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Consumer Participation in Using Online Product Recommendation Agents: Effects of Trust, PerceivedControl, and Perceived Risk in Providing Personal Information

Xiaojing Sheng
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To the Graduate Council:

I am submitting herewith a dissertation written by Xiaojing Sheng entitled "Consumer Participation in Using Online Product Recommendation Agents: Effects of Trust, PerceivedControl, and Perceived Risk in Providing Personal Information." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Business Administration.

Pratibha A. Dabholkar, Major Professor

We have read this dissertation and recommend its acceptance:

Daniel J. Flint, Funda Sahin, Michael A. Olson

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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ABSTRACT

Online product recommendation agents are gaining greater strategic importance as an innovative technology to deliver value-added services to consumers. Yet the active role of consumers as the participants in using this technology is not well understood. This dissertation builds on the technology-based self-service (TBSS) literature, consumer participation literature, the service-dominant logic, and the trust literature on recommendation agents to develop a research framework that explains the role of consumer participation in using online product recommendation agents.

The objective of this dissertation is three-fold: (1) to examine the effects of consumer participation and privacy/security disclosures in using online product recommendation agents, (2) to explore the mediating effects of trust, perceived control, and perceived risk in providing personal information, and (3) to test the trust transference process within the current research context.

A field experiment using existing recommendation agents was conducted with multiple sessions in computer labs to collect data from university students, a representative sample of the online population. 67 undergraduate students participated in the pretest, and 117 participated in the main study. Structural equation modeling with AMOS 7.0 was used to test the research hypotheses.

The results showed that consumer participation was a contributing factor in building consumers' trust in recommendation agents and that privacy/security disclosures decreased consumers' perceived risk in providing personal information. Moreover, the trust

transference process was validated among the three different types of consumer trust within the agent-mediated environment, that is, trust in the recommendation agent, trust in the Web site, and trust in recommendations. Finally, perceived control was shown to be a salient factor in increasing consumers' trust and motivating consumers to reuse the recommendation technology.

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CHAPTER 1

INTRODUCTION

Information and communication technologies have enabled firms to increasingly engage consumers in the processes of producing and delivering goods and services. In fact, researchers have long argued for the critical role of technology as a means through which firms interact with consumers, manage relationships with consumers, and retain consumers. This aspect has been well investigated by research within the technology-based self-service (or TBSS) context (Dabholkar 1990, 1992, 1994a, 1994b, 1996, 2000; Bobbitt and Dabholkar 2001; Dabholkar and Bagozzi 2002; Dabholkar, Bobbitt, and Lee 2003; Dolen and Dabholkar 2005; Dolen, Dabholkar, and Ruyter 2007), also referred to as self-service technologies (or SSTs) (Meuter 1999; Bitner, Brown, and Meuter 2000; Bitner, Ostrom, and Meuter 2002; Meuter, Ostrom, Roundtree, and Bitner 2000; Meuter, Ostrom, Bitner, and Roundtree 2003; Meuter, Bitner, Ostrom, and Brown 2005). Consistent with TBSS research, the emergent service-dominant logic (Vargo and Lusch 2004; Lusch and Vargo 2006) also emphasizes the active role of consumers as the co-creator of value. As many researchers point out, technology and process innovations have empowered firm-customer collaboration and interaction to take place to a greater extent and depth (e.g., Flint 2006; Payne, Storbacka, and Frow 2008). At the same time, matching customers' requirements and co-creating goods and services through firm-customer interaction also present great potential for firms to broaden differentiation opportunities and gain profitability (e.g., Prahalad and Ramaswamy 2000, 2004).

Online product recommendation agents (hereafter recommendation agents) are gaining greater strategic importance as an example of today's innovative technologies that deliver value-added services to consumers. Recommendation agents have been variously referred to as shopbots, shopping agents, or recommender systems; but in essence, they are based on software technology that is designed to understand consumers' interests and/or preferences for products by explicitly or implicitly eliciting inputs from individual consumers and make recommendations accordingly (e.g., Maes 1999; Xiao and Benbasat 2007). Recommendation agents aim to improve consumers' information search as well as decision making processes (e.g., Grenci and Todd 2002; Maes, Guttman, and Moukas 1999). Similar to sales people who consumers can talk to in brick-and-mortar stores, recommendation agents on Web sites intend to facilitate personalized, two-way dialogues between marketers and individual consumers through providing assistance and guidance. Thus, recommendation agents are becoming a critical touch point between a firm and its consumers.

Indeed, recommendation agent technology extends the traditional interactive marketing being carried out by salespeople and at local general stores into the online environment. Consumers seek advice from recommendation agents, an "impersonal" source providing information on the Internet, rather than from personal advocates like sales clerks. As West et al. (1999) describe, recommendation agents could perform different roles like a tutor, a clerk, an advisor, and sometimes even a banker in their interactions with consumers. Among all possible advantages offered by recommendation agent technology to marketers, the capacity

to provide consumers an interactive, flexible, and personalized relationship is probably one of the most important (Senecal and Nantel 2004). Given this, recommendation agents in fact provide a dynamic platform where consumers and firms both actively participate in the process of value co-creation. Moreover, recommendation agents also present much potential for firms to learn and generate knowledge about their customers through asking well-formed questions (e.g., Ariely, Lynch, and Aparicio 2004). As O'Reilly (2005) writes, a defining feature of today's online culture is to trust users as co-developers, to harness the collective intelligence, and to deliver richer user experiences.

Furthermore, the role of recommendation agents in consumers' online shopping experiences is becoming even more evident and important with the fact that more and more consumers complain about experiencing "Internet fatigue," a state in which Internet users feel overwhelmed by the amount of information found online (Pew/Internet 2008). On one hand, consumers enjoy the convenience and large product assortments offered by today's online shopping environment. However, on the other hand, complexity and the enormous amount of information also challenge consumers' limited information processing capacities (e.g., Dabholkar 2006; West et al. 1999). Consequently, marketers are increasingly devoting huge financial investments into making recommendation agents available to consumers through their websites. According to the Economist (Economist Report 2005), in 2005 eBay spent $620 million in buying Shopping.com, a pioneer in recommendation agent technology and leading provider of comparison shopping services on the Internet. Olay recently launched a personalized, product recommendation program, Olay for You, on its Web site to

assist consumers' purchase decisions. These examples all indicate that marketers have begun to realize the critical role of recommendation agent technology. Moreover, with the rapid growth in online retailing, which is projected to account for 13% of the total retail sales in 2010 (Forrester Research Report 2004), recommendation agents are expected to be a differentiator that enables marketers to attract new customers and more importantly, to retain existing customers.

Literature on Recommendation Agents

Existing research has offered many insights into the study of recommendation agents: whereas some studies have shown that using recommendation agents could help consumers reduce cognitive effort, improve decision quality, and decrease information overload (e.g., Häubl and Trifts 2000; Todd and Benbasat 1992, 2000), others explored the issue of the types of computer algorithms that make effective recommendations (e.g., Ansari, Essegaier, and Kohli 2000). Still others maintain that recommendation agents present much potential for marketers to learn and generate knowledge about their consumers (e.g., Ariely, Lynch, and Aparicio 2004). But broadly speaking, the extant literature on recommendation agents reveals two major research foci: one is on the effectiveness of computer algorithms that underlie the recommendations, and the other is on the effect of use of recommendation agents in facilitating consumer decision making process.

The effectiveness of different types of computer algorithms is one major focus of research on recommendation agents (e.g., Ansari, Essegaier, and Kohli 2000; Ariely, Lynch, and Aparicio 2004). For instance, Ansari, Essegaier, and Kohli (2000) examined the merits

as well as the limitations of both content filtering and collaborative filtering algorithms in making recommendations. Collaborative filtering methods predict an individual's preferences based on other "like-minded" people's preferences, mimicking word-of-mouth recommendations. Content filtering methods make recommendations on the basis of an individual's preferences for product attributes. The authors proposed a Bayesian preference model that integrates different types of information such as an individual's expressed preferences, other consumers' preferences, and experts' evaluations. In addition, the proposed model also accounts for consumer as well as product heterogeneity. However, the authors also pointed out that these algorithms will not be effective if consumers do not provide information to the agents.

Ariely, Lynch, and Aparicio (2004) employed simulations to examine the learning functions of collaborative filtering based, as well as content filtering based, recommendation agents. The authors suggest that both types of agents have their advantages and disadvantages due to different learning properties and that the selection between these two needs to consider factors like consumer characteristics and product attributes. Similar to what Ansari, Essegaier, and Kohli (2000) had argued, the authors also indicated that the inherent problem of motivating consumers to use recommendation agents presents an issue that might hinder the learning effectiveness of these agents. After all, agents' learning of consumers, and thus their ability to make precise and useful recommendations depend on the amount and the quality of information that consumers provide.

Other researchers, however, advocate the implementation of the hybrid method that

combines content filtering and collaborative filtering given that neither of these two methods dominates the other (e.g., Balabanovic and Shoham 1997; Mobasher, Cooley, and Srivastava 2000). Balabanovic and Shoham (1997) empirically demonstrated that the hybrid content-based/ collaborative Web-page system improved recommendation performance in Stanford University's digital library by incorporating the merits of both methods.

The issue of how the use of recommendation agents affects consumers' search behavior and decision making processes also has received extensive research. Findings from this research stream suggest that consumers benefit from using the agents by improving decision quality, reducing search effort, and minimizing information overload. For instance, Todd and Benbasat (1992, 2000) conducted a series of experiments and compared users' decision making strategies under the condition of using or without using computer decision aids. The authors found that users gave more weight on saving cognitive efforts than on improving decision accuracy. They further concluded that users utilized decision aids in such a way as to reduce their cognitive efforts.

Researchers also suggest that recommendation agents can help consumers improve decision quality and minimize information overload. For example, using two types of interactive decision aids, i.e. a recommendation agent and a comparison matrix, Häubl and Trifts (2000) found the use of both decision aids reduced users' search efforts, decreased the size of consideration sets, and improved the quality of their purchase decisions; whereas the recommendation agent is a decision aid that assists the initial screening of product alternatives, the comparison matrix is one that facilitates the in-depth product comparisons.

Hostler, Yoon, and Grimaraes (2004) reached similar conclusions. That is, Internet agents enhanced end users' performance by saving time in product searching and selecting and by making purchase decisions of better quality.

Finally, Punj and Moore (2007) studied the differential impact of using smart versus knowledgeable agents on consumers' information search behavior and their satisfaction about the search process. According to the authors, whereas a knowledgeable agent only screens and filters product alternatives to find a match that satisfies consumers' requirements, a smart agent goes one step further by providing feedback to consumers if no match is found. The researchers found that consumers conducted fewer iterations of product search and were more satisfied with the search process when they used smart agents in comparison to knowledgeable agents.

Research Gaps in Extant Literature on Recommendation Agents

Existing research into recommendation agents has offered many interesting insights. However, the literature review as shown above reveals several research gaps. First, there is a lack of research that examines the active role of consumer participation in using recommendation agents. The role of consumers in previous research is only limited to being a passive receiver of recommendation agent technology. But in fact, consumers are also actively participating in using this technology. This is an important issue that warrants further research for two reasons: consumer participation has long been a topic of interest to services marketing researchers (e.g., Bateson 1985; Lovelock and Young 1979), and is an intrinsic part of the TBSS and SST literature stream cited earlier. Therefore, it would be

important to examine whether the effects of consumer participation found in other research contexts can be extended to the context of using recommendation agents. This has become a salient issue to both consumers and firms, especially given the increasing importance of recommendation agents as an innovative technology to deliver value-added services to consumers and to improve firms' profitability. Furthermore, as the view that consumers actively participate in the process of producing and delivering goods/services and thus are always co-producers of value has been gaining wider acceptance as part of the emergent service-dominant logic in the marketing field, a consumer-centric perspective needs to be taken to reexamine the phenomenon of consumer use of recommendation agents.

Second, previous research on recommendation agents has not taken into consideration the broader, technological environment in which recommendation agents are operating, i.e., the Web sites. Instead, past work only centers on examining recommendation agents solely. In fact, consumers are interacting with the Web site that hosts a recommendation agent while using the agent. For example, shopping.com has recommendation agent technology available to consumers. But if consumers are not aware of the agent or do not know how to use it, they can still browse the Web site and obtain any information they need, suggesting that the agent is a separate entity from its Web site. Thus, there is a missing piece in the so-called recommendation agent-mediated e-commerce environment (Komiak and Benbasat 2004). As Komiak and Benbasat (2004) describe, an agent-mediated e-commerce environment consists of not only the recommendation agent but also the Web site and information provided by the agent such as information about a product and information about a company.

Therefore, only through situating recommendation agents in their hosting Web sites can a fuller picture of the realistic situation of consumer using recommendation agents be presented. Evidently, this holistic view points to the need of research that examines both recommendation agents and their hosting Web sites on the Internet.

Third, although previous research has begun to examine the role of trust, the referent of trust only focused on recommendation agents. As indicated by the above discussion, recommendation agents are only one element of the agent-mediated e-commerce environment. In addition to the recommendation agent, the Web site that hosts the agent and recommendations provided by the agent all will have some influence on consumers' perceptions and evaluations of their experiences within such an agent-mediated e-commerce environment. Given this background, more research is needed to examine the other two important trust referents, that is, the Web sites that host recommendation agents and recommendations that are provided by recommendation agents.

