reputation. Although we channeled the effect of vendor reputation through information quality, there might be more effective solutions. One way to reduce the potential bias from vendor effect is selecting those vendors who have presence on both physical and electronic channels. This way, individual vendors' reliability can be held constant. However, since sellers who have presence in both channels usually have websites of decent quality, the selection would have to be performed in a way to best maximize the variance of information quality that is required for the successful experiments.

Third, in this study the scale items for consumers' cognitive overhead did not reflect on various specific sources of bad organization, such as pop-up windows and blinking banners. Cognitive overhead was measured by the overall organization and format of the contents because it was extremely difficult to find websites that show variances for each specific source of cognitive overhead, as well as for all seventeen constructs in the research model. Therefore, a future study that focuses on cognitive overhead with web pages customized for each specific source of "bad" organization may contribute to the development of effective design schemas for web pages.

Finally, the question about the relation between product price level and performance risk remains unanswered. We expected that perceived risk would increase as

price level goes up. This can be tested in a future study involving products within a wider price range, and controlled by participants' self-evaluated financial situation.

6.4 Future Research

There are several potential research opportunities in relation to this study. First, of DeLone and McLean's (2004) three success factors for e-commerce, this study focused on information quality to address performance risk, and makes important contributions to the e-commerce literature. Another opportunity lies in the elaboration on the other two factors such as system quality and service quality, which will address the remaining two major types of risk such as source risk and financial risk. Adding these results to this study's results centering on information quality will give a broader nomological network for e-channel choice.

Second, future research can examine online service purchase through the investigation of the roles and the determinants of information quality. The drastic development of web technologies now not only shortens the distance between buyers and sellers, but also enables rich communication like face-to-face conversation. For example, now we can begin to realize the possibility of a web medical service through web cameras without the hassle of driving to a doctor's clinic. Since information itself is also a good that can be bought and sold, and there's no physical delivery issue like in transactions of products, the future of service transactions on the Internet seems promising and invites further studies.

Third, from the result of our study, it becomes evident that the high level of telepresence on the Internet satisfies consumers' demand for better product information. However, this conclusion does not automatically lead sellers to pursue active use of cutting-edge web technologies on their online stores. The domain of information to transfer to consumers, and the timing and extent of information exposure will depend on various contingencies, such as the market power of the company, characteristics of target consumers, and network infrastructure, such as the national average bandwidth for consumers. Even some companies may want to use e-channels only as information source rather than cannibalizing the sales of their physical stores. In that case the issue will be how sellers can lead consumers, while not revealing complete or high-quality information to consumers in their online stores, to their physical stores for purchase. Therefore, our study can be extended to investigate the determinants of firm strategy on the levels of information exposure and quality.

Fourth, since telepresence offers virtual experience to consumers, it may even be possible for online stores to present higher-quality information than brick-and-mortar stores. Consumers might have access to a certain facet of information that used to be unavailable in a physical space because of physical limitations. For example, home-buyers cannot take a look at the details of a house that is under construction. However, 3-D graphics can create a virtual house where home-buyers can examine and experience the details of the house, and even make customized requests to home-builders by screening various options such as number of rooms and square feet of garden. Therefore, this enhanced telepresence and screening capability of virtual space might operate as

motivators, thereby enabling better consumer experience in electronic channels than physical channels.

Fifth, the manipulability of telepresence by design elements was supported. While these four elements are highly affected by information technologies, our model reflects the capability of current web technologies, in which telepresence is limited to visual and auditory dimensions. Therefore, future studies can further investigate where we are heading in terms of the other three human senses of smell, taste, and touch.

Sixth, the communication logic of this study explained 60 percent of variance of perceived information quality. For the explained variance, a future study may explore other factors under different theoretical framework.

Finally, this study's potential extension that benefits both academics and practitioners is the research that clarifies Nelson's (1970) categorization of experience goods. Identification of substitute experience along geometric, mechanical, and material experience goods (Klatzki et al., 1991; Li et al., 2003) would encourage more comprehensive evaluation of the effectiveness of e-commerce. Differences in the experience attributes of products will call for different types of information and their corresponding information technologies. Therefore, an attempt to identify information quality dimensions that fit the needed indirect experience type will be worth studying, and contribute to the development of e-commerce.

6.5 Conclusions

Competition between electronic and physical channels has intensified in the recent Internet era. However, online sales still account for only a small portion of retail sales. This study attempted to explain why this is the case, and to identify the bottleneck that deters the development of e-commerce. This study is a first step in developing the comprehensive nomological network of e-channel choice. While information quality has been the least examined concept in the e-commerce literature, we identified it as key to capturing customers that will purchase in e-channels. Consequently, a theoretical model that explains the consumers' choice of electronic channels was developed and tested. Results provide support for the model, thereby illustrating information quality's ability to address performance risk. Overall, this study directs practitioners' attention to the reasons why information quality is important in electronic transactions, and the ways to increase information quality in e-channels. This study also unfolds a potential for future studies on such topics as detailed description of telepresence, identification of nomological network about service quality and systems quality in e-channels, and determinants of online service purchase.

APPENDICES

Appendix A

Selected Websites For Each Product

Product	Website to Navigate
Digital camera	HQ: http://www.abtelectronics.com/scripts/site/site_product.php3?source=bizrate&id=23598# LQ: http://www.bestpriceaudiovideo.com/catalog/46/5496/?affiliate_code=BR
Apparel	HQ : http://www.gap.com/browse/product.do?cid=5156&pid=467900 LQ : http://www.californiaclothing.com/guys/shorts/sc_20_cargo_walk_black.html
Movie DVD	HQ : http://movies.go.com/the-illusionist/d769020/drama LQ : http://www.moviesunlimited.com/musite/product.asp?sku=D69452
Flat-panel monitor	HQ : http://www.circuitcity.com/ssm/ViewSonic-19-Widescreen-Monitor-VA1930WM/sem/rpsm/oid/162159/catOid/-12965/rpem/ccd/productDetail.do LQ : http://www.trademoon.com/Product369147.aspx

Type 1. Digital camera (a site selected to display high information quality)

Type 2. Digital camera (a site selected to display low information quality)

163

Type 3. Apparel (a site selected to display high information quality)

Type 4. Apparel (a site selected to display low information quality)

Type 5. Movie DVD (a site selected to display high information quality)

Type 6. Movie DVD (a site selected to display low information quality)

Type 7. Flat Panel Monitor (a site selected to display high information quality)

Type 8. Flat Panel Monitor (a site selected to display low information quality)

Appendix B

Scale Items

The GOAL of this survey is to know whether the quality of product information at online stores generally influences consumers' online behaviors.

Therefore, please think of yourself as a consumer buying a product. Browse through the designated Website. When browsing, please scroll down the Web page and click the information links to search for product information. Try to utilize all the information on the product that the website offers. Please take at least five minutes to do this.

1. Select the best description of yourself.

	I have previously used the Internet to search for product information, and I have experience buying a product on the Internet.
	I have previously used the Internet to search for product information, but I have NEVER purchased a product on the Internet.
	I have NEVER used the Internet to search for product information, but have purchased a product on the Internet.
	I have NEVER used the Internet to search for product information, and have NEVER purchased a product on the Internet.
	I frequently use the Internet to search for product information and purchase products on the Internet.