Finally, as evidenced by the literature review, outcome variables of past work on recommendation agents primarily center on indicators of consumer decision quality such as the size of consideration set and the level of confidence in the choice. Much less is known about critical issues such as consumers' actual or intended usage of recommendation agents and whether consumers will indeed follow up with the recommendations and make the purchase accordingly. Without substantiating the linkage between offering recommendation agents and consumers' increased usage as well as purchase behaviors, marketers might suffer from financial losses resulted from their investments.

Research Purpose and Questions

The objective of this dissertation is to investigate the above discussed research issues that are of direct, practical relevance and importance to both marketers as well as consumers but have been neglected in the extant literature on recommendation agents. Specifically, this dissertation intends to answer the following research questions: Do consumer participation and privacy/security disclosures increase consumer trust when using recommendation agents? Do perceived control and perceived risk mediate these effects? Is there any difference between trust in a recommendation agent, trust in the website that hosts the recommendation agent, and trust in the recommendations provided by the agent? If so, what is the relationship between them? Do privacy/security disclosures reduce consumer perceived risk in providing personal information to recommendation agents? What are the consequences of consumer participation and privacy/security disclosures in using recommendation agents? By answering these questions, this researcher hopes to bridge these gaps by drawing upon the TBSS literature, the consumer participation literature, and the service-dominant logic as the theoretical grounding and by extending as well as contributing to the existing literature on recommendation agents.

CHAPTER 2

THEORETICAL FOUNDATION AND CONCEPTUAL FRAMEWORK

In order to develop the conceptual framework for this dissertation, a review of relevant research is presented below. First, past research that tied together customer participation and TBSS is reviewed. Next, the link between trust and recommendation agents is examined. Finally, insights from the extant literature on consumer participation will be reviewed and brought into the context of using recommendation agents. These three literature bases form the theoretical foundation for this dissertation.

TBSS Literature

The TBSS literature has offered many insights into the outcomes of customer participation in technology-based self-service as well as the motivating factors that drive consumers to participate in such options (e.g., Dabholkar 1990, 1991, 1996). In terms of outcomes, Dabholkar (1990) proposed that for people who are familiar with a service *or* for services that require a low level of expertise, customer participation in service delivery would increase perceptions of control and reduce perceptions of waiting time. Also, in terms of motivating factors, Dabholkar (1991, 1996) examined how customer participation in technology-based self-service leads to service quality through empirically testing two alternative models, i.e., an attribute model and an overall affect model. The attribute model is based on a cognitive approach to decision making, where consumers form expectations of service quality on the basis of their evaluations of the attributes associated with a technology-based self-service option. The overall affect model builds on an approach where

consumers' predispositions such as attitude toward technology products in general and need for interaction with employees influence the expected service quality. Although both models were supported, the attribute model was found to be superior to the overall affect model. The author also found that among various attributes, i.e., speed, reliability, ease of use, consumer evaluations of enjoyment and control were the two most influential predictors of service quality when customers participate in technology-based self-service.

Dabholkar (1994) presented a schematic framework that classifies technology-based service delivery options based on three dimensions, i.e., who delivers the service and where as well as how the service is delivered. The framework highlights the need for further research that extends the study of customer participation to the use of technology in self service situations. Along this line, Dabholkar (2000) discussed the importance of technology in service delivery and the impact of technology-based service delivery options on both the customers and the marketers. The author further emphasized the need for marketers to understand what customers really want, whether it is perceived control or fun, from participating in technology-based service delivery.

This line of research has been successfully extended to other technology-based self-service contexts such as online banking (e.g., Shamdasani, Mukherjee, and Malhotra 2008), Internet travel Web sites and book stores (e.g. Yen 2005), and hand-held self-scanners in retail stores (e.g., Dabholkar, Bobbitt, and Lee 2003; Weijters, Rangarajan, Falk, and Schillewaert 2007). These studies have uncovered different technology attributes that motivate consumers to participate in self-service based on technology. For instance, Yen

(2005) found that efficiency, ease of use, performance, perceived control, and convenience are the determining attributes for consumers' satisfaction with a travel Web site and an Internet book store. Shamdasani, Mukherjee, and Malhotra (2008) found that speed of service, reliability, enjoyment, and control positively impact consumers' perceived service quality of the Internet banking option. Weijters, Rangarajan, Falk, and Schillewaert (2007) determined that usefulness, ease of use, reliability, and fun had positive effects on consumer attitude toward using hand-held self-scanners in offline retail stores. Although findings from these studies differ in the details, they tend to focus mostly on the underlying motivations for consumer participation in technology-based self-service options.

As previously explained, recommendation agents are one type of software technology. Therefore, it is a natural extension to utilize TBSS research as a theoretical foundation to examine consumer use of recommendation agents. Specifically, rather than examining the underlying motivators for consumer participation, this dissertation will extend the TBSS literature by directly investigating the behavior of participating in using a technology to produce and deliver services.

Literature on Trust in Recommendation Agents

Trust is a key element in today's e-commerce environment. This is especially true for using recommendation agents, as consumers who seek advice from agents to make their purchase decisions may wonder whether these agents truly represent their benefits rather than the vendors'. In spite of its critical importance, past research on recommendation agents has paid little attention to studying the role of trust, but researchers have now started

examining this issue.

Wang and Benbasat (2005) integrated trust into the Technology Acceptance Model and explored the relationships between trust, perceived ease of use, perceived usefulness, and adoption intentions. The authors found that perceived ease of use of a recommendation agent positively affected consumer trust in that agent which in turn, had positive effects on perceived usefulness of the agent and intention to adopt the agent. Komiak and Benbasat (2006) studied how cognitive trust and emotional trust in a recommendation agent mediated the effects of perceived personalization and familiarity on an individual's intention to adopt the agent either as a decision aid or as a delegated agent. Evidence from their study suggested that perceived personalization and familiarity both increased consumers' intentions to adopt by increasing cognitive trust and emotional trust. Further, the authors also found that emotional trust in a recommendation agent fully mediated the impact of cognitive trust on consumer intention to adopt the agent as a delegated agent, while it partially mediated the effect of cognitive trust on intention to adopt the agent as a decision aid. Wang and Benbasat (2007) examined the influence of providing how, why, and trade-off explanations on building knowledge-based trust in recommendation agents. Findings from their study revealed that whereas "how" explanations increased consumers' beliefs in a recommendation agent's competence, "why" and "trade-off" explanations strengthened their beliefs in the agent's benevolence and integrity respectively.

This research stream shed important light on consumer trust in recommendation agents; it also points to directions for further research on the trust issue. Specifically, there is a need

to broaden the scope of trust referents when examining the role of trust within a recommendation agent-mediated e-commerce environment. As previously discussed, a recommendation agent-mediated e-commerce environment consists of not only the recommendation agent but also the Web site and information provided by the agent such as information about a product and information about a company. However, the above reviewed studies indicate that the trust referent has been solely focused on recommendation agents. Therefore, this dissertation will build on the existing research on trust and further extend it to include Web sites that host recommendation agents and recommendations provided by recommendation agents as the other two important trust referents besides the recommendation agent itself. This dissertation will also extend the trust transference process that has received empirical support from buyer-seller relationships context to the recommendation agent-mediated ecommerce environment to understand the relationships between trust with different referents as before described. The above review also demonstrates that past work only examined intentions to adopt recommendation agents as the outcome variable of trust. Given this, this dissertation will explore other important outcome variables, i.e., intentions to reuse a recommendation agent, to return to a Web site, and to purchase based on recommendations, to contribute to the extant literature on recommendation agents.

Literature on Consumer Participation

The concept that consumers co-produce value with firms has become the icon of the emergent service-dominant logic in marketing thought and a focus of recent literature on

consumer-firm relationships (e.g., Prahalad and Ramaswamy 2004; Vargo and Lusch 2004). In most cases, the literature centers on the merits of increasing the extent of active consumer involvement in service production and delivery. As Bendapudi and Leone (2003) point out, co-production could become the next frontier in competitive effectiveness for firms who recognize the importance of encouraging consumers to actively participate in producing goods and services.

In fact, the idea of co-production can be traced back to that of consumer participation which has long been a focus of research interest in services marketing (e.g., Bateson 1985; Dabholkar 1990; Lovelock and Young 1979). Broadly speaking, past research in consumer participation reveals three research streams. One stream focuses on the economic benefits that firms can obtain from cost reductions and increased productivity as a result of consumer participation (e.g., Bowers, Martin, and Luker 1990; Lovelock and Young 1979; Mills, Chase, and Margulies 1983). Another research stream centers on the issue of how consumer participation affects consumer satisfaction and evaluation of services quality as well as co-production experiences. For instance, Cermak, File, and Prince (1994) studied the effect of participation on consumers' satisfaction with their service providers, i.e., a nonprofit organization and a legal/financial consulting firm. Bendapudi and Leone (2003) explored the impact of consumer participation on consumer satisfaction from a psychological response perspective based on the self-serving bias theory. These researchers extended the traditional research domain where consumers participate in producing and delivering services to consumer experience in co-producing goods.

A third research stream in consumer participation examines the strategies of managing consumer participation and explores the different roles that consumers could play in participating in producing and delivering services. For example, Kelly, Donnelley, and Skinner (1990; Kelly, Skinner, and Donnelley 1992) argued that customers should be treated as "partial employees" in managing their participatory encounters with firms. Bitner, Faranda, Hubbert, and Zeithaml (1997) classified customers' roles in service experiences into three major types, i.e., the customer as productive resource, the customer as contributor to quality, satisfaction and value, and the customer as competitor to the service organization.

Although addressing the same phenomenon from different angles, all three research streams converge to one common theme that consumer participation has much potential to benefit both firms and their consumers. Previous research primarily focused on understanding the role of consumer participation within the traditional, offline products and services co-production context. It has been noted that the Internet and World Wide Web are transforming the role of the consumer "from isolated to connected, from unaware to informed, from passive to active" (Prahalad and Ramaswamy 2004, p. 2). The pervasiveness of the Internet and the Web has greatly facilitated consumer participation in the online environment. However, "none of this research considers the roles of customers in electronic service delivery" (Blazevic and Lievens 2008, p. 2).

Given this background, recommendation agents provide a relevant research context to examine whether effects of consumer participation found in an offline context can be extended to the online context. Specifically, building upon the extant literature on consumer

participation, this dissertation will extend previous research findings into the context of using recommendation agents by empirically testing the link between consumer participation and trust as well as that between consumer participation and perceived control. Both links have received empirical support from the offline context.

Conceptual Framework

Based on relevant research in TBSS literature, literature on recommendation agents, and literature on consumer participation, a conceptual model is developed and presented in Figure 2.1. As depicted by Figure 2.1, the model describes the processes of how consumer participation and privacy/security disclosures influence consumers' behavioral intentions through the mediating effects of trust, perceived control, and perceived risk.

Specifically, the level of consumer participation enabled by a recommendation agent and privacy/security disclosures on the hosting Web site of a recommendation agent are proposed as the antecedents. Mediating variables include perceived control, trust in the hosting Web site of a recommendation agent, trust in a recommendation agent, trust in recommendations provided by a recommendation agent, and perceived risk in providing personal information. Intentions to reuse the recommendation agent, to return to the Web site, and to purchase based on the recommendations provided by the agent are the outcome variables. The reason for choosing the variables as described above and the definition for each variable are discussed below.

Antecedents: Level of Consumer Participation; Privacy/Security Disclosures

1. Level of Consumer Participation

Consumer participation is an intrinsic part of the TBSS literature (Dabholkar 1990, 1991, 1994, 1996, and 2000) and has attracted a great deal of attention from researchers in services marketing (e.g., Bateson 1985; Lovelock and Young 1979). The service-dominant logic also strongly endorses the view that consumers are always co-producers of value and active participants in producing and delivering goods and services. However, in the extant literature on recommendation agents, consumer participation has been largely ignored. This oversight is also reflected by a recent call for studying the roles of customers in electronic service delivery from a co-production perspective (Blazevic and Lievens 2008). As recommendation agent technology is increasingly gaining greater importance as a means to delivery services to consumers on the Internet, the need to understand the role of consumer participation in using recommendation agents is further underscored.

Customer participation has been defined as "the degree to which the customer is involved in producing and delivering the service" (Dabholkar 1990, p. 484). Similarly, Cermak, File, and Prince (1994) referred customer participation as the behaviors related to specifying and delivering a service. In a review article, John and Biswas (2006) also agreed that customer participation is a behavioral concept. The authors further argued that customer participation includes "any interaction with the human or non-human components of the service system" (John and Biswas 2006, p. 49).

Given the above discussion, consumer participation in using a recommendation agent

should include any interaction between an individual consumer and an agent through the consumer's input of time, effort, and information. In this study, the level of consumer participation enabled by a recommendation agent is defined as the amount of consumer input in the form of time, effort, work, and information in using a recommendation agent. Whereas some recommendation agents like MyProductAdvisor (www.myproductadvisor.com) offer much room for consumer participation through enabling interactive conversations with consumers, others like BookMatcher (www.amazon.com) provide little room for consumer participation.

2. Privacy/Security Disclosures

Privacy/security is a salient factor of concern for Internet users. According to Bart, Shankar, Sultan, and Urban (2005), privacy refers to "the protection of individually identifiable information on the Internet" (p. 135), whereas security indicates "the safety of the computer and credit card or financial information" (p. 135). Previous studies have established the strong positive link between privacy/security protection and trust in Web sites (e.g., Bart, Shankar, Sultan, and Urban 2005; Hoffman, Novak, and Peralta 1999; Schlosser, White, and Lloyd 2005; Wang, Beatty, and Foxx 2004). Researchers also maintain that privacy/security concerns are the key barriers that prevent consumers from engaging in monetary transactions and disclosing personal information on the Internet (e.g., Liu, Marchewka, Lu, and Yu 2005; Milne and Culnan 2004; Miyazaki and Fernandez 2001). However, none of the past research in recommendation agents examined the privacy/security issue. This lack of consideration is surprising, given the fact that recommendation agents are

usually embedded within and running through Internet Web sites.

Therefore, it is necessary to investigate whether the privacy/security issue affects consumer use of recommendation agents on Web sites. In this study, privacy/security disclosures on a Web site are used to conceptualize the privacy/security issue. It is a common practice for Web sites to address the privacy/security issue by disclosing their privacy/security protection policies. Research has shown that most Web sites contain some type of privacy/security statement (e.g., Adkinson, Eisenach, and Lenard 2002). In this study, privacy disclosures refer to a Web site's statement that describes why consumer data are collected, how those collected data will be used, and how the data will be stored to protect consumer privacy. Security disclosures on a Web site explain how transaction data such as credit card information and personal information are encrypted during the data transmission and what type of technology is utilized to ensure the security of information.

Mediators: Trust, Perceived Control, and Perceived Risk

3. Trust in a Recommendation Agent; Trust in the Hosting Web Site of a Recommendation Agent; Trust in Recommendations Provided by a Recommendation Agent

Trust is the key to the success of e-commerce and needs to be placed in the center of the Internet strategy (e.g., Reichheld and Schefter 2000; Urban, Sultan, and Qualls 2000). As Hoffman, Novak, and Peralta explain, "the reason more people have yet to shop online or even provide information to Web providers in exchange for access to information, is the fundamental lack of faith between most businesses and consumers on the Web today" (Hoffman, Novak, and Peralta 1999, p. 80). According to Macklin (2006), every breach of

trust occurring online has a detrimental effect to the entire online sector.

Trust is also a salient factor of concern when using recommendation agents on the Internet, given the inherent uncertainty involved in the online environment in general and in recommendation agents specifically. Although existing research in recommendation agents that has studied the issue of trust focused on recommendation agents as the only trust referent, it offers insights into how trust is conceptualized. A review of the definitions of trust in recommendation agents is presented below.

Wang and Benbasat (2005) defined trust in a recommendation agent as an individual's beliefs in an agent's competence, benevolence, and integrity. Komiak and Benbasat (2006) conceptualized trust in a recommendation agent as comprised of an individual's emotional trust in an agent and cognitive trust in an agent's competence as well as integrity. In a recent study, Wang and Benbasat (2007) write that knowledge-based trust occurs when an individual has enough information to understand a recommendation agent and to use it properly. In essence, knowledge-based trust still builds on a combination of beliefs in a recommendation agent's competence, integrity, and benevolence.

In fact, trust in recommendation agents as defined in the above described studies extends the concept of interpersonal trust that has been extensively examined in relationship marketing (e.g., Doney and Cannon 1997; Dwyer, Schurr, and Oh 1987; Ganesan 1994; Morgan and Hunt 1994) and organizational settings (e.g., Mayer, Davis, and Schoorman 1995; McAllister 1995) to the context of person-to-recommendation agent relationship. Interpersonal trust has been conceptualized as a construct that involves a cognitive and an

affective element in the literature (e.g., Dabholkar, van Dolen, and Ruyter 2009; McAllister 1995; Swan, Trawick, Rind, and Roberts 1988; Swan, Bowers, and Richardson 1999). However, conceptualizing trust as cognitive beliefs has dominated research that studies trust within the context of information technology in general (e.g., Gefen, Karahanna, and Straub 2003; McKnight, Choudhury, and Kacmar 2002a, 2002b) and recommendation agents in specific (e.g., Wang and Benbasat 2005, 2007). As Gefen, Karahanna, and Straub (2003) write, affective trust is more relevant in interpersonal relationships and less so in person-to-technology interactions. Given this background, trust in this dissertation is defined as the beliefs that reflect the trustworthiness of a trust referent which might be a recommendation agent, the Web site that hosts an agent, or the recommendations provided by an agent. Trust in a recommendation agent involves certain beliefs that indicate an individual consumer's expectations that the recommendation agent will be capable of performing the required functions and that the consumer's interests will not be exploited by the agent. Along this line, the conceptualization of trust in recommendation agents is applied to trust in Web sites that host recommendation agents and trust in recommendations provided by recommendation agents.

4. Perceived Control over Using a Recommendation Agent

Control has been well recognized as a human driving force and is defined as an individual's need to demonstrate the competence, superiority, and mastery that the individual has over the environment (White 1959). Averill (1973) distinguished among three types of control, i.e., behavioral control, cognitive control, and decisional control. Whereas

behavioral control refers to “direct action on the environment” (p. 286), cognitive control is “the way in which an event is interpreted, appraised, or incorporated into a cognitive ‘plan’” (p. 287). Finally, decisional control indicates “the opportunity to choose among various courses of action” (p. 287).

Different from actual control, perceived control refers to subjective feelings or a sense of control and is considered to be a powerful predictor of behavioral outcomes (e.g., Ajzen 1991, 2002; Hui and Bateson 1991; Notani 1998). For example, Dabholkar (1996) found that perceived control is an influential predictor of consumer evaluations of the touch-screen technology-based food ordering service option in fast food restaurants. Novak, Hoffman, and Yung (2000) determined that control is a critical determinant of achieving the psychological state of flow within computer-mediated environments. Wolfinbarger and Gilly (2001) maintain that besides freedom and fun, consumers shop online for control. Zhu (2002) demonstrated the role of perceived control as the central construct that mediated the effects of a technology’s physical attributes and individual traits on consumer attribution, expectation, and behavioral outcomes during service failures in self-service encounters.

The above discussion indicates that perceived control is a construct that is especially relevant to research within the Internet and other technology-mediated contexts, as many researchers have long suggested (e.g., Bobbitt and Dabholkar 2001; Dabholkar 1990, 1991, 1996; Zeithaml, Parasuraman, and Malhotra 2002). Given this background, it would be interesting to explore the role of perceived control in using recommendation agents as past research has not studied this construct yet. In this study, perceived control over using a

recommendation agent is defined as an individual's sense of control that the individual feels over using a recommendation agent.

5. Perceived Risk in Providing Personal Information

The introduction of the concept of perceived risk can be traced back to Bauer (1960). Bauer (1960) defined perceived risk as consumers' subjective beliefs of suffering a loss in the pursuit of a desired outcome. Cox and Rich (1964) conceptualized perceived risk as consumer perceptions of the nature and amount of risk when contemplating a particular purchase decision. Murray (1991) described perceived risk as representing consumer uncertainty about loss or gain in a particular transaction. As Mitchell (1999) concluded, Bauer did not expect that his proposal of this concept would initiate a rich program of research in the effects of perceived risk on consumer behavior. According to Mitchell (1999), the concept of perceived risk is appealing not only because it enables researchers and marketers to view the world through consumers' eyes but also has wide applicability in various disciplines.

Today, perceived risk is a well-accepted central concept in consumer information search behavior in general (e.g., Bettman 1973; Cox and Rich 1964; Dowling 1986; Dowling and Staelin 1996) and in online search as well as shopping behavior (e.g., Biswas and Biswas 2004; Jarvenpaa, Tractinsky, and Vitale 2000; Pavlou 2003; Pires, Stanton, and Eckford 2004). However, perceived risk is an overlooked aspect in past research in recommendation agents. Therefore, it is important to incorporate perceived risk into the current study to bridge the gap and to contribute to our understanding of the role of perceived risk in using

recommendation agents.

Perceived risk can be manifested in different ways, e.g., performance risk, financial risk, psychological risk, social risk, temporal risk (e.g., Jacoby and Kaplan 1972). Due to inherent uncertainties involved in searching and shopping on the Internet, such as the trust issue and privacy/security concerns (discussed earlier), this study focuses on *perceived risk in providing personal information*. It refers to the uncertainty involved with and subjective beliefs of suffering a loss in providing personal information to a recommendation agent as well as on the agent's hosting Web site.

Perceived risk in providing personal information is especially salient and relevant to consumer use of recommendation agents on Web sites. This is because in addition to consumer concerns about the privacy/security issue on the Internet in general, using recommendation agents in itself involves information exchange between the consumer and an agent. Financial and performance risk may also be relevant to the online context, but are not critical to the main focus of this study. Nevertheless, financial risk is examined as an exploratory issue (see Chapter 3).

Outcomes: Intention to Reuse a Recommendation Agent, Intention to Return to a Web site, and Intention to Purchase Based on Recommendations

This study chooses to focus on behavioral intentions as the key outcome variables because of the potential managerial implications. Specifically, the outcome variables include: intention to reuse a recommendation agent, intention to return to a Web site, and intention to purchase based on recommendations. As previously discussed, past research in

recommendation agents centers on either assessing the effectiveness of computer algorithms or investigating the impact of using recommendation agents on consumers' decision making processes. Consequently, these studies primarily focus on outcome variables such as the size of a consideration set, the degree of confidence in the choice made, and cognitive efforts spent in the search process. Thus, there exists limited research that examined consumer behavioral intent related to using recommendation agents, although researchers have started investigating intention to adopt as an indicator of consumer acceptance of recommendation agent technology. For example, Wang and Benbasat (2005) studied the effects of perceived ease of use, perceived usefulness, and trust on consumer intention to adopt a recommendation agent. Komiak and Benbasat (2006) examined the influence of familiarity and personalization on consumer intention to adopt a recommendation agent either as a decision aid or as a delegate. This study builds on previous research and extends the scope to include other behavioral intention variables that are of relevance and importance of marketers.

The conceptual framework is presented in Figure 2.1 (All tables and figures are in the Appendix A).

Research Hypotheses

Consumer Participation, Trust, and Behavioral Intentions

1. Effect of Consumer Participation on Trust

The extant literature on consumer participation revealed three major research streams. One focuses on the economic benefits of consumer participation such as cost reduction and

increased productivity from firm's perspective, the other examines the link between participation and consumer satisfaction as well as service quality evaluations. The third research stream, which explored organizational strategies of managing consumer participation such as treating consumers as "partial employees," offers insight into the relationship between consumer participation and trust. For example, Chalos and Haka (1989) suggested that increased employee participation in decision-making related to their jobs led to greater feelings of organizational trust. The positive effect of consumer participation on trust is also evidenced from studies conducted within the healthcare context. For example, Ouschan, Sweeney, and Johnson (2006) found that patients were more trusting of and committed to physicians who empowered them by involving them more in patient-physician consultations. By the same logic, the more consumers participate in dialogue with recommendation agents, the better they will understand why and how recommendation agents arrive at recommendations which in turn, build consumer trust. Consumer participation in using a recommendation agent also indicates an individual consumer's direct experience with the agent, where the effect of direct experience on trust has received empirical support. For example, Fuller, Serva, and Benamati (2007) found that an individual's direct experience with an e-vendor's Web site positively affected the individual's trusting beliefs about the e-vendor.

It is expected that participation in using a recommendation agent will have positive effects on consumer trust; however, the targets of trust might include other entities that comprise the recommendation agent-mediated e-commerce environment. In addition to trust

in a recommendation agent, two other aspects of trust are also expected to emerge, that is, trust in the hosting Web site of an agent and trust in the recommendations provided by an agent. In fact, the idea that trust can have multiple targets has been reflected in previous research in both the offline context and the online context. For example, within an industrial buying setting, Doney and Cannon (1997) explored the antecedents and consequences of a buying firm's trust of a supplier firm and trust of its salesperson. Along this line, Urban, Sultan, and Qualls (2000) have suggested that Web trust cannot be established unless the three elements, i.e., trust in the Web site, trust in the information displayed, and trust in delivery fulfillment, are all well developed. Therefore, applying this line of reasoning to the context of using recommendation agents, the following is proposed:

H1: The level of consumer participation in using a recommendation agent will have a positive effect on trust in the hosting Web site of the agent

H2: The level of consumer participation in using a recommendation agent will have a positive effect on trust in the agent

H3: The level of consumer participation in using a recommendation agent will have a positive effect on trust in recommendations provided by the agent

2. Relationships between Trust in the Hosting Web Site of a Recommendation Agent, Trust in a Recommendation Agent, and Trust in the Recommendations Provided by a Recommendation Agent

Similar to talking to a sales person who works in a brick-and-mortar store, consumers talk to a recommendation agent who "works" within a Web site through participating in

dialogues with the agent. When consumers interact with a recommendation agent on a Web site, they will first form perceptions of the Web site as to whether the Web site can be trusted. When trust in the Web site is established, perceptions that the Web site can be trusted will then be translated into trust in the agent and trust in the recommendations that the agent provides. This process has been well described by Urban, Sultan, and Qualls (2000) who argued that consumer trust on the Internet is developed through a multiple-stage, cumulative process whereby trust in a specific Web site needs to be first established so that trust in the information on the Web site can then be engendered.