2. Your gender?

	Male
	Female

3. How many years have you used the Internet?

4. Age?

5. Degree sought?

	Bachelors
	Graduate

6. Type?

I. You just browsed through a designated Website to search for product information. Based on this experience, please answer the following questions by checking the appropriate space.

Not at all   Very Much
    1-----------2---- --------3-------------4-------------5-------------6--------------7

Choice of e-channels

If you need to buy this product, are you willing to buy it on the Website rather than at a physical store?
Will you choose the Website over conventional stores if you need to buy this product?
Are you comfortable with buying this product on the Website rather than at a physical store?

Telepresence

Does the Website enable you to find information about the product as if you are in a physical store?
Can you evaluate the product on the Website as you do in the physical store?
Does the website depiction of the product make you feel like you are looking at it in a physical store?

Screening capability

Does the Website allow you to compare the product with others?
Does the Website allow you to organize comparisons across products by price?
Does the Website enable you to effectively filter information needed if you were searching for products?

Channel trust

Based on the appearance of this Web site, do you believe this store is legitimate?
Do you believe the information that this store provides you?
Do you find no reasons to be cautious with this store?

II. Based on the experience of the designated Website you just browsed through, please indicate the extent of your agreement to each statement.

Strongly Disagree   Strongly Agree
      1-----------2---- --------3-------------4-------------5-------------6--------------7

Cognitive overhead

The amount of information on the Website is more than I can use.
The Website is crowded with content.
There are distractions such as advertisements or blinking banners on the Website.
On this Website, it is NOT easy to find the necessary information for purchase.
The information provided by the Website is NOT well organized.

Search saliency of a product

I do NOT have to see the product in a physical store to know the value of it.
I do NOT have to physically see the product in a store to know the quality of it.

Product price

This product is expensive considering my financial situation.
Considering the price of other products that I have purchased, I feel that this product is expensive.
In general, this product is costly to me.

Brand reputation

I think that the brand of the product is reliable.
I think that the brand represents high quality.
I think that the brand is good.
I think that the brand is popular.

Pre-knowledge

I was knowledgeable about this product before I navigated the Website.
I was familiar with this type of product.
I had essential information to evaluate this product before I looked at the Website.

III. Considering your experience of the designated Website, would you agree with the following statements?

Very Unlikely   Very Likely
　1-----------2---- --------3-------------4-------------5-------------6--------------7

Information quality in e-channels

The information given on the website helps me evaluate the product.
The quality of product information on the Website is enough for my purchasing decision.
In general, information about the product is relevant to my purchase decision.

Standardization of specification

Information on the product is described in standard categories.
The specification of the product information on the Website is consistent with other retailers.
The characteristics of the product are described in a standardized way.

Sensory descriptiveness

The Website shows various images of the product using different angles.
The Website shows detailed views for a certain part of the product.
The Website enables me to sense the product through audiovisual trials such as sounds or 3-D views.

Feedback quality

The Website gives me useful testimonials (e.g., experts, other consumers) about the product performance.
The performance testimonials (e.g., experts, other consumers) I get from the Website is helpful.

Interactivity

The Website allows me to interact with a person to get information on the product.
It is easy to manage the communication process on the Website.
The Website allows prompt responses to give information on the product.

IV. Online stores are Web stores that run on the Internet. Please describe your general perception about online stores (not for the specific Website you just browsed).

Strongly Disagree   Strongly Agree
   1-----------2---- --------3-------------4-------------5-------------6--------------7

System quality

Online stores have enough safeguards to make me feel comfortable when using it to transact personal business.
I feel assured that Web technologies adequately protect me from problems at online stores.
In general, online stores now have a reliable environment in which to transact business.

Service quality

Refunds are easy with online stores.
Online stores provide good after-sales support.
It is easy to cancel orders placed with online stores.

Comparative benefit

In general, online prices are lower than those at the offline conventional stores.
Buying online minimizes personal hassle.
Buying online minimizes time pressure when shopping.

REFERENCES

Abdellaoui, M., Vossmann, F., and Weber, M. "Choice-Based Elicitation and Decomposition of Decision Weights for Gains and Losses Under Uncertainty," *Management Science* (51:9), 2005, pp. 1384-1399.

Agarwal, R., Venkatesh, V. "Assessing a Firm's Web Presence: A Heuristic Evaluation Procedure for the Measurement of Usability," *Information Systems Research* (13:2), 2002, pp. 168-186.

Alba, J., and Lynch, J. "Interactive Home Shopping: Consumer, Retailer, and Manufacturer Incentives to Participate in Electronic Marketplaces," *Journal of Marketing* (61:3), 1997, pp. 38-53.

American Marketing Association Dictionary, 1988)

Ashworth, C. J., Schmidt, R. Ä., Pioch, E.A., and Hallsworth, A. "An approach to sustainable 'fashion' e-retail: A five-stage evolutionary strategy for 'Clicks-and-Mortar' and 'Pure-Play' enterprises," *Journal of Retailing & Consumer Services* (13:4), 2006, pp. 289-299.

Ba, S., Stallaert, J., Whinston, A., and Zhang, H. "Choice of Transaction Channels: The Effects of Product Characteristics on Market Evolution," *Journal of Management Information Systems* (21:4), 2005, pp. 173-197.

Bakos, J. Y. "Reducing buyer search costs: Implications for electronic marketplaces," *Management Science* (43:12), 1997, pp. 1676–1692.

Barnes, S. J., and Vidgen, R. "An evaluation of cyber-bookshops: The WebQual method. *International Journal of Electronic Commerce* (6:1), 2001, pp. 11-30.

Barron, T., and Saharia, A. N. "Optimal Information Structures for the Seller of a Search Good," Information Systems Research (1:2) 1990, pp. 188-204.

Bellman, S., Lohse, G. L., and Johnson, E. J. "Predictors of on-line buying behavior," *Communications of the ACM* (42:12), 1999, pp. 32-38.

Benjamin, R., and Wigand, R. "Electronic markets and virtual value chains on the information superhighway," *Sloan Management Review* (36:2), 1995, pp. 62–72.

Bentler, P.M. *EQS structural equations program manual,* Encino, CA, 2005, Multivariate Software (www.mvsoft.com).

Berghel, H. "Identity Theft, Social Security Numbers, and the Web," *Communications of the ACM* (43:2), 2000, pp. 17-21.

Berman, B. *Marketing Channels*, Wiley, New York, 1996.

Bhattacherjee, A. "Individual Trust in Online Firms: Scale Development and Initial Test," *Journal of Management Information Systems* (19:1), 2002, pp. 211-241.

Bhatnagar A. Misra, S., and Rao, H. R. "On risk, convenience, and internet shopping behavior," *Communications of the ACM* (43:11), 2000, pp. 98–105.

Black, N. J., Lockett, A., Ennew, C., Winklhofer, H. and McKechnie, S. "Modelling consumer choice of distribution channels: an illustration from financial services," *International Journal of Bank Marketing* (19:4), 2002, pp. 161–73.