The above described process can also be explained by the notion of trust transference (e.g., Doney and Cannon 1997; Milliman and Fugate 1988; Strub and Priest 1976). Doney and Cannon (1997) suggested that trust can be developed through the trust transference process whereby an industrial buying firm's trust of a supplier firm led to its trust of the salesperson who worked for that supplier firm. Similarly, Wood, Boles, and Babin (2008) found that a customer's trust for a selling firm was positively related to the customer's trust of that firm's salespeople. Along this line, Stewart (2003) demonstrated trust transfer on the World Wide Web by empirically validating the positive effect of consumers' trusting beliefs about a known Web site on their trusting beliefs about an unknown Web site which was embedded in the known Web site through a hypertext link.

In light of the above discussions, the following is proposed:

H4: Trust in the hosting Web site of a recommendation agent will have a positive effect on trust in the agent

H5: Trust in the hosting Web site of a recommendation agent will have a positive effect on trust in the recommendations provided by the agent

H6: Trust in a recommendation agent will have a positive effect on trust in recommendations provided by the agent

3. Trust and Behavioral Intentions

There are many intended behaviors that have been studied as consequences of trust. For example, Ganesan (1994) found that trust played a key role in determining a trustor's (e.g., a vendor) long-term orientation toward future goals such as maintaining long-term relationships that involve the target of trust (e.g., a retailer). Doney and Cannon (1997) confirmed that a buying firm's trust in a supplier firm positively affected its intention to make future purchase from that supplier firm. Within the online context, actions to make purchases, share personal information, and follow a Web vendor's advice have been shown to represent behaviors that are essential to wide-spread e-commerce adoption (e.g., McKnight, Choudhury, and Kacmar 2002a, 2002b).

Behavioral intentions of interest in this study include intention to reuse the recommendation agent, intention to return to the Web site, and intention to purchase based on the recommendations. The main reason to focus on these variables is because of the potential managerial implications that these variables have. Moreover, previous work within the online context also provides extensive empirical support for the effects of trust on these behavioral intentions. For instance, Pavlou (2003) integrated trust into the technology acceptance model to explain consumer intentions to transact with online retailers. The author

found that trust in an online retailer was the most influential predictor of consumer intentions to purchase from the retailer. Bart, Shankar, Sultan, and Urban (2005) found that trust in a Web site positively affected consumers' behavioral intent which is measured by a composite scale with items of intention to purchase from the site, to recommend the site to a friend, and to register at the site. Similarly, Schlosser, White, and Lloyd (2006) confirmed that a consumer's trusting belief in a firm's ability had a positive effect on the consumer's intention to purchase from that firm's Web site. Along this line, Wang, Beatty, and Foxx (2004) provide empirical evidence that consumers' trust in small online retailers have a positive effect on their willingness to provide personal information.

In the case of using recommendation agents, Wang and Benbasat (2005) found that trust had a positive effect on consumer intentions to adopt recommendation agents. Komiak and Benbasat (2006) confirmed that trust increased consumer intentions to use recommendation agents both as a decision aid that assists consumers in their purchase decisions and as a delegate that makes purchase decisions on behalf of consumers. Given this background, the following is proposed:

H7: Trust in the hosting Web site of a recommendation agent will have a positive effect on intention to return to the Web site

H8: Trust in a recommendation agent will have a positive effect on intention to reuse the agent

H9: Trust in the recommendations provided by an agent will have a positive effect on intention to purchase based on the recommendations

Consumer Participation, Perceived Control, and Behavioral Intentions

Researchers have long suggested that perceived control is a crucial driver for consumer adoption of self-service options. Langeard, Bateson, Lovelock, and Eiglier (1981) found that control is important to consumers in using self-service options. Bateson (1985) pointed out that people choose to use self-service for control but not for monetary savings. In other words, consumers derive the benefit of being in control from participating in producing and delivering services themselves.

Perceived control has also been shown to be a key construct that mediates consumers' affective and behavioral responses to the physical environment that constitutes a service encounter. For example, Hui and Bateson (1991) found that the density of a service environment and the availability of consumer choice within that environment influenced consumers' feelings of the pleasantness of the service experience through the mediating effect of perceived control. Hui and Toffoli (2002) provided further evidence that perceived control influenced consumers' affective responses to a service encounter both directly and indirectly through the attribution process. The authors also confirmed the direct, positive effect of perceived control on consumers' behavioral responses to the service encounter.

Within the technology-based self-service context (Dabholkar 1990, 1991, 1994, 1996, 2000), research has been conducted to examine the influence of technology attributes on consumers' perceived control over using the technology as well as their behavioral intentions to approach or avoid the technology. Dabholkar (1991) provided empirical evidence that consumer participation in service delivery by using a technology-based food ordering option

increased consumers' perceived control over using that self-service. In a self-service failure context, Zhu (2002) found that the technology attributes of interactivity and openness to competitive information positively affected consumers' perceived control over using the technology which in turn, negatively influenced their intention to switch to another technology and intention to switch to an interpersonal service. Similar to interactivity and openness to competitive information, the more room that a recommendation agent allows for consumer participation, the greater ability consumers will have to command the usage situation and thus achieve greater perceived control. But contrary to intention to switch to another technology or to an interpersonal service as in a service failure encounter, perceived control will lead to greater intention to reuse the recommendation agent. Given this line of reasoning, the following is proposed:

H10: The level of consumer participation in using a recommendation agent will have a positive effect on perceived control over using the agent

H11: Perceived control over using a recommendation agent will have a positive effect on intention to reuse the agent

Furthermore, empirical evidence has also shown that perceived control positively affects consumer trust and acceptance of technology. For example, Kernal (1999) demonstrated strong support from two studies that consumers' perceived control over using a centralized home control system had positive effects on their trust in that system and on their acceptance of that system. Moreover, the author also found that lower perceived control in fact led to increased anxiety in using the system. Applying this line of reasoning to using

recommendation agents, the following is proposed:

H12: Perceived control over using a recommendation agent will have a positive effect on trust in the agent

Therefore, hypotheses 2, 10, and 12 together suggest that consumer participation in using a recommendation agent will have a positive effect on trust in the agent directly and indirectly through the mediating effect of perceived control.

Privacy/Security Disclosures, Perceived Risk, and Behavioral Intentions

Being concerned about the dire consequences of privacy/security breaches on the Internet, consumers tend to be reluctant to provide personal information to Web sites. According to Hoffman, Novak, and Peralta (1999), almost 95% of the Web users have declined to provide personal information to Web sites at one time or another when they were asked. As many researchers point out (e.g., Forsythe and Shi 2003; Milne and Boza 1999; Miyazaki and Fernandez 2001), privacy/security concerns have become major barriers to the growth of e-commerce. For example, Miyazaki and Fernandez (2001) found that consumers' perceived risk in online shopping is positively associated with their concerns about the privacy/security protection on the Internet. Similarly, Forsythe and Shi (2003) showed that privacy concern was a most frequently cited issue mentioned by the respondents in their study. Privacy/security concerns also might cause marketers to loose opportunities to gather consumer information, one of the most important strategic assets of a firm (Xie, Teo, and Wan 2006). This aspect is even more pronounced in the case of using recommendation agents as recommendations are made based on information such as product preferences and past purchase history that

consumers provide.

Evidence has shown that privacy/security policy disclosures are effective in building consumer trust in Web sites and reducing consumer risk perceptions. Hoffman, Novak, and Peralta (1999) suggest that privacy is a key driver of online trust. Bart, Shankar, Sultan, and Urban (2005) found that privacy is the most influential determinant of trust for Web sites that involve high information risk such as travel Web sites and online community Web sites. Schlosser, White, and Lloyd (2006) confirmed that the presence of strong privacy/security policy statement on an e-vendor's Web site which explicitly informs consumers of how the company collects and uses consumer information had a positive effect on consumers' trusting beliefs in that company's benevolence and integrity. Wang, Beatty, and Foxx (2004) provide further empirical support that security disclosures on a small retailer's Web site lead to higher consumer trust in that retailer. Finally, Liu, Marchewka, Lu, and Yu (2005) found that the availability of privacy policy notification on a Web site positively influenced consumer trust in that Web site which in turn, translated into greater likelihood of revisiting the site, purchasing again at the site, and making positive comments about the site.

In light of the above discussion, the following is proposed:

H13: Privacy/security disclosures on the hosting Web site of a recommendation agent will have a positive effect on consumer trust in that Web site

H14: Privacy/security disclosures on the hosting Web site of a recommendation agent will have negative effect on consumer perceived risk in providing personal information

The link between trust and perceived risk has been supported theoretically and empirically. Deutsch (1958) has long maintained that risk taking behavior and trusting behavior are closely tied to one another and are indeed "different sides of the same coin" (Deutsch 1958, p266). Mayer, Davis, and Schoorman (1995) also argued that risk is an essential component of a model of trust and that risk perceptions and trust are closely related to each other. In an extensive review of consumer perceived risk, Mitchell (1999) concluded that perceived risk is a necessary antecedent for trust to be operative. Finally, empirical evidence has shown that perceptions of reduced risks led to an increased level of trust (e.g., Jarvenpaa, Tractinsky, and Saarinen 1999). Applying this line of reasoning to the case of using recommendation agents, the following is proposed:

H15: Perceived risk in providing personal information will have a negative effect on consumer trust in the hosting Web site of a recommendation agent

H16: Perceived risk in providing personal information will have a negative effect on consumer trust in a recommendation agent

Hypotheses 13, 14, and 15 together suggest that privacy/security disclosures on a recommendation agent's Web site will have a direct, positive effect on consumer trust in the Web site and an indirect effect through perceived risk in providing personal information.

The research model with all sixteen hypotheses is depicted in Figure 2.1.

CHAPTER 3

METHODOLOGY

Research Design

Selection of Research Method

The main objective of this dissertation is to investigate the effect of consumer participation and that of privacy/security disclosures on consumer trust and behavioral intentions. This objective calls for a quantitative method to study these research issues.

A careful review of existing empirical research into recommendation agents reveals that the majority of the studies employed an experimental approach (e.g., Aggarwal and Vaidyanathan 2003; Haubl and Trifts 2000; Haubl and Murray 2003; Hostler, Yoon, and Guimaraes 2004; Komiak and Benbasat 2006; Olson and Widing 2002; Punj and Moore 2007; Swaminathan 2003; Todd and Benbasat 1992, 2000; Vijayasarathy and Jones 2001; Wang and Benbasat 2005, 2007), with a very few exceptions where simulation or mathematical modeling was used (e.g., Ansari, Essegaier, and Kohli 2000; Ariely, Lynch, and Aparicio 2004). This provides evidence that an experimental design is a viable approach to empirically testing the research hypotheses proposed in this dissertation.

For those studies that utilized experimental approach, mock recommendation agents were usually created and installed on computers prior to the start of the experiment, which was conducted in computer labs. Conducting the experiment in computer labs offered researchers greater control in keeping extraneous variables such as Internet connection speed and computers' hardware as well as software set-ups from influencing the results of the

experiment. However, the use of mock recommendation agents made participants' agent using experiences somewhat unreal.

Building upon previous research designs, this dissertation took a different approach where real recommendation agents that already existed on Web sites were used in a controlled, lab experiment. This design in essence blended a field experiment with a lab experiment and offered improvement over previously employed pure lab experiments. Such a design retained the major merits of a controlled experiment, that is, control and randomization. It also allowed the phenomenon of using recommendation agents to take place in its naturally occurring field by making use of real recommendation agents. In so doing, this study was able to stay closer to the reality of the phenomenon of interest in this dissertation.

Design and Experimental Manipulation

The level of consumer participation in using online recommendation agents is the main treatment of interest in this study and was manipulated through using two real Web sites with built-in recommendation agents. These two Web sites are www.myproductadvisor.com and www.shopping.com. The recommendation agents on these two Web sites are "stand-alone," meaning neither works within the Web sites of retailers like Amazon or manufacturers like Dell. This helps avoid the possible confounding effect that a certain retailer or manufacturer's reputation might bias consumer perceptions. Both agents function similarly and use content filtering to make product recommendations on the basis of individual consumers' preferences. The major difference is that these two agents allow different levels

of consumer participation. Specifically, the agent on www.myproductadvisor.com enables a high level of consumer participation by initiating a set of well-organized, structured question-answer dialogues that ask about topics ranging from consumers' product usage situation to attribute preferences for that product. On the other hand, the agent on www.shopping.com allows a low level of consumer participation that only facilitates consumer input for basic product attributes like price range and brand.