Bollen, K. A. *Structural equations with latent variables*, Wiley, New York, 1989.

Booker, E. "Internet users cruising for info, not purchase," *Computerworld* (29:8), 1995, p. 6.

Boulding, W., and Kirmani, A. "A consumer-side experimental examination of signaling theory: Do consumers perceive warranties as signals of quality?," *Journal of Consumer Research* (20:1), 1993, pp. 111-123.

Boudreau, M., Gefen, D., and Straub, D. W. "Validation in information systems research: A state-of-the-art assessment," *MIS Quarterly* (25:1), 2001, pp.1–16.

Brynjolfsson, E., and Smith, M. "Frictionless commerce: A comparison of Internet and conventional retailers," *Management Science* (46:4), 2000, pp. 563–585.

Burk, R. R. "Technology and the Customer Interface: What Consumers Want in the Pysical and Virtual Store," *Journal of the Academy of Marketing Science* (30:4), 2002, pp. 411-432.

Burroughs, R. E. and Sabherwal, R. "Determinants of Retail Electronic Purchasing: A Multi-period Investigation," *INFOR* (40:1), 2001, pp. 35-56.

Byrne, B.M. *Structural Equation Modeling with EQS: Basic Concepts, Applications, and Programming*, 2nd ed., Lawrence Erlbaum Associates, Inc., Mahwah, NJ, 2006.

Campanelli, M. "Clicks to Bricks," *Entrepreneur* (33:8), 2005, pp. 44-46.

Campbell, D. T., and Fiske, D. W. "Convergent and discriminant validation by the multitrait-multimethod matrix," Psychological Bulletin, (56), pp. 823-840, 1959

Cao, M., Zhang, Q, and Seydel, J. "B2C e-commerce web site quality: an empirical examination," *Industrial Management & Data Systems* (105:5), 2005, pp. 645-661.

Castelfranchi, C., Tan, Y. "The Role of Trust and Deception in Virtual Societies," *International Journal of Electronic Commerce* (6:3), 2002, pp. 16-70.

Chandon, P., Wansink, B., and Laurent, G. "A benefit congruency framework of sales promotion effectiveness," *Journal of Marketing* (64:4), 2000, pp. 65-81.

Chaudhuri, A. and Holbrook, M. B. "The chain effects from brand trust and brand affect to brand performance: The role of brand loyalty," *Journal of Marketing* (652), 2001, pp. 81-93.

Chen, L., Gillenson, M. L., and Sherrell, D. L. "Enticing online consumers: An extended technology acceptance perspective," *Information & Management* (39:8), 2002, pp. 705–719.

Chen, L., Mark L. G., and Daniel L. S. "Enticing online consumers: an extended technology acceptance perspective, *Information & Management* (39:8) 2002, pp. 705-719.

Cheung, G. W., and Rensvold, R. B. "Evaluating Goodness-of-Fit Indexes for Testing Measurement Invariance," *Structural Equation Modeling* (9:2), 2002, pp. 233-255.

Chiang, K., and Dholakia, R. R. "Factors Driving Consumer Intention to Shop Online: An Empirical Investigation," *Journal of Consumer Psychology* (10:1/2), 2003, pp. 177-183.

Chiu, H., Hsieh, Y., and Kao, C. "Website quality and customer's behavioral intention: An exploratory study of the role of information," *Total Quality Management & Business Excellence* (16:2), 2005, pp. 185-197.

Chu, W. Choi, B., and Song, M. R. "The Role of On-line Retailer Brand and Infomediary Reputation in Increasing Consumer Purchase Intention," *International Journal of Electronic Commerce* (9:3), 2005, pp. 115-127.

Cohen, J. *Statistical power analysis for the behavioral sciences*, 2nd ed., Erlbaum, Hillsdale, NJ, 1988.

Coia, A. "Channeling E-tail Resources," *Apparel Magazine* (44:12), 2003, pp. 18-20.

Conklin, J. "Hypertext: An introduction and survey," *Computer Magazine* (20), 1987, pp. 17-41.

Cooper, G. "Research into Cognitive Load Theory and Instructional Design at UNSW," Available at http://www.tadlp.monroe.army.mil/9%20Dec%2005%20VTC/Cognitive%20Load%20Theory%20&%20Instructional%20Design%20at%20UNSW.htm

Cox, D. F., and Rich, S. U. "Perceived risk and consumer decision-making: The case of telephone shopping," *Journal of Marketing Research* (1:4), 1964, pp. 32–39.

Daft, R. L., and Lengel, R. H. "Organizational Information Requirements, Media Richness and Structural Design," *Management Science* (32:5), 1986.

Daft, R. L., and Macintosh, N. B. "A Tentative Exploration into the Amount and Equivocality of Information Processing in Organizational Work Units," *Administrative Science Quarterly* (26) 1981, pp. 207-224.

Davidson, J. "Multi-tasking is fine for computers but bad for people," *Public Management* (78:6), 1996.

D'Ambra, J., Rice, R. E., and O'Connor, M. "Computer-Mediated Communication and Media Preference: An Investigation of the Dimensionality of Perceived Task Equivocality and Media Richness," *Behaviour & Information Technology* (17:3), 1998, pp. 164-174.

de Vries, H. J. *Standardization: A Business Approach to the Role of National Standardization Organizations*, Kluwer Academic Publishers, Boston, 2003, p.155.

DeLone, W. H., and McLean, E. R. "Measuring e-Commerce Success: Applying the DeLone & McLean Information Systems Success Model," *International Journal of Electronic Commerce* (9:1), 2004, pp. 31-47.

Dennis, A. R. "Rethinking Media Richness: Toward a Theory of Media Synchronicity," *Proceedings of the 32nd Hawaii International Conference on System Sciences*, 1999.

Dennis, A. R., Kinney, S. T. "Testing Media Richness Theory in the New Media: The Effects of Cues, Feedback, and Task Equivocality," *Information Systems Research* (9:3), 1998, pp. 256-274.

Devaraj, S., Fan, M., and Kohli, R. "Antecedents of B2C Channel Satisfaction and Preference: Validating e-Commerce Metrics," *Information Systems Research* (13:3), 2002, pp. 316-333.

Dewey, J. How We Think, D. C. Health and Company, Boston, 1910.

Dickinson, A., and Pearce, J. M. "Inhibitory interactions between appetitive and aversive stimuli," *Psychological Bulletin* (84), 1977, pp. 690-711.

Donthu, N., and Garcia, A. "The Internet Shopper," *Journal of Advertising Research* (39:3), 1999, pp. 52-58.

Dowling, G. R., and Staelin, R. "A model of perceived risk and intended risk-handling activity," *Journal of Consumer Research* (21:1), 1994, pp. 119–134.

Drèze, X., and Zufryden, F. "Measurement of Online Visibility and Its Impact on Internet Traffic," *Journal of Interactive Marketing* (18:1), 2004, pp. 20-37.

Emons, W. "Credence goods and fraudulent experts," *RAND Journal of Economics* (28:1), 1997, pp. 107-119.