In addition to investigating the direct effects of consumer participation and privacy/security disclosures, this study also intends to examine an exploratory issue; that is, whether the magnitude of financial risk (as manifested by product type) involved in a purchase moderates the hypothesized effects of consumer participation and those of privacy/security disclosures. Studying financial risk as an exploratory issue is based on the consideration that there has no literature support for the impact of financial risk on the effects of consumer participation and on those of privacy/security disclosures as proposed in the framework. But it makes intuitive sense that for a product that involves high financial risk in purchase, the effects of consumer participation on trust as well as perceived control are expected to be strengthened. This is because with a greater vested interest and a heightened level of caution in a high financial risk purchase, consumers' trust and perceived control will be influenced to a greater extent by participating in using a recommendation agent through consumers' own work of providing information as well as spending time and effort in working with the agent. Similarly, with a high financial risk purchase, the effects of privacy/security disclosures on consumers' trust and perceived risk in providing personal

information are also expected to be strengthened. The reason is that consumers will be more cautious of whether and how well their privacy and security will be protected at a Web site that they might make the purchase from and provide their personal information to. Therefore, a Web site's privacy/security disclosures will take on a greater weight in influencing consumers' trust and risk perceptions regarding providing personal information.

In summary, this study used a 2 (level of consumer participation: high vs. low) X 2 (level of financial risk: high vs. low) between-subject experiment design. Two real Web sites were used to manipulate the level of consumer participation, with www.myproductadvisor.com representing the high participation group and www.shopping.com the low participation group. The level of financial risk was manipulated by asking participants to search for product information and get recommendations for either a laptop computer or a digital camera in a scenario-based, projected purchase situation (See Appendix A for the scenarios). Laptop computers were used to represent the high financial risk group and digital cameras represented the low financial risk. The selection of laptop computers and digital cameras to represent different levels of financial risk was based on the results from focus group interviews with undergraduate students who were the target subjects in this study. Expert opinions from doctoral committee members were also consulted to assess the appropriateness of using laptop computers and digital cameras to manipulate financial risk. In addition, the manipulation of financial risk was further strengthened by specifying the price range in the scenarios. For laptop computers, the price range was set at $1000 - $1200; for digital cameras, the price range was set at $80 - $120.

Sample

This study recruited college students as the research participants as they were a major, representative sample of today's online shopping population (e.g., Gefen and Straub 2003; Wang, Beatty, and Foxx 2004). A recent Pew/Internet research report (Pew/Internet 2009) shows that the largest share (30%) of today's Internet population consists of users who age between 18 and 32. Using search engines, doing research on products, buying something online, and making travel reservations are the dominant activities that these users like to do on the Internet. The fact that the majority of previous empirical research in recommendation agents used student participants further justified that college students were the target subjects for this study. Details of the sample are provided in Chapter 4.

Procedure

The experiment was conducted in a computer lab at the University of Tennessee – Knoxville. The lab had 35 computers, all of which had the same hardware and software specifications as well as Internet connection speed. Data were collected using multiple sessions and students signed up for these ahead of time. Students were informed prior to the study that they were going to use a Web site to search for product information and get product recommendations. A little extra course credit was given to the students who participated.

Upon arrival, participants were allowed to sit at any computer that they liked. A five-minute practice session was held after all the participants in a session were seated. Either the Web site of shopping.com or myproductadvisor.com was used in the practice

session as an illustration to explain what a recommendation agent is and how to use the agent on its Web site. Next, the scenarios were randomly distributed. The participants were told to read the scenarios carefully and then use the agent on the Web site specified in the scenario to search for product information and get recommendations. Finally, the participants filled out survey questionnaires. On average, each session took 30 minutes to complete. After completing all the lab sessions for the pretest and the main study, the participants were debriefed about the purpose of this research.

Measures

Most of the measures in this study were adapted from previously validated scales found in the extant literature. Following the guidelines suggested by Churchill (1979), new items were added to some of the existing scales and new scales were developed for those constructs that had not been empirically tested in the literature. Multiple items were used for each construct to increase reliability, decrease measurement error, and effectively measure the construct (Anderson and Gerbing 1988; Churchill 1979).The survey was reviewed by doctoral committee members to assess the content validity of all the measures and the clarity as well as flow of the questionnaire.

Consumer Participation

Manipulation checks were used for the main treatment of interest in this study -- the level of consumer participation in using a recommendation agent. Two types of scales were used to fully assess whether the manipulation of consumer participation was successful. On a 7-point scale with end points “very minimal” and “quite a lot,” participants were asked to

respond to the statement "When using this agent, the number of questions I was asked was…" by circling a number between 1 and 7 to indicate their answers. As another check on the manipulation of consumer participation, participants were asked to think back and respond to a dichotomous scale by indicating whether they were asked a lot of questions or very few questions when using the agent.

In addition to the manipulation, consumer participation was also measured using four items to capture the amount of consumer input in using a recommendation agent. Two items were adapted from Bendapudi and Leone (2003) to assess the extent of effort and work that a consumer put into while using an agent. One item was adapted from Fang (2008) to capture the amount of information that a consumer provided to an agent. The fourth item was newly developed to tap into the amount of time that a consumer spent in using an agent. All four items were measured on a seven-point scale, with end points "very minimal" and "quite a lot."

Financial Risk

Manipulation checks were also used for the second treatment – the level of financial risk involved in a purchase. Two types of scales were employed to verify the effectiveness of the manipulation of financial risk, following the same idea applied to the manipulation check of consumer participation. On a 7-point scale with end points "very inexpensive" and "very expensive," participants were asked to respond to the statement "The product that I was trying to get recommendations for was…" by circling a number between 1 and 7 to indicate their answers. Another check on the manipulation of financial risk asked participants to think

back of the scenario they read earlier and indicate whether the product type for which they were getting recommendations was expensive or not.

Financial risk was also measured as a perception with five items, on a five-point Likert scale. Three of the five items were adapted from Biswas and Biswas (2004). The other two items were newly developed and were used to assess the extent to which the participants were concerned about the money involved in the purchase and the extent to which the participants considered the price for a product affordable.

Privacy/Security Disclosures

Eight items were used to capture participants' overall impression of whether their privacy/security is protected on a certain Web site as it was difficult, if not impossible, to objectively make judgments about the strength of privacy/security disclosures. Four of the eight items were adapted from Bart, Shankar, Sultan, and Urban (2005) and were used to tap participants' evaluation of the privacy/security policy on the Web site that they visited earlier. These four items evaluated how easy it was to find the policy, how easy it was to understand the policy, whether the policy explained why user information was collected, and how this information would be shared with other companies. The other four items were newly created and were used to capture participants' perceptions of whether the Web site had the technology and was capable of protecting their privacy, whether the Web invested money to protect their privacy, and whether the participants believed that their privacy was protected at this Web site. All the items were measured on a five-point Likert scale, with an added option of "Not Applicable" so that those participants who did not read the privacy/security

disclosures could respond to all the statements as well.

Perceived Control over Using a Recommendation Agent

Perceived control over using a recommendation agent was measured with seven items, each with a five-point Likert scale. Three items were adapted from existing, validated scales for perceived control in using technology-based self-service interfaces (Dabholkar 1996; Yen 2005) and perceived control over using Web sites in face of download delays (Dabholkar and Sheng 2008). Four items were newly developed to tap other aspects of the feelings of being in control and being in charge while using a recommendation agent. For example, participants were asked to indicate whether they felt they directed the agent on finding out what they like and whether the agent let them change product preferences at any time.

Trust in the Web Site

Trust in the Web site was measured using five items, on a five-point Likert scale. Four out of the five items were adapted from previously validated scales (Bart, Shankar, Sultan, and Urban 2005; Schlosser, White, and Lloyd 2006; Wang, Beatty, and Foxx 2004). One new item was added to assess participants' beliefs toward the trustworthiness of the information displayed on the Web site that they visited earlier.

Trust in the Recommendation Agent

Trust in the recommendation agent was measured with seven items. The items were adapted from existing scales that had been validated in previous research in recommendation agents (Komiak and Benbasat 2006; Wang and Benbasat 2005). Five-point, Likert scales were used for all seven items.

Trust in Recommendations

Trust in recommendations was defined as the beliefs that reflect the trustworthiness of the product recommendations provided by a recommendation agent in Chapter 2. Based on this definition, five items were used to tap different aspects of the trustworthiness of the recommendations from participants' perspectives. One item was adapted from the validated scales for trust in the recommendation agent (Komiak and Benbasat 2006; Wang and Benbasat 2005) and was intended to assess participants' beliefs regarding whether the product recommendations are unbiased. Another item was adapted from Bart, Shankar, Sultan, and Urban (2005) to assess participants' confidence about the recommendations. A third item was an adapted version from Rathnam (2005) and was used to capture participants' beliefs regarding whether the recommendations could be relied upon. Two other items were used to tap participants' thoughts regarding the accuracy of the recommendations and whether they trust the recommendations. All five items were measured on a five-point Likert scale.

Perceived Risk in Providing Personal Information

Perceived risk in providing personal information was measured using six items, each with a five-point Likert scale. Overall, these six items were intended to capture participants' perceptions of how risky it would be for them to give out personal information on the Web site that they just visited. One out of the six items was adapted from Bart, Shankar, Sultan, and Urban (2005) to assess the extent to which an individual feels comfortable to share personal information on a Web site. Another item was adapted from Wang, Beatty, and Foxx

(2004) to assess how strongly an individual would feel regarding the possibility that a Web site might sell personal information to other companies. The other four items were newly developed to tap participants' concerns about the uncertainty and safety of providing personal information on the Web site visited earlier.

Behavioral Intentions

Intention to reuse the recommendation agent, intention to return to the Web site, and intention to purchase based on the recommendations are the three outcome variables in this study. Five items were used to measure intention to reuse the recommendation agent. All five items were measured on a five-point intention scale with endpoints "very unlikely" and "very likely," based on Dabholkar (1996). Four out of these five items were influenced by Gentry and Calantone (2002), Komiak and Benbasat (2006), and Wang and Benbasat (2005). One new item was added to assess how likely it was for an individual to recommend the agent to friends.

Intention to return to the Web site was also measured with a five-point intention scale with endpoints "very unlikely" and "very likely." Four items were used to assess the likelihood that an individual would bookmark and return to a Web site as well as recommend the Web site to others. All the items were adapted versions of the intention scale used in previous research by Bart, Shankar, Sultan, and Urban (2005), Dabholkar (1996), Dabholkar and Sheng (2008), and Wang, Beatty, and Foxx (2004).

Intention to purchase based on the recommendations was a new construct proposed in this dissertation and measured using a five-item, five-point Likert scale. These items were

used to assess the likelihood that the participants would follow the agent's recommendations and purchase the recommended product.

Measures for the above discussed eleven constructs as well as the sources for these measures are shown in Table 3.1. The complete survey instrument is included in Appendix B.

Analysis

A pretest was conducted before the launch of the main study. The main objective of the pretest was to check whether the manipulation of consumer participation and the manipulation of financial risk were successful. A secondary objective was to provide an initial assessment of the validity of the adapted measures.

Cross-tabulations with chi-squared tests and independent-samples t-tests were used to perform manipulation checks on the treatment of consumer participation and that of financial risk. Confounding checks were also conducted, following guidelines by Purdue and Summers (1986). Specifically, General Linear Modeling (GLM) was used to make sure that the manipulation of consumer participation did not have a main effect on financial risk perceptions and that the manipulation of financial risk did not have a main effect on consumer participation perceptions. The interaction term formed by the consumer participation manipulation and the financial risk manipulation was also tested in GLM to ensure that the interaction effect was not significant.

Exploratory factor analysis (EFA) was run to assess measure validity. Convergent and discriminant validity of a construct were evaluated by checking factor loadings and cross-loadings. Cronbach's alpha was calculated to assess construct reliability. The

well-established guidelines that item factor loading should be greater than 0.40 and Cronbach's alpha value should be greater than 0.7 were followed in evaluating measure validity (Cronbach and Meehl 1955; Nunnally 1978; Peter 1979, 1981). Correlations among the constructs were also checked to ensure that the constructs demonstrated discriminant validity.

Manipulation checks and confounding checks were also performed for the main study. Using the main study data, EFA was first conducted to identify the data structure. Based on the EFA results, confirmatory factor analysis (CFA) using AMOS 7 was then performed to evaluate the adequacy of the measurement model as indicated by construct reliability and convergent as well as discriminant validity. Cronbach's alpha value was used to assess construct reliability. Convergent validity was assessed by examining the model fit indices and whether items had statistically significant factor loadings on their intended constructs. Discriminant validity was assessed by examining the correlations among the constructs. To ensure discriminant validity, model comparisons between "one-factor" and "two-factor" models were also conducted for pairs of the constructs that had correlations higher than 0.7. The measurement model was then refined based on modification indices, standardized residual covariances, and factor loadings. After convergent and discriminant validity as well as construct reliability was established, structural equation modeling (SEM) with AMOS 7 was used to test research hypotheses.

CHAPTER 4

RESULTS

Pretest

67 undergraduate students from the University of Tennessee – Knoxville participated in the pretest. The participants were recruited from two junior-level undergraduate marketing classes. Due to the size constraint of the computer lab, four sessions were made available to the participants. The experimental procedure, as detailed in Chapter 3, was strictly followed for each session.

Descriptive Statistics

All 67 responses were retained for data analysis as there were no cases of missing data among the filled surveys. Most of the participants majored in marketing, and several of them had other majors such as logistics, enterprise management, and international business. 98.5% of the participants had at least five years of Internet experiences and 95.5% of them spent more than one hour on the Internet on a daily basis. 25.4% of the participants had used recommendation agents on Web sites such as amazon.com, google.com, and yahoo.com before. But none of them reported using the agents on shopping.com or myproductadvisor.com. 56.7% of the participants were female and the average age was 21.36.

Data Distribution

There were 61 substantive questions pertaining to the research model in the survey. In addition, the survey also included manipulation checks and questions on Internet usage as

well as demographic information. All substantive questions were measured on a five-point or seven-point Likert or Likert type scale. Mean values for these items ranged from 2.33 to 4.42. Standard deviations ranged from 0.67 to 1.64. The values of kurtosis for all 61 items ranged from to -0.03 to 2.77 and the values of skewness ranged from -0.02 to -1.29 (See Table 4.1). Since the values of kurtosis and skewness were all within the threshold of ± 3, non-normality did not appear to be a concern for the pretest data (e.g., Bollen 1989; DeCarlo 1997).

Manipulation Checks

The manipulation of consumer participation in using a recommendation agent was checked in two ways. One question asked participants to think back and indicate on a dichotomous scale whether they were asked a lot of questions or very few questions when using a recommendation agent. As another check on the manipulation of consumer participation, participants were also asked to use a seven-point scale with endpoints "very minimal" and "quite a lot" to indicate the number of questions that they were asked when using a recommendation agent. A cross-tabulation with chi-squared test was performed to check the manipulation measured on the dichotomous scale. The results showed that the manipulation had worked, $\chi^2 = 33.24$, $p < 0.001$. 25 out of the 28 participants who used the agent on shopping.com indicated that they were asked very few questions. In other words, 89.3% of the participants who were assigned to the low participation group correctly classified themselves. 32 out of the 39 participants who used the agent on myproductadvisor.com indicated that they were asked a lot of questions, meaning 82.1% of the participants correctly classified themselves in the high participation group. A t-test was

also run to check the manipulation that was measured on the continuous scale. The results showed that there was a significant difference between the high and low participation group and the mean difference between the two groups was in the correct direction ($M_{\text{High Participation}} = 4.97$, $M_{\text{Low Participation}} = 2.97$, $t = 6.08$, $p < 0.001$).

The manipulation of financial risk involved in a purchase was checked in two ways as well. One question asked participants to think back and indicate on a dichotomous scale whether the product described in the scenario that they read earlier was expensive or not expensive. The manipulation of financial risk was checked by running a cross-tabulation with a chi-squared test. The results showed that the manipulation was successful, $\chi^2 = 17.95$, $p < 0.001$. Specifically, 40 participants out of the total of 50 who read the digital camera scenario indicated that the product was not expensive (i.e., 80% correct rate of classification), and 13 out of the 17 participants who read the laptop scenario indicated that the product was expensive (i.e., 76.5% correct rate of classification). Participants were also asked to use a seven-point scale with endpoints "very inexpensive" and "very expensive" to indicate the extent to which how expensive the product was that they were trying to get recommendations for. The results from a t-test showed that the participants in the high financial risk group rated the product as more expensive ($M_{\text{High FinRisk}} = 4.74$) compared to those who were in the low financial risk group ($M_{\text{Low FinRisk}} = 3.43$), $t = 4.72$, $p < 0.001$.

Confounding checks were also performed to ensure that the manipulation of consumer participation did not cause any changes in participants' perceptions of financial risk and neither did the manipulation of financial risk cause any changes in participants' perceptions

of participation in using a recommendation agent. The procedure recommended by Purdue and Summers (1988) was followed in conducting the confounding checks. The results from General Linear Modeling (GLM) showed that both the manipulations had worked properly and that no confounding effects were detected. The effect of the consumer participation manipulation on participants' perceptions of the financial risk was not significant ($F = 0.22$, $p = 0.64$). The interaction effect of the consumer participation manipulation and the financial risk manipulation on financial risk perceptions was also found to be insignificant ($F = 0.01$, $p = 0.92$). The effect of the financial risk manipulation on perceptions of consumer participation was not significant ($F = 0.04$, $p = 0.85$), and the interaction effect of both the manipulations on consumer participation perceptions was also found to be insignificant ($F = 0.33$, $p = 0.57$).

Measure Validity

Exploratory factor analysis (EFA) using principal component analysis with Varimax rotation was conducted to provide an initial assessment of measure validity based on the pretest data. Due to the small sample size and yet the large number of items to be examined, EFA was performed on four subgroups of items (See Table 4.2). Maximally similar constructs were grouped together to allow a more rigorous evaluation of the measure validity. Specifically, the first subgroup included all the items for the three trust constructs, i.e., trust in the Web site, trust in the recommendation agent, and trust in recommendations. The second subgroup included all the items for the three intention constructs, i.e., intention to return to the Web site, intention to reuse the recommendation agent, and intention to

purchase based on the recommendations. The third subgroup included the items for privacy/security disclosures and those for perceived risk in providing personal information. Finally, the fourth set grouped together the items for perceived control and those for the perception measures of the consumer participation manipulation and the financial risk manipulation, i.e., perceived participation and perceived financial risk. The factor loading of each item onto its intended construct and whether items cross-loaded onto unintended constructs were evaluated to assess the convergent and discriminant validity of the measures. Cronbach's alpha was calculated to assess construct reliability (See also Table 4.2 for factor loadings and Cronbach's alpha values). Correlations among these nine constructs are displayed in Table 4.3.

For the first subgroup of items, the EFA results showed a clear 3-factor structure. Items 1-4 for trust in the recommendation agent loaded on their intended factor, and factor loadings ranged from 0.43 to 0.84 for these four items. But items 5-7 did not load properly; instead, these three items had higher factor loadings on trust in recommendations, i.e., 0.53, 0.66, and 0.68 respectively. For trust in the Web site, items 1, 2, 4, and 5 loaded properly on the intended factor. Factor loadings ranged from 0.75 to 0.85 for these four items. But item 3 loaded on trust in the recommendation agent, and the factor loading was 0.52. For trust in recommendations, items 2-5 all loaded on their intended factor. Factor loadings ranged from 0.61 to 0.80 for these four items. However, the first item for trust in recommendations cross-loaded on its intended factor and trust in the Web site, and the factor loading was 0.45 for the former construct and 0.44 for the latter.

EFA was performed on the second subgroup of items. The results showed that all five items for intention to reuse the recommendation agent and items 1-3 for intention to return to the Web site loaded on one factor. Factor loadings for these eight items ranged from 0.61 to 0.84. Item 4 for intention to return to the Web site did not load on its intended factor or on intention to purchase based on the recommendations; instead, item 4 had a factor loading of 0.80 on a third, unidentified factor. Items 1, 3, 4, and 5 for intention to purchase based on the recommendations loaded properly on their intended factor. Factor loadings ranged from 0.60 to 0.84 for these four items. However, item 2 for intention to purchase cross-loaded on its intended factor and the factor to which the items for intention to reuse the recommendation agent and those for intention to return to the Web site converged, and the factor loading was 0.52 for the former construct and 0.58 for the latter.

For the third subgroup of items, the EFA results indicated a three-factor structure. All six items for perceived risk in providing personal information loaded on the appropriate factor, and factor loadings ranged from 0.55 to 0.88 for these six items. The items for privacy/security disclosures were shown to load on two separate factors. Items 1-3 loaded on one factor, and factor loadings ranged from 0.73 to 0.78 for these three items. Items 5-8 loaded on the other factor, and factor loadings ranged from 0.85 to 0.95 for these four items. Item 4 cross-loaded on both factors, and the factor loading was 0.60 for one factor and 0.55 for the other.

For the fourth subgroup of items, the EFA results showed a three-factor structure. All the items for perceived participation loaded on one factor, and factor loadings ranged from 0.72

to 0.84 for these four items. All five items for perceived financial risk loaded on their intended factor, and factor loadings ranged from 0.79 to 0.90 for these five items. For perceived control, items 1, 2, and 7 loaded on the appropriate factor. Factor loadings for these three items ranged from 0.46 to 0.81. However, items 3-6 did not load properly.

Overall, the factor structure identified from the EFA provided preliminary evidence of the discriminant validity of the constructs within each subgroup. Moreover, factor loadings of the items that loaded properly were all above the recommended threshold of 0.40 (Nunnally 1978), providing support for convergent validity. Results from the EFA also flagged several items that did not load properly. An analysis was then performed on each of the flagged items. Results of the analysis are discussed below.

An examination of items 5-7 for trust in the recommendation agent, item 3 for trust in the Web site, and item 1 for trust in recommendations revealed that these flagged items were all worded clearly and appropriately. Moreover, among these five items, four items were the adapted versions of the existing, validated scales in the extant literature. The only exception was that item 3 for trust in the Web site was newly developed and reverse-coded. Item 2 for intention to purchase, which did not load properly, was also a reverse-coded item. Finally, items 3-6 for perceived control were carefully examined. Content validity of these four items did not seem to be a concern as the wordings of these items all seemed to be clear and appropriate, although item 3 was found to be a reverse-coded item.

The unexpected result that the items discussed above did not load properly might be due to the fact that the pretest had a fairly small sample size. Another possible explanation is the

use of the reverse-coded item as the extant literature has documented issues such as unexpected factor structures and diminished scale reliabilities associated with the use of reverse-coded items (e.g., Marsh 1996; Swain, Weathers, and Niedrich 2008; Wong, Rindfleisch, and Burroughs 2003). Because of the exploratory nature of this analysis, it was decided to retain all the items for the main study as the content validity of these items was not a concern as indicated by the item analysis.

Two other unexpected but interesting results were that intention to reuse the recommendation agent and intention to return to the Web site loaded on one factor and that privacy/security disclosures loaded on two separate factors. An examination of the items for intention to reuse the agent and the items for intention to return to the Web site did not raise any concerns of the content validity of those items as all the items were worded clearly and appropriately. A possible explanation for the result that the items for these two intention constructs loaded together was that from participants' perspectives, returning to the Web site and reusing the recommendation agent were simply two integral parts of one action as the agent was embedded within the Web site.

As for the two-factor structure of privacy/security disclosures, an item analysis showed that items 1-3 seemed to reflect participants' perceptions of a Web site's privacy/security policy such as whether the policy was easy to find on the Web site and whether the policy was easy to understand. On the other hand, items 5-8 seemed to capture participants' perceptions and thoughts regarding whether a Web site was capable of and had the monetary as well as technological investment in protecting users' privacy and security. However, the

one-factor structure of intention to reuse the recommendation agent and intention to return to the Web site as well as the two-factor structure of privacy/security disclosures could not be confirmed given the small sample size constraint of the pretest. Therefore, all the items were retained for the main study to see if a larger sample size would yield the same results.

Cronbach's alpha was calculated for each construct. All the items were included in calculating the alpha values as none of the items were dropped in the pretest. For trust in the recommendation agent, Cronbach's alpha was 0.80. For trust in the Web site, the alpha value was 0.85. For trust in recommendations, the alpha value was 0.86. Cronbach's alpha was 0.89 for intention to reuse the agent, 0.82 for intention to return to the Web site, and 0.80 for intention to purchase. For privacy/security disclosures and perceived risk in providing personal information, the alpha value was 0.90 and 0.89 respectively. Finally for perceived participation, perceived financial risk, and perceived control, the alpha value was 0.83, 0.92, and 0.31.

As a summary, the results of manipulation checks and confounding checks performed on the pretest data indicated that both the treatment of consumer participation and that of financial risk were successful, thus addressing the main objective of the pretest. Furthermore, the pretest offered an initial assessment of the validity of the adapted measures, thus addressing the second objective of the pretest. The EFA results provided preliminary evidence of measure validity but also identified problematic items. All the problematic items were analyzed, and the content validity of those items did not appear to be a concern. Therefore, all the items were retained for the main study. The only exception was that the

question stem for perceived control was changed for the main study survey. The original question stem for perceived control read "How did you feel about using the recommendation agent on this Web site?", which seemed to be somewhat vague as the participants might have many other feelings besides the feeling of being in charge and control over using a recommendation agent. Thus, in the main study survey, the question stem was changed to "How much control did you feel about using the recommendation agent on this Web site?" to improve its clarity.

Main Study

117 undergraduate students from the University of Tennessee – Knoxville participated in the main study. The participants were recruited from a large, introductory marketing class offered to students with a minor in business administration. There were 62 participants in the low participation treatment group and 54 participants in the high participation treatment group. 48 participants were in the low financial risk treatment group and 68 participants were in the high financial risk treatment group. The main study followed the same experimental procedure and used the same scenarios employed in the pretest. But the survey instrument was the refined version of the one used in the pretest. There were seven experiment sessions for the main study, given the number of the participants and the size constraint of the computer lab.