Etezadi-Amoli, J., and Farhoomand, A. F. "On end-user computing satisfaction," *MIS Quarterly* (15:1), 1991, pp. 1-4.

Figueiredo, J. M. "Finding sustainable profitability in electronic commerce," *Sloan Management Review* (41:4), 2000, pp. 41–52.

Fiore, A. M. Jin, H. and Kim, J. "For fun and profit: Hedonic value from image interactivity and responses toward an online store," *Psychology & Marketing* (22:8), 2005, pp. 669-694.

Ford, G., Smith, D. B., and Swasy, J. L. "An Empirical Test of the Search, Experience and Credence Attributes Framework," in *Advances in Consumer Research* (15), Houston, M. J. (ed.), Association for Consumer Research, Provo, UT, 1988, pp. 239-243.

Fornell, C., and Larcker, D. F. "Evaluating structural equations with unobservable variables and measurement error," *Journal of Marketing Reserch* (18:2), pp.39-50, 1981.

Fram, E. H., and Grady, D. B. "Internet shoppers: Is there a surfer gender gap?," *Direct Marketing* (59:9), 1997, pp. 46-50.

Frey, D. "Recent research on selective exposure to information," in *Advances in Experimental Social Psychology* (19), L. Berkowitz (ed.), Academic Press, New York, 1986, pp. 41–80.

Galbraith, J. R. *Organization Design*, Addison-Wesley Pub. Co., Reading, Mass., 1977. (and Galbraith, J .R. "Organization Design: An Information Processing View," *Interfaces* (4:3), 1974, pp. 28-36.)

Gefen, D., Straub, D., and Boudreau, M. "Structural equation modeling and regression: Guidelines for research practice," *Communications of the Association for Information Systems* (4:August), 2000, pp.1-79.

Gefen, D., Karahanna, E., and Straub, D. W. "Trust and TAM in online shopping: An integrated model," *MIS Quarterly* (27:1), 2003, pp. 51-90.

Goldman, S., Nagel, R., and Preis, K. *Agile Competitors and Virtual Organizations: Strategies for Enriching the Customer*, New York, Van Nostrand Reinhold, 1995.

Greller, M. M. "Evaluation of feedback sources as a function of role and organizational level," *Journal of Applied Psychology* (65), 1980, pp. 24-27.

Grenci, R.T., and Todd, P.A. "Solutions-Driven Marketing," *Communications of the ACM* (45:3), 2002, pp. 65-71.

Grover, V., and Ramanlal, P. "Six Myths of Information and Markets: Information Technology Networks, Electronic Commerce, and the Battle for Consumer Surplus," *MIS Quarterly* (23:4), 1999, pp. 455-485.

Grossman, S. J. "An Introduction to the Theory of Rational Expectations Under Asymmetric Information," Review of Economic Studies (48:154), 1981, pp. 541-559.

Gupta, A., Su, B., and Walter, Z. "An Empirical Study of Consumer Switching from Traditional to Electronic Channels: A Purchase-Decision Process Perspective," *International Journal of Electronic Commerce* (8:3), 2004, pp. 131-161.

Hahn, S. "The Advertising of Credence Goods as a Signal of Product Quality," *Manchester School* (72:1), 2004, pp. 50-59.

Hanser, L. M., and Muchinsky, P. M. "Work as an information environment," *Organizational Behavior and Human Performance* (21), 1978, pp. 47-60.

Harris, R.J. *A primer of multivariate statistics*, 2nd ed., Academic Press, New York, 1985.

Hassanein, K., and Head, M. "The Impact of Infusing Social Presence in the Web Interface: An Investigation Across Product Types," *International Journal of Electronic Commerce* (10:2), 2005, pp. 31-55.

Heijden, H. V. D., Verhagen, T., and Creemers, M. "Understanding Online Purchase Intentions: Contributions from Technology and Trust Perspectives," *European Journal of Information Systems* (12:1), 2003, pp. 41-48.

Heijden, H. V. D., Verhagen, T., and Creemers, M. "Predicting online purchase behavior: Replications and tests of competing models," in *Proceedings of the 34th Hawaii International Conference on System Sciences*," IEEE Computer Society Press, Maui, HI, 2001.

Heijden, H.V.D. "User acceptance of hedonic information systems," *MIS Quarterly* (28:4), 2004, pp. 695-704.

Herold, D. M., Liden, R. C., and Leatherwood, M. L. "Using multiple attributes to assess sources of performance feedback," *Academy of Management Journal* (4), 1987, pp. 826-835.

Herrod, J. "Cognitive Overload," December 2000, Available at http://www.jchconsulting.com/fall2000/index.htm

Herzberg, F., Mausner, B. and Snyderman, B. B. *The Motivation to Work,* John Wiley. New York.

Hoffman, D. L., Novak, T. P. and Peralta, M. "Building Consumer Trust Online," *Communications of the ACM* (42:4), 1999, pp. 80–85.

Hopkinson, P., Sammut, A., and Whitaker, M. "The Standardisation of Environmental Performance Indicators and Their Relationship to Corporate Environmental Reporting: What Can We Learn From the UK Water Industry?," *Journal of Environmental Assessment Policy and Management* (1:3), 1999, pp. 277–296.

Hsieh, Y., Chiu, H., and Chiang, M. "Maintaining a committed online customer: A study across search-experience-credence products," *Journal of Retailing* (81:1), 2005, pp. 75-82.

Hsu, P., Kraemer, K. L., and Dunkle, D. "Determinants of E-Business Use in U.S. Firms," *International Journal of Electronic Commerce* (:4), 2006, pp. 9-45

Hu, L. T., and Bentler, P. M. "Cutoff criteria for fit indices in covariance structure analysis: Conventional criteria versus new alternatives," *Structural Equation Modeling* (6), 1999, pp. 1-55.

Huber, G. P. "The Nature and Design of Post-Industrial Organizations," *Management Science* (30:8), 1984, pp. 928-951.

Huizingh, E. "The content and design of web sites: an empirical study," *Information & Management* (37:3), 2000, pp. 123-134.

Ilfeld, J. S., and Winer, R.S. "Generating Website Traffic," *Journal of Advertising Research* (42:5), 2002, pp. 49-61.

International Council of Shopping Centers, *E-Commerce Report-Multichannel Retailing*, 2000.

Jackson, D. L. "Revisiting Sample Size and Number of Parameter Estimates: Some Support for the N:q Hypothesis," *Structural Equation Modeling* (10:1), 2003, pp. 128-141.

Janssen, M. C. W. and Noll, V. D. R. "Electronic Commerce and Retail Channel Substitution," *Tinbergen Institute Working Paper* (No. 02-042/1), 2002, Available at SSRN: http://ssrn.com/abstract=309679

Jarvenpaa S.L., and Todd P. A. "Consumer reactions to electronic shopping on the World Wide Web," *International Journal of Electronic Commerce* (1:2), 1996, pp.59-88.

Javenpaa, S.L., Tractinsky, N., and Vitale, M. "Consumer Trust in an Internet Store," *Information Technology and Management* (1:1-2), 2000, pp. 45-71.

Jasper, C. R., and Lan, R. P. "Apparel catalog patronage: Demographic, lifestyle and motivational factors," *Psychology and Marketing* (9:4), 1992, pp. 275–296.

Jedd, M. "Returns happen," *Inbound Logistics,* 2000, pp. 22–30.

Jiang, Z., Wang, W., and Benbasat, I. "Online Consumer Decision Support," *Communications of the ACM* (48:9), 2005, pp. 92-98.

Jiang, Z., and Benbasat, I. "The Effects of Presentation Formats and Task Complexity On Online Consumers' Product Understanding," *MIS Quarterly* (31:3), 2007, pp. 475-500

Joanes, D. N., and Gill, C. A. "Comparing measures of sample skewness and kurtosis," *Journal of the Royal Statistical Society (Series D): The Statistician* (47: 1), 1998, pp. 183–189.

Kahai, S. S., and Cooper, R. B. "Exploring the Core Concepts of Media Richness Theory: The Impact of Cue Multiplicity and Feedback Immediacy on Decision Quality," *Journal of Management Information Systems* (20:1), 2003, pp. 263-299.

Kamp, B. "Experience-dependent Information Diffusion and Product Quality," *Economic Inquiry* (36:1), 1998, pp. 161-170.

Keeney, R. L. "The Value of Internet Commerce to the Customer," *Management Science* (45:4), 1999, pp. 533-542.

Kim, Y. J., Kishore, R., and Sanders, G. L. "From DQ to EQ: Understanding Data Quality in the Context of E-Business Systems," *Communications of the ACM* (48:10), 2005, pp. 75-81.

King, N. "Clarification and Evaluation of the Two-Factor Theory of Job Satisfaction," *Psychological Bulletin* (74:1), 1970, pp. 18-31.

King, R. C., Sen, R., and Xia, M. "Impact of Web-based e-Commerce on Channel Strategy in Retailing," *International Journal of Electronic Commerce* (8:3), 2004, pp. 103-130.

Kirmani, A., and Rao, A. R. "No Pain, No Gain: A Critical Review of the Literature on Signaling Unobservable Product Quality," *Journal of Marketing* (64:2), 2000, pp. 66-79.

Kirsh, D. "A Few Thoughts on Cognitive Overload," *Intellectica* (30), 2000, pp. 19-51.

Klatzky, R. L., Lederman, S. J., and Matula, D. E. "Imagined haptic exploration in judgments of object properties," *Journal of Experimental Psychology: Learning, Memory, and Cognition* (17), 1991, pp.314-322.

Klein, L .R. "Evaluating the potential of interactive media through a new lens: search versus experience goods," *Journal of Business Research* (41:3), 1998, pp. 195-203.

Klein, R.B. *Principles and practice of structural equation modeling*, 2nd ed., Guilford, New York, 2005.

Konorski, J. *Integrative activity of the brain,* University of Chicago Press, Chicago, IL, 1967.

Kotkin, J. "The mother of all malls," (Web shopping overview)(Forbes ASAP) (Industry Trend or Event), *Forbes* (161: April 6), 1998, pp. S60-S64.

Koufaris, M. "Applying the Technology Acceptance Model and Flow Theory to Online Consumer Behavior," *Information Systems Research* (13:2), 2002, pp. 205-223.

Koufaris, M., Kambil, A., and LaBarbera, P. A. "Consumer behavior in Web-based commerce: an empirical study," *International Journal of Electronic Commerce* (6:2), 2001, pp. 115–138.

Kovar, S. E., Burke, K. G., and Kovar, B. R. "Consumer Responses to the CPA Web Trust Assurance," *Journal of Information Systems* (14:1), 2000, pp. 17-35.

Lala, V., Arnold, V., Sutton, S. G., and Guan, L. "The impact of relative information quality of e-commerce assurance seals on Internet purchasing behavior," *International Journal of Accounting Information Systems* (3:4), 2002, pp. 237-243.

Lance, C. E., Noble,C. L., and Scullen, S. E. "A critique of the correlated trait-correlated method and correlated uniqueness models for multitrait-multimethod data," *Psychological Methods* (7), 2002, pp. 228-244.

Lavidge, R. J., and Steiner, G. A. "A Model For Predictive Measurement Of Advertising Effectiveness," *Journal of Marketing* (25:4), 1961, pp. 59-62.

Lawrence, P. R., and Lorsch, J. W. "New Managerial Job: The Integrator," *Havard Business Review*(45:6), 1967, pp. 142-151.

Lederer, A. L., Maupin, D. J., Sena, M. P., and Zhuang, Y. "The Technology Acceptance Model and the World Wide Web," *Decision Support Systems* (29:3), 2000, pp. 269-282.

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

Lee, Y. W., Strong, D. M., Kahn, B. K., and Wang, R. Y. "AIMQ: a methodology for information quality assessment," *Information & Management* (40:2), 2002, pp. 133-146.

Leuthesser, L., Kohli, C. S., and Harich, K. R. "Brand equity: the halo effect measure," *European Journal of Marketing* (29:4), 1995, pp. 57-66.

Li, H., Daughty, T., and Biocca, F. "Characteristics of Virtual Experience in Electronic Commerce: A Protocol Analysis," *Journal of Interactive marketing* (15:3), 2001, pp. 13-30.

Li, H., Daughty, T., and Biocca, F. "The Role of Virtual Experience in Consumer Learning," *Journal of Consumer Psychology* (13:4), 2003, pp. 395-407.

Li, H., Kuo, C., and Russell, M.G. "The impact of perceived channel utilities, shopping orientations, and demographics on the consumer's online buying behavior," *Journal of Computer-Mediated Communication* (5:2), 1999.

Li, X., Rong, G., and Thatcher, J.B. "Fostering Purchase Intention: An Empirical Investigation of the Influence of Appearance and Functionality on Consumers' Swift Trust in a Web Vendor," *Journal of Organizational and End-User Computing*, (Forthcoming).

Liang, T., and Huang, J. "An empirical study on consumer acceptance of products in electronic markets: A transaction cost model," *Decision Support Systems* (24:1), 1998, pp. 29–43.

Liang, H., Saraf, Nilesh, Hu, Q, and Xue, Y. "Assimilation of Enterprise Systems: The Effect of Institutional Pressures and The Mediating Role of Top Management," *MIS Quarterly* (31:1), 2007, pp. 59-87.

Lichtenstein, D. R., Burton, S., and Karson, E. J. "The effect of semantic cues on consumer perceptions of reference price ads," Journal of Consumer Research (18:3), pp.380-391.

Liebermann, Y., and Shmuel S. "Perceived risks as barriers to Internet and e-commerce usage," *Qualitative Market Research* (5:4), 2002, pp. 291-300.

Lightner, N. J., and Eastman, C. "User Preference for Product Information in Remote Purchase Environments," *Journal of Electronic Commerce Research* (3:3), 2002, pp. 174-185.

Little, T.D. "Mean and covariance structures (MACS) analyses of cross-cultural data: Practical and theoretical issues," *Multivariate Behavioral Research*, (32), 1997, pp. 53-76.