Descriptive Statistics

All the participants were in the junior or senior year into their programs. They majored in different areas such as political science, psychology, engineering, architecture, advertising,

and public relations. The participants can be described as Internet technology savvy as about 99% of the participants had at least five years of Internet experiences and 83.6 % of them spent at least one hour on the Internet on a daily basis. Some participants (i.e., 38.8%) reported having used recommendation agents before. But neither shopping.com nor myproductadvisor.com was among the agents which the participants reported having used previously. 45.7% of the participants were female and the average age was 21.91.

Data Distribution

Among the 117 filled surveys, one survey missed two-thirds of the questions. This survey was therefore removed from data analysis, which left a total of 116 valid responses. Mean values for all the 61 substantive items ranged from 2.59 to 4.97. Standard deviations ranged from 0.72 to 1.68. No values of kurtosis or skewness were beyond the threshold of ± 3 (See Table 4.4). Therefore, non-normality did not appear to be a concern for the main study data.

Manipulation Checks

First, cross-tabulations with chi-squared tests were run to check the manipulations. The results showed that both the manipulations had worked. For the manipulation check of consumer participation, the chi-squared test yielded a chi-squared value of 68.25 ($p < 0.001$), indicating that there was a significant difference between the high participation and the low participation group. 51 out of the 54 participants who used the agent on shopping.com indicated that they were asked very few questions, meaning 94.4% of the participants correctly classified themselves in the low participation group. 51 out of the 62 participants

who used the agent on myproductadvisor.com indicated that they were asked a lot of questions, meaning 82.3% of the participants correctly classified themselves in the high participation group. For the manipulation check of financial risk, the chi-squared test yielded a chi-squared value of 30.25 ($p < 0.001$), showing that the difference between the high and low financial risk groups was significant. 84.2% (i.e., 48 out of 57) of the participants who were in the laptop scenario group correctly classified themselves in the high financial risk group. 66.1% (i.e., 39 out of 59) of the participants who read the digital camera scenario correctly classified themselves in the low financial risk group.

The results from t-tests offered further evidence that both the manipulations were successful. The mean difference between the high and low participation group was significant and in the correct direction ($M_{\text{High Participation}} = 5.48$, $M_{\text{Low Participation}} = 3.16$, $t = 8.74$, $p < 0.001$). Similarly, the mean for the high financial risk group was significantly higher than the mean for the low financial risk group ($M_{\text{High FinRisk}} = 4.79$, $M_{\text{Low FinRisk}} = 3.85$, $t = 4.72$, $p < 0.001$).

Additional analyses were performed to ensure that the manipulation of consumer participation did not confound with the manipulation of financial risk. Confounding checks were conducted by running GLM where the consumer participation manipulation and the financial risk manipulation were entered as the fixed factors and participation perceptions as well as financial risk perceptions was the dependent variable. The results showed that the main effect of the consumer participation manipulation on financial risk perceptions was not significant ($F = 1.13$, $p = 0.29$). The interaction effect of the consumer participation

manipulation and the financial risk manipulation on financial risk perceptions was also found to be insignificant ($F = 0.48$, $p = 0.49$). Similarly, the main effect of the financial risk manipulation on participation perceptions was not significant ($F = 0.002$, $p = 0.96$), and the interaction effect was also found to be insignificant ($F = 2.14$, $p = 0.15$).

Measure Validity

EFA using principal component analysis with Varimax rotation was first performed on all 61 items together to identify the factor structure before establishing the measurement models. Items that had factor loadings below the recommended threshold of 0.4 (Nunnally 1978) and those that cross-loaded on unintended factors were dropped from further analysis. Confirmatory factor analysis (CFA) using AMOS 7 was then conducted on the measurement models built on the EFA results. The extant literature has shown that it is a viable approach to assessing measure validity through conducting EFA and CFA sequentially and that this approach has been successfully utilized in past research (e.g., Kumar, Lee, and Kim 2009; Zhu 2002). Below, the EFA results are presented first, which is then followed by the discussion of the CFA results.

1. Exploratory Factor Analysis (EFA)

61 substantive items were subjected to an EFA all at once. Principal component analysis and Varimax rotation were employed in the EFA. Eignevalues over 1 was used as the criterion for factor extraction. The results showed a factor structure with eleven distinctive factors (See Table 4.5). Specifically, for perceived control, items 1, 2, 5, 6, and 7 loaded properly on their intended factor. The factor loadings of these items ranged from 0.40 to 0.82.

Items 3 and 4 had very weak factor loadings, i.e., 0.21 and 0.29 respectively, and were therefore dropped. For trust in the recommendation agent, items 1-5 and item 7 loaded on the appropriate factor, and factor loadings ranged from 0.49 to 0.68 for these six items. But item 6 for trust in the recommendation agent cross-loaded on its intended factor and trust in the Web site, and the factor loading was 0.41 for the former construct and 0.43 for the latter. Therefore, item 6 was dropped from further analysis. For intention to reuse the recommendation agent, all five items loaded on the appropriate factor and the factor loadings of these items ranged from 0.72 to 0.83. Similarly, items for trust in the Web site all loaded properly on their intended factor, and the factor loadings of these five items ranged from 0.47 to 0.71.

The items for intention to return to the Web site were found to load on intention to reuse the recommendation agent, which was consistent with the EFA results based on the pretest data. This result confirmed the explanation discussed earlier, that is, from participants' perspectives, returning to the Web site and reusing the recommendation agent were two parts of one action. Because of the lack of discriminant validity between intention to reuse the agent and intention to return to the Web site, it was decided to collapse these two constructs into one and label it as intention to return to the Web site and reuse the agent.

As for trust in the recommendations, only items 1 and 2 loaded properly on the appropriate factor. The factor loading was 0.78 for item 1 and 0.52 for item 2. Item 3 did not load on any of the factors. Items 4 loaded on trust in the Web site, and the factor loading was 0.45. Item 5 cross-loaded on intention to purchase and trust in the Web site, and the factor

loading was 0.41 for the former construct and 0.59 for the latter. Given this, only items 1 and 2 were retained for trust in recommendations. All five items for intention to purchase based on the recommendations loaded properly on their intended factor, and the factor loadings of these items ranged from 0.66 to 0.86. For privacy/security disclosures, items 1, 2, 3, and 4 loaded on one factor, and items 5, 6, and 8 loaded on another factor. This result was consistent with the two-factor structure identified in the pretest. The factor on which items 1-4 loaded captured participants' perceptions of a Web site's privacy/security policy. The other factor on which items 5, 6, and 8 loaded captured participants' perceptions regarding their privacy/security protection on the Web site. Item 7 was found to cross-load on both factors and was dropped from further analysis. Given this, privacy/security disclosures was decomposed into two constructs, i.e., perceived privacy/security policy, which included items 1-4, and perceived privacy/security protection, which included items 5, 6, and 8.

For perceived risk in providing personal information, the first four items loaded properly on the appropriate factor and the factor loadings of these items ranged from 0.80 to 0.83. Item 5 cross-loaded on its intended factor and perceived privacy/security protection, and the factor loading was 0.49 for the former construct and 0.65 for the latter. Item 6 loaded on perceived privacy/security protection, and the factor loading was 0.73. Therefore, these two items were dropped. For perceived participation, items 2, 3, and 4 loaded properly on their intended factor. The factor loadings of these items ranged from 0.79 to 0.90. However, the first item had a weak factor loading of 0.33 and was thus dropped. Finally, all five items for perceived financial risk loaded properly on their intended factor. The factor loadings of these

five items ranged from 0.73 to 0.91.

As a summary, 51 items were retained from the EFA using the criteria that an item's factor loading needed to be higher than 0.40 and that the item did not cross-load on unintended factors. Cronbach's alpha was then calculated based on the retained items for each construct. For perceived control, Cronbach's alpha was 0.79. For trust in the Web site and trust in the recommendation agent, the alpha value was 0.88 and 0.82 respectively. Intention to return to the Web site and reuse the agent, and intention to purchase had a high alpha value of 0.93 and 0.90 respectively. For perceived privacy/security policy, perceived privacy/security protection, and perceived risk in providing personal information, the alpha was 0.88, 0.86, and 0.90 respectively. Finally, Cronbach's alpha was 0.85 for perceived participation and 0.91 for perceived financial risk. Correlation was reported for trust in recommendations ($r = 0.65$) as this construct only had two items.

Overall, the main study EFA results demonstrated many improvements in measure validity compared to the pretest. For example, after changing the question stem for perceived control in the main study survey, five items out of the total of seven loaded properly compared to the result that only three items properly loaded in the pretest. Cronbach's alpha was improved from 0.31 in the pretest to 0.79 in the main study for perceived control. Additionally, with a larger sample size, the main study results further confirmed the one-factor structure of intention to reuse the agent and intention to return to the Web site as well as the two-factor structure of privacy/security disclosures.

All 51 items retained based on the main study EFA results were then used to establish

two measurement models on which confirmatory factor analysis was performed. The results of CFA are presented below.

2. Confirmatory Factor Analysis (CFA)

CFA was performed on two sub-measurement models as the sample size of the main study was not large enough to provide good estimates for a full model with all 51 items included at once. The first sub-measurement model included the following six constructs: trust in the recommendation agent, trust in the Web site, trust in recommendations, intention to reuse the recommendation agent, intention to return to the Web site, and intention to purchase. The reason that these constructs were grouped together was three-fold: First, such a grouping allowed for a rigorous examination of the discriminant validity of these maximally similar constructs; second, through assessing the discriminant validity of the three trust constructs, one of the research questions raised in Chapter 1, that is whether there is a difference between trust in the recommendation agent, trust in the Web site, and trust in recommendations, could be addressed; third, although the EFA results suggested a lack of discriminant validity between intention to reuse the agent and intention to return to the Web site, a confirmatory analysis was needed to further ensure that these two intentions were indeed one construct. The second sub-measurement model included perceived participation, perceived privacy/security policy, perceived privacy/security protection, perceived risk in providing personal information, and perceived financial risk.

A. Sub-Measurement Model 1: Trust in the Recommendation Agent, Trust in the Web Site, Trust in Recommendations, Intention to Reuse the Recommendation Agent, Intention to Return to the Web Site, and Intention to Purchase Based on the Recommendations

CFA was first performed on the model that included the three trust constructs and the three intention constructs. The CFA results showed that the model had an acceptable fit, χ^2 = 504.67, df = 309, χ^2/df = 1.63, comparative fit index (CFI) = 0.90, and root mean square error of approximation (RMSEA) = 0.07.

However, the correlation between intention to reuse the agent and intention to return to the Web site was found to be 1. Moreover, an examination of the modification indices revealed that item 4 for intention to return to the Web site, which read "I would bookmark this Web site," cross-loaded on three different constructs, i.e., trust in the recommendation agent, trust in the Web site, and intention to purchase. In addition, items 3 for intention to return to the Web site and item 3 for intention to reuse the recommendation agent were shown to correlate highly with each other and had a modification index higher than 10. Therefore, these three items were dropped from further analysis. The retained two items from intention to return to the Web site and four items from intention to reuse the recommendation agent were re-specified as the manifest items for intention to return to the Web site and reuse the agent.

Another CFA was conducted on the refined model in which intention to return to the Web site and intention to reuse the agent were collapsed into one construct and the three items discussed above were deleted. The refined model was shown to fit the data well, χ^2 = 346.05, df = 242, χ^2/df = 1.43, CFI = 0.94, and RMSEA = 0.06.

Convergent validity was supported by (1) the good fit indices of the refined model, and (2) the substantial factor loadings of the items onto their intended constructs, which ranged from 0.56 to 0.91 and were all significant at $p < 0.001$. Discriminant validity among the five constructs was assessed by first examining the correlations among these constructs. These correlations ranged from 0.42 to 0.63, with the exception of the correlation between trust in the Web site and trust in the recommendation agent, which was 0.73 (See Table 4.6). Overall, these correlations were within the acceptable range, thus providing evidence of discriminant validity. But to confirm the discriminant validity between trust in the Web site and trust in the agent, a comparison was conducted between the model in which the covariance between these two constructs was constrained to 1 and the original model where the covariance between these two constructs were unconstrained. The results showed that the constrained model was inferior to the unconstrained model, $\chi^2 = 407.39$, $df = 246$, $\chi^2/df = 1.66$, CFI = 0.90, and RMSEA = 0.08. The chi-square difference between these two models was significant, $\Delta\chi^2 = 61.34$, $\Delta df = 4$, $p < 0.001$. Therefore, the discriminant validity between trust in the Web site and trust in the agent was further supported.

The reliabilities of the constructs (Cronbach's alpha values) reported earlier remained the same for trust in the recommendation agent ($\alpha = 0.82$), trust in the Web site ($\alpha = 0.88$), trust in recommendations ($r = 0.65$), and intention to purchase ($\alpha = 0.90$). Cronbach's alpha was re-calculated for intention to return to the Web site and reuse the agent as three items were dropped in the refined model. Cronbach's alpha was 0.91 for this construct.

B. Sub-Measurement Model 2: Perceived Control, Perceived Privacy/Security Policy, Perceived Privacy/Security Protection, Perceived Risk in Providing Personal Information, Perceived Participation, and Perceived Financial Risk

As discussed earlier, the EFA results showed that privacy/security disclosures was in fact two separate constructs, i.e., perceived privacy/security policy and perceived privacy/security protection. To confirm this finding, CFA was first performed on the model that included perceived control, perceived risk in providing personal information, perceived participation, perceived financial risk, and privacy/security disclosures as one construct. The results indicated that the model did not fit the data well, $\chi^2 = 580.25$, $df = 266$, $\chi^2/df = 2.18$, CFI = 0.88, and RMSEA = 0.08.