Liu, C., and Arnett, K.P. "Exploring the factors associated with Web site success in the context of electronic commerce," *Information & Management* (38), 2000, pp. 23-33.

Lohse, G., and Spiller, P. "Internet retail store design: How the user interface influences traffic and sales," *Journal of Commuter-Mediated Communication* (5:2), 1999.

Lokken, S., Hyllegard, K., Damhorst, M. L., Lyons, N., Lakner, H., Bastow-Shoop, H., and Manikowske, L. "Rural Consumers' Attitudes Toward Television and Internet for Information Search and Product Purchase," *Consumer Interests Annual* (46), 2000, p. 215.

Low, G.S., and Lamb, C.W. "The measurement and dimensionality of brand associations," *Journal of Product & Brand Management* (9:6), 2000, pp. 350-370.

182

MacCallum, R. C., Browne, M. W., and Sugawara, H. M. "Power analysis and determination of sample size for covariance structure modeling," *Psychological Methods* (1:2), 1996, pp. 130-149.

Maes, P. "Agents that Reduce Work and Information Overload," *Communications of the ACM* (37:July), 1994, pp. 31-40.

Mahajan, V., Srinivasan, R., Wind, J. "The Dot.com Retail Failures of 2000: Were There Any Winners?," *Journal of the Academy of Marketing Science* (30:4), 2002, pp. 474-486.

Mahmood, M. A., Bagchi, K., and Ford, T. C. "On-line Shopping Behavior: Cross-Country Empirical Research," *International Journal of Electronic Commerce* (9:1), 2004, pp. 9-30.

Maignan, I., and Lukas, B. A. "The nature and social uses of the Internet: A qualitative investigation," *Journal of Consumer Affairs* (31:2), 1997, pp. 346-371.

Malhotra, N.K. "Information Load and Consumer Decision Making," *Journal of Consumer Research* (8:March), 1982.

Marsh, H., Wen, Z.,and Hau, K. "Structural Equation Models of Latent Interactions: Evaluation of Alternative Estimation Strategies and Indicator Construction," *Pschological Methods* (9:3), 2004, pp. 275-300.

Martin, D., and Klecker, P. "Parallel Processing Models of Consumer Information Processing: Their Impact on Consumer Research Methods," Advances in Consumer Research (17:1), 1990, pp. 443-448.

Maslow, A.H. "A Theory of Human Motivation," *Psychological Review* (50), 1943, pp. 370-396. Available at http://psychclassics.yorku.ca/Maslow/motivation.htm

Mathieson, K. "Predicting User Intentions: Comparing the Technology Acceptance Model with the Theory of Planned Behavior," *Information Systems Research* (2:3), 1991, pp. 173-191.

Maxwell, S. E. "Sample size and multiple regression analysis," *Psychological Methods* (5:4), 2000, pp. 434-458.

McCabe, D. B., and Nowlis, S. M. "Information Integration across Online and Offline Shopping Environments and its Effects on Consumers' Purchase Decisions," in Frank Biocca (Ee.), *Proceedings of the Experiential E-commerce Conference*, [CD-ROM], East Lansing, MI, 2001.

McCall, M. W., Jr., and Kaplan, R. E. *Whatever It Takes: Decision Makers at Work*, Englewood Cliffs, NJ: Prentice-Hall, Inc., 1985.

McCorkle, D. E. "The Role of Perceived Risk in Mail Order Catalog Shopping," *Journal of Direct Marketing* (4:Autumn), 1990, pp. 26-35.

McColl-Kennedy, J. R., and Fetter, R. E. Jr. "An empirical examination of the involvement to external search relationship in services marketing," *Journal of Services Marketing* (15:2), 2001, pp. 82–98.

McGuire, S. "Consumers trust Web for drug Info," *Medical Marketing & Media* (42:9), 2007, p. 26.

McKillen, D. "Web Watch," *Medical Marketing & Media* (42:9), 2007, p. 26.

McKinney, V., Kanghyun Y., Zahedi, F. M. "The Measurement of Web-Customer Satisfaction: An Expectation and Disconfirmation Approach," *Information Systems Research* (13:3), 2002, pp. 296-315.

McKnight, D. H., Kacmar, C. J., and Choudhury, V. "Dispositional Trust and Distrust Distinctions in Predicting High-and Low-Risk Internet Expert Advice Site Perceptions," *e-Service Journal* (3:2), 2004, pp. 35-58.

McKnight, D. H., Cummings, L. L. and Chervany, N. L. "Initial Trust Formation in New Organizational Relationships," *Academy of Management Review* (23:3), 1998, pp. 473–490.

McKnight, D.H., Cummings, L.L., Chervany, N.L. "What Trust Means in E-commerce Customer Relationship: An Interdisciplinary Conceptual Typology," *International Journal of Electronic Commerce* (6:2), 2001, pp. 35-39.

Medina, J.F., and Duffy, M.F. "Standardization vs globalization: a new perspective of brand strategies," *Journal of Product & Brand Management* (7:3), 1998.

Meyers-Levy, J., and Tybout, A. M. "Schema congruity as a basis for product evaluation," *Journal of Consumer Research* (16), 1989, pp. 39-54.

Milgrom, P., and Roberts, J. "Price and Advertising Signals of Product Quality," Journal of Political Economy (94:4), 1986, pp. 796-821.

Miller, G.A. "The Magical Number Seven, Plus or Minus Two: Some Limits On Our Capacity For Processing Information," *Psychology Review* (101:2), 1994, pp. 343-352.

Miller, H. "Information quality and market share in electronic commerce," *Journal of Services Marketing* (19:2), 2005, pp. 93-102.

Miller, H. "The multiple dimensions of information quality," *Information Systems Management* (13:2), 1996, p. 79

Molla, A., and Licker, P. S. "E-commerce systems success: An attempt to extend and respecify the DeLone and McLean model of IS success," *Journal of Electronic Commerce Research* (2:4), 2001, pp. 1–11.

Mueller, R. O. "Structural Equation Modeling: Back to the Basics," *Structural Equation Modeling* (4:3), 1997, pp. 353-369.

Neelamegham, R., and Jain, D. "Consumer Choice Process for Experience Goods: An Econometric Model and Analysis," *Journal of Marketing Research* (36:3), 1999, pp. 373-386.

Nelson, P.J. "Information and Consumer Behavior," *Journal of Political Economy* (78:2), 1970, pp. 311-329.

Nelson, P.J. "Advertising as information," *Journal of Political Economy* (82:4), 1974, pp. 729-754.

Nelson, R. R., Todd, P. A., and Wixom, B. H. "Antecedents of Information and System Quality: An Empirical Examination Within the Context of Data Warehousing," *Journal of Management Information Systems* (21:4), 2005, pp. 199-235.

Nelson, M. R., Yaros, R. A., and Keum, H. "Examining the Influence of Telepresence on Spectator and Player Processing of Real and Fictitious Brands in A Computer Game," *Journal of Advertising* (35:4), 2006, pp. 87-99.

Nicolaou, A.I., and McKnight, D.H. "Perceived Information Quality in Data Exchanges: Effects on Risk, Trust, and Intention to Use," *Information Systems Research* (17:4), 2006, pp.332-351.

Nikolaeva, R. "Strategic Determinants of Web Site Traffic in On-Line Retailing," *International Journal of Electronic Commerce* (9:4), 2005, pp. 113-132.

Nöteberg, A., Christiaanse, E., and Wallage, P. "Consumer Trust in Electronic Channels," *e-Service Journal* (2:2), 2003, pp. 46-67.

Nunnally, J. "Psychometric Theory", New York: McGraw-Hill, 1978

O'Brien, J. A., and Marakas, G. M. *Introduction to Information Systems*, 13th ed., McGraw-Hill/Irwin, New York, NY, 2007.

O'Cass, A., and Fenech, T. "Web retailing adoption: exploring the nature of internet users Web retailing behaviour," *Journal of Retailing & Consumer Services* (10:2), 2003, pp. 81-94.

Odom, M. D., Kumar, A., and Sauders, L. "Web Assurance Seals: How and Why They Influence Consumers'Decisions," *Journal of Information Systems* (16:2), 2002, pp. 231-250.

O'Reilly III, C. A. "Variations in Decision Makers' Use of Information Sources: The Impact of Quality and Accessibility of Information," *Academy of Management Journal* (25:4), 1982, pp. 756-771.

Orr, K. "Data Quality and System Theory," *Communications of the ACM* (41:2), 1998, pp. 66-71.

Palmer, J. W. "Web Site Usability, Design, and Performance Metrics," *Information Systems Research*, (13:2), 2002, pp. 151-167.

Palmer, J. W., Bailey, J., and Faraj, S. "The role of intermediaries in the development of trust on the WWW: The use and prominence of trusted third parties and privacy statements," *Journal of Computer-Mediated Communication* (5:3), 2000.

Patwardhan, P., and Ramaprasad, J. "A Rational Integrative Model of Online Consumer Decision Making," *Journal of Interactive Advertising* (6:1), 2005, pp. 3-18.

Pavlou, P. A., and Fygenson, M. "Understanding And Prediction Electronic Commerce Adoption: An Extension of the Theory of Planned Behavior," *MIS Quarterly* (30:1), 2006, pp. 115-143.

Pavlou P.A. "Consumer Acceptance of Electronic Commerce: Integrating Trust and Risk with the Technology Acceptance Model," *International Journal of Electronic Commerce* (7:3), 2003, pp. 101-135.

Pavlou, P. A., and Gefen, D. "Psychological Construct Violation in Online Marketplaces: Antecedents, Consequences, and Moderating Role," *Information Systems Research* (16:4), 2005, pp. 372-399.

Peiperl, M. A., and Baruch,Y. "Models of careers: Back to square zero," *Organizational Dynamics* (35:4), 1997, pp. 7-22.

Pennington, R., Wilcox, H. D., Grover, V. "The Role of System Trust in Business-to-Consumer Transactions," *Journal of Management Information Systems* (20:3), 2003, pp. 197-226.

Peterson, R.A., Albaum, G., and Ridgway, N.M. "Consumers who buy from direct sales companies," *Journal of Retailing* (65:2), 1989, pp. 273–286.

Peterson, R. A., Balasubramanian, S., and Bronnenberg, B. J. ""Exploring the Implications of the Internet for Consumer Marketing," *Journal of the Academy of Marketing Science* (25:4), 1997, pp. 329-346.

Petty, R.E., and Cacioppo, J. T. "Source Factors and the Elaboration Likelihood Model of Persuasion," *Advances in Consumer Research* (11:1), 1984, pp. 668-672.

Podsakoff, P. M., MacKenzie, S.B., Lee, J. Y., and Podsakoff, N. P. "Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies," *Journal of Applied Psychology* (88:5), pp. 879–903, 2003.

Poon, S. "The Nature of Goods and Internet Commerce Benefit: A Preliminary Study," *Proceedings of the 32nd Hawaii International Conference on System Sciences*, 1999.

Putnam, L.L. and Sorenson, R.L. "Equivocal Messages in Organizations," *Human Communication Research* (8), 1982, pp. 114-132.

Ramaswami, S. N., Strader, T. J., and Brett, K. "Determinants of On-Line Channel Use for Purchasing Financial Products," *International Journal of Electronic Commerce* (5:2), 2000, pp. 95-118.

Ratchford, B. T., Talukdar, D., and Myung-Soo L. "A Model of Consumer Choice of the Internet as an Information Source," *International Journal of Electronic Commerce* (5:3), 2001, pp. 7-21.

Reinstein, D. A., and Snyder, C. M. "The Influence Of Expert Reviews On Consumer Demand For Experience Goods: A Case Study Of Movie Critics," *Journal of Industrial Economics* (53:1), 2005, pp. 27-51.

Rice, M. "What makes users revisit a Web site?," *Marketing News* (31:6), 1997, p. 12.

Rogelberg, S. G., Conway, J. M., Sederburg, M. E., Spitzmuller, C., Aziz, S., and Knight, W. E. "Profiling active and passive-non-respondents to an organizational survey," *Journal of Applied Psychology* (88:6), 2003, pp. 1104-1114.

Rogelberg, S. G., and Stanton, J. M. "Introduction Understanding and Dealing With Organizational Survey Nonresponse," *Organizational Research Methods* (10:2), 2007, pp. 195-209.

Rose, G., Khoo, H., and Straub, D. W. "Current Technological Impediments To Business-To-Consumer Electronic Commerce," *Communications of the AIS* (1:16), 1999

Ross, I. "Perceived risk and consumer behavior: a critical review," *Advances in Consumer Research* (2:1), 1975, pp. 1–19.

Rousseau, D. M., Sitkin, S. B., Burt, R. S. and Camerer, C. "Not So Different After All: A Cross-Discipline View of Trust," *Academy of Management Review* (23:3), 1998, pp. 393–404.

Satorra, A., and Bentler, P.M. "A scaled difference chi-square test statistic for moment structure analysis," *Psychometrika* 66(4), pp. 507-514, 2001.

Selvarajan, T. T. "A Cognitive Processing Model for Assessing Ethical Behaviour of Employees," *Journal of American Academy of Business* (9:1), 2006, pp. 86-92.

Settle, R.B., and Alreck, P.L. "Reducing Buyers' Sense of Risk," *Marketing Communications* (14:January), 1989, pp. 34-40.

Shapiro C., and Varian H.R. *Information Rules: A Strategic Guide to the Network Economy*, Harvard Business School Press. Boston, Massachusetts, 1999, p.9.

Sobel, M. E. "Asymptotic intervals for indirect effects in structural equations models," In S. Leinhart (Ed.), *Sociological methodology,* Jossey-Bass, San Francisco, 1982, pp. 290-312.

Sparrow, D. "Get'em to Bite," *Catalog Age* (20:4), 2003, pp. 35-36.

Spence, M. "Signaling in Retrospect and the Informational Structure of Markets," *American Economic Review* (92:3), 2002, pp. 434-459.

Spiller, P., and Lohse, G.L. "A classification of Internet retail store," *International Journal of Electronic Commerce* (2:2), 1997, pp. 29-56.

Steelman, L.A., Levy, P. E., and Snell, A. F. "The Feedback Environment Scale: Construct Definition, Measurement, and Validation," *Educational & Psychological Measurement* (64:1), 2004, pp. 143-164.

Steinfield, C., Bouwman, H., and Adelaar, T. "The Dynamics of Click-and-Mortar Electronic commerce: Opportunity and Management Strategies," *International Journal of Electronic Commerce* (7:1), 2002, pp. 93-119.

Steinfield, C., Adelaar, T., and Liu, F. "Click and Mortar Strategies Viewed from the Web: A Content Analysis of Features Illustrating Integration Between Retailers' Online and Offline Presence," *Electronic Markets* (15:3), 2005, pp. 199-212.

Steuer, J. "Defining Virtual Reality: Dimensions Determining Telepresence," *Journal of Communication* (42:Autumn), 1992, pp. 73- 93.

Stewart, D. W., Frazier, G. L., and Martin, I. "Integrated channel management: Merging the communication and distribution functions of the firm," In *Integrated communication: Synergy of persuasive voices,* E. Thorson & J. More (Eds.), Lawrence Erlbaum Associates, Publishers. Mahwah, NJ, 1996, pp. 185-215.

Straub, D. W. "Validating instruments in MIS research," *MIS Quarterly* (13:2), 1989, pp. 147–169.

Strong, D.M., Lee, Y.W., and Wang, R.Y. "Data Quality in Context," *Communications of the ACM* (40:5), 1997, pp. 103-110.

Struthers, C. W., Eaton, J., Czyznielewski, A., and Dupuis, R. "Judging Up the Corporate Ladder: Understanding the Social Conduct of Workers," *Journal of Applied Social Psychology* (35:6), 2005, pp. 1223-1245.

Suh, B., and Han, I. "The Impact Of Customer Trust And Perception Of Security Control On The Acceptance Of Electronic Commerce," *International Journal of Electronic Commerce* (7:3), 2003, pp. 135-162.

Suh, K., and Lee, Y.E. "The Effects of Virtual Reality on Consumer Learning: An Empirical Investigation," *MIS Quarterly* (29:4), 2005, pp. 673-697.

Sujan, M., and Dekleva, C. "Product categorization and inference making: Some implications for comparative advertising," *Journal of Consumer Research* (14), 1987, pp. 372-378.

Sullivan, J. "What are the functions of corporate home pages?," *Journal of World Business* (34:2), 1999, pp. 193–210.

Swaminathan, V., Lepkowska-White, E., and Rao, B.P. "Browsers or Buyers in Cyberspace? An Investigation of Factors Influencing Electronic Exchange," *Journal of Computer-Mediated Communication* (5:2), 1999.

Sweller, J. "Cognitive load during problem solving : Effects on learning," *Cognitive Science* (12), 1988, pp. 257-285.

Sweller, J. "Cognitive load theory, learning difficulty and instructional design," *Learning and Instruction* (4), 1994, pp. 295-312.

Tabachnick, B.G., and Fidell, L.S. *Using Multivariate Statistics*. 4th ed., Allyn & Bacon, Needham Heights, MA, 2001.

Thorndike, E. L. "A Constant Error on Psychological Rating," *Journal of Applied Psychology* (4), 1920, pp. 25-29. Available at http://en.wikipedia.org/wiki/Halo_effect

Torkzadeh, G., and Dhillon, G. "Measuring Factors that Influence the Success of Internet Commerce," *Information Systems Research* (13:2), 2002, pp. 187-204.

Tsao, H., Pitt, L. F., and Berthon, P. "An experimental study of brand signal quality of products in an asymmetric information environment," *Omega* (34:4), 2006, pp. 397-405.

Tushman, M. L., and Nadler, D. A. "Information Processing as an Integrating Concept in Organization Design," *Academy of Management Review* (3), 1978, pp. 613-624.

Ungson, G. R., Braunstein, D. N., and Hall, P. D. "Managerial information processing: Aresearch review," *Administrative Science Quarterly* (26), 1981, pp. 116-134.

U.S. Census Bureau "Statistical Abstract of the United States: 2006," 125th ed., Washington, D. C., 2006, pp.751-753. Available at http://www.census.gov/statab/www/

Vakratsas, D., and Ambler, T. "How Advertising Works: What Do We Really Know?," Journal of Marketing (63:1), 1999, pp. 26-43

Wang, R.Y., and Strong, D.M. "Beyond Accuracy: What Data Quality Means to Data Consumers," *Journal of Management Information Systems* (12:4), 1996, pp. 5-34.

Weick, K.E. *The social Psychology of organizing*, Addison-Wesley, Reading, Mass, 1979.

Weiss, S. J., Thomas, D. A., and Weissman, R. D. "Combining Operant baseline derived Conditioned Excitors and Inhibitors from the Same and Different Incentive Classes: An Investigation of Appetitive-Aversive Interactions," *Quarterly Journal of Experimental Psychology* (49:4), Section B, 1996, pp. 357-381.

Weitzel, T., Beimborn, D., and Konig, W. "A Unified Economic Model of Standard Diffusion: The Impact of Standardization Cost, Network Effects, and Network Topology," *MIS Quarterly* (30: Special Issue), 2006, pp. 489-514.

Wernerfelt, B. "Selling Formats For Search Goods," *Marketing Science* (13:3), 1994, pp. 298-309.

Wilburn, W.V. "Testing Talcott Parsons' theory of motivation," *Journal of Social Psychology* (80:2), 1970, pp. 239-240.

Wintrob, S. "Cyberspace consumers still just looking, not buying," *Computing Canada* (21:8), 1995, p. 34.

Wixom, B. H., Watson, H. J. "An Empirical Investigation Of The Factors Affecting Data Warehousing Success," *MIS Quarterly* (25:1), 2001, pp. 17-41.

Wood, S.L. "Remote Purchase Environments: The Influence of Return Policy Leniency on Two-Stage Decision Processes," *Journal of Marketing Research* (38), 2001, pp. 157-169.

Wright, A. A., and Lynch, J. G. Jr., "Communication effects of advertising versus direct experience when both search and experience attributes are present," *Journal of Consumer Research* (21:4), 1995, pp. 708-718.

Xu, H., and Koronios, A. "Understanding Information Quality In E-Business," *Journal of Computer Information Systems* (45:2), 2004, pp. 73-82.

Yadav, M.S., and Varadarajan, R. "Interactivity in the Electronic Marketplace: An Exposition of the Concept and Implications for Research," *Journal of the Academy of Marketing Science* (33:4), 2005, pp. 585-603.

Yoh, E., Damhorst, M. L., Sapp, S., and Laczniak, R. "Consumer Adoption of the Internet: The Case of Apparel Shopping," *Psychology & Marketing* (20:12), 2003, pp. 1095-1118.

Zmud, R.W. "An Empirical Investigation of the Dimensionality of the Concept of Information," *Decision Sciences* (9:2), 1978, pp. 187-195.