An examination of the modification indices revealed that items 1 and 2 for privacy/security disclosures highly correlated with each other and had a substantial modification index of 23.69. Item 1 was also found to correlate highly with item 3 and the modification index was 11.37. Items 3 and 4 were found to highly correlate with each other and had a modification index as high as 26.19. In addition, the standardized residual covariance between items 3 and 4 was 3.31, and that between items 1 and 2 was 3.6. Both were well beyond the threshold of $\pm$ 2. On the other side, items 5, 6, and 8 were found to correlate among each other and had high modification indices that ranged from 15.15 to 17.47. Finally, item 7 was found to cross-load on perceived participation. These results were consistent with those of the EFA results and suggested that privacy/security disclosures needed to be separated into two constructs. Therefore, items 1-4 were re-specified as the manifest variables for perceived privacy/security policy. Items 5, 6, and 8 were re-specified as the manifest variables for perceived privacy/security protection. Item 7 was dropped

because of the cross-loading. In addition, for perceived control, item 7 was found to have a very weak factor loading of 0.39. Thus, this item was also dropped from further analysis.

Another CFA was conducted on the refined model in which privacy/security disclosures was decomposed into two constructs and item 7 for perceived control was dropped due to the low factor loading. The results showed that the refined model fit the data well, $\chi^2 = 315.83$, $df = 215$, $\chi^2/df = 1.47$, CFI = 0.94, RMSEA = 0.06. Convergent validity of the constructs in the refined model was supported by the good fit indices and by the significant factor loadings of the items on their intended constructs. The factor loadings ranged from 0.41 to 0.99 and were all significant at $p < 0.001$. Discriminant validity was assessed by examining the correlations among all six constructs. These correlations ranged from -0.21 to 0.20, with the exception that the correlation between perceived privacy/security policy and perceived privacy/security protection was 0.71 (See Table 4.6). Overall, these correlations provided evidence of discriminant validity as they were within the acceptable range. But since perceived privacy/security policy and perceive privacy/security protection had a correlation of 0.71, a model comparison was conducted to confirm the discriminant validity between these two constructs.

Specifically, the model in which the covariance between perceived privacy/security policy and perceived privacy/security protection was constrained to 1 was compared to the original model where these two constructs were allowed to freely correlate. The results showed a poor model fit for the constrained model, $\chi^2 = 402.08$, $df = 220$, $\chi^2/df = 1.83$, CFI = 0.89, RMSEA = 0.09. The chi-square difference between the constrained and unconstrained

model was significant, $\Delta\chi^2 = 86.25$, $\Delta df = 5$, $p < 0.001$. Therefore, the discriminant validity between perceived privacy/security policy and perceived privacy/security protection was further supported. The reliabilities of the constructs (Cronbach's alpha values) reported earlier remained the same and ranged from the lowest of 0.85 for perceived participation to the highest of 0.91 for perceived financial risk. The only exception was that Cronbach's alpha was re-calculated for perceived control as the last item of this construct was dropped in the refined model. The new alpha value for perceived control was 0.81 and improved after dropping the item.

As a summary, the CFA results showed that after refining the measurement models, the constructs appeared to be reliable and demonstrated both convergent and discriminant validity. Moreover, the good fit statistics provided further support for the construct validity of the individual constructs in the measurement models. Table 4.7 provides a summary of the retained items for each construct in the refined measurement models, factor loadings of the items, and Cronbach's alpha values.

Hypothesis Testing

With the construct validity and reliability established, structural equation modeling (SEM) with AMOS 7 was used to test the hypotheses proposed in the research model. Originally, there were sixteen research hypotheses. The inclusion of perceived privacy/security policy and perceived privacy/security protection increased the total number of hypotheses to be tested to eighteen. Due to the sample size constraint, these eighteen hypotheses were tested with two structural models. Structural model 1 focused on the effects

of consumer participation and included hypotheses 1-12. Structural model 2 focused on the effects of privacy/security disclosures and included hypotheses 13-16. Trust in recommendations was added to structural model 2 to make it a recursive model and to further test the trust transference process. Therefore, hypotheses 4-6 were also included in structural model 2. Hypotheses 13 and 14 were tested separately for perceived privacy/security policy, i.e., hypotheses 13.1 and 14.1, and for perceived privacy/security protection, i.e., hypotheses 13.2 and 14.2.

Perceived participation, a perception measure of the manipulation of consumer participation in using a recommendation agent, was used in the structural models to test related hypotheses. Intention to return to the Web site and reuse the agent was used to test hypotheses 7, 8, and 12 as intention to return to the Web site and intention to reuse the recommendation agent were combined into one construct. Structural model 1 is depicted in Figure 4.1, and structural model 2 is depicted in Figure 4.2. The results of hypothesis testing are discussed below.

1. Structural Model 1

SEM with AMOS 7 was used to test the first structural model as depicted in Figure 4.1. The model fit was acceptable, $\chi^2 = 623.16$, $df = 423$, $\chi^2/df = 1.47$, CFI = 0.90, RMSEA = 0.06. Among the twelve hypotheses tested, seven were strongly supported, one was marginally supported, and the other four hypotheses were not supported.

Hypotheses 1, 2, 3, and 10 stated that the level of consumer participation in using a recommendation agent will have a positive effect on trust in the Web site that hosts the agent,

a positive effect on trust in the agent, a positive effect on trust in recommendations, and a positive effect on perceived control over using the agent. The standardized β coefficient for consumer participation was -0.09 (t = -0.84, p = 0.40) for hypothesis 1, 0.18 (t = 2.00, p = 0.046) for hypothesis 2, 0.06 (t = 0.63, p = 0.53) for hypothesis 3, and 0.08 (t = 0.86, p = 0.39) for hypothesis 10. Thus, hypothesis 2 was supported, and hypotheses 1, 3, and 10 were not supported.

Independent-samples t-test was used to perform an additional test for hypotheses 1-3 as well as hypothesis 10 and to show the mean difference in trust in the Web site, trust in the recommendation agent, trust in recommendations, and perceived control across the high and low participation groups. The results indicated that consumers' trust in the Web site for the high participation group ($M_{\text{High Participation}}$ = 3.89) was slightly higher than that for the low participation group ($M_{\text{Low Participation}}$ = 3.71). But the difference was not statistically significant across the high and low participation groups, t = 1.48, p = 0.14. Therefore, hypothesis 1 was not supported. For hypothesis 2, t-test results showed that consumers who participated more in using a recommendation agent had significantly higher trust in the agent ($M_{\text{High Participation}}$ = 4.16) than those who participated less ($M_{\text{Low Participation}}$ = 3.62), t = 5.12, p = 0. Thus, hypothesis 2 was supported. For hypothesis 3, consumers who were in the high participation group had a slightly higher level of trust in recommendations ($M_{\text{High Participation}}$ = 3.94) than those who were in the low participation group ($M_{\text{Low Participation}}$ = 3.73). But the difference was not statistically significant across the high and low participation groups, t = 1.5, p = 0.14. Thus, hypothesis 3 was not supported. Finally, for hypothesis 10, t-test results indicated that

consumers who participated more in using a recommendation agent had a slightly higher level of perceived control over using the agent ($M_{\text{High Participation}} = 4.36$) than those who participated less ($M_{\text{Low Participation}} = 4.26$), but the difference was not significant, $t = 0.81$, $p = 0.42$. Therefore, hypothesis 10 was not supported. The t-test results from testing these four hypotheses were consistent with the SEM results discussed earlier, with the exception of hypothesis 1. The t-test results indicated that although the hypothesized effect of consumer participation on trust in the Web site was not significant, it was in the predicted direction. However, the SEM results showed an insignificant, but negative standardized β coefficient for consumer participation, which was in the opposite direction of what was predicted.

Hypotheses 4 and 5 proposed that consumers' trust in the Web site that hosts the recommendation agent will have a positive effect on trust in the agent and a positive effect on trust in recommendations. The results showed strong support for both hypotheses. The standardized β coefficient for trust in the Web site was 0.70 ($t = 6.05$, $p < 0.001$) in hypothesis 4 and 0.50 ($t = 3.37$, $p < 0.001$) in hypothesis 5. Hypothesis 6 stated that consumers' trust in the recommendation agent will have a positive effect on trust in recommendations. The results also showed strong support for this hypothesis. The standardized β coefficient for trust in the recommendation agent was 0.37 ($t = 2.43$, $p = 0.015$).

Hypothesis 7 stated that consumers' trust in the Web site that hosts the recommendation agent will have a positive effect on intention to return to the Web site. Hypothesis 8 proposed that consumers' trust in the recommendation agent will have a positive effect on intention to reuse the agent. Intention to return to the Web site and reuse the agent was used as the

outcome variable in testing these two hypotheses. The results supported hypothesis 7, but not hypothesis 8. The standardized β coefficient for trust in the Web site was 0.32 ($t = 2.27$, $p = 0.02$), and that for trust in the agent was 0.19 ($t = 1.32$, $p = 0.19$). Hypothesis 9 proposed that consumers' trust in recommendations will have a positive effect on intention to purchase based on the recommendations. This hypothesis was strongly supported. The standardized β coefficient was 0.72 for trust in recommendations, $t = 6.13$, $p < 0.001$.

Hypotheses 11 and 12 stated that perceived control over using a recommendation agent will have a positive effect on consumers' intentions to reuse the agent and a positive effect on consumers' trust in the agent. Intention to return to the Web site and reuse the agent was used to test hypothesis 11. The results indicated that hypothesis 11 was supported, with a standardized β coefficient of 0.25 for perceived control ($t = 2.77$, $p = 0.006$). Hypothesis 12 was marginally supported, and the standardized β coefficient was 0.14, $t = 1.75$, $p = 0.08$.

The support of hypotheses 2, 4, and 12 indicated that 51.8% of the total variance in trust in the recommendation agent was explained by consumer participation, trust in the Web site, and perceived control. For trust in recommendations, trust in the Web site and trust in the recommendation agent accounted for 63.9% of its total variance. Perceived control and trust in the Web site explained 29.6% of the total variance in intention to return to the Web site and reuse the agent. Finally, 51.3% of the variance in intention to purchase was accounted for by trust in recommendations.

2. Structural Model 2

The second structural model was also tested using SEM with AMOS 7. The model fit

was good, $\chi^2 = 349.63$, $df = 242$, $\chi^2/df = 1.45$, CFI = 0.93, RMSEA = 0.06. Hypotheses 4-6 were supported in structural model 2 as well, providing further validation of the trust transference process. Among the rest of the four hypotheses tested, two were supported and the other two were not.

For the supported hypotheses 4-6, the standardized β coefficient was 0.75 ($t = 6.15$, $p < 0.001$), 0.39 ($t = 2.70$, $p = 0.007$), and 0.31 ($t = 2.03$, $p = 0.043$) respectively. Hypotheses 13 and 14 stated that privacy/security disclosures on the hosting Web site of a recommendation agent will have a positive effect on consumer trust in the Web site and a negative effect on consumers' perceived risk in providing personal information. As discussed earlier, perceived privacy/security policy was used to test hypotheses 13.1 and 14.1, and perceived privacy/security protection was used to test hypotheses 13.2 and 14.2. The results did not support hypotheses 13.1, and the standardized β coefficient for perceived privacy/security policy was 0.15 ($t = 1.08$, $p = 0.28$). Hypothesis 13.2 was not supported. The standardized β coefficient for perceived privacy/security protection was 0.23 ($t = 1.55$, $p = 0.12$). The results supported hypothesis 14.2, with a standardized β coefficient of -0.32 for perceived privacy/security protection, $t = -2.04$, $p = 0.04$. But hypothesis 14.1 was not supported. The standardized β coefficient for perceived privacy/security policy was 0.20 ($t = 1.34$, $p = 0.18$).

Finally, hypotheses 15 and 16 proposed that perceived risk in providing personal information will have a negative effect on consumers' trust in the hosting Web site of a recommendation agent and a negative effect on consumers' trust in the recommendation agent. The results strongly supported hypothesis 15, with a standardized β coefficient of

-0.35 for perceived risk in providing personal information, $t = -3.70$, $p < 0.001$. But hypothesis 16 was not supported. The standardized β coefficient was 0.04 ($t = 0.49$, $p = 0.62$).

The support of hypotheses 14.2 and 15 indicated that perceived privacy/security protection explained 5.1% of the variance in perceived risk in providing personal information and that perceived risk in providing personal information alone explained 27.1% of the variance in trust in the Web site. The results of hypothesis testing are summarized in Table 4.8.

Post Hoc Analysis

The result that neither perceived privacy/security policy nor perceived privacy/security protection had any effects on trust in the Web site was somewhat counterintuitive and inconsistent with the findings from past research. Moreover, only perceived privacy/security protection was found to negatively affect perceived risk in providing personal information. Additional tests were then conducted to further explore the relationships among perceived privacy/security policy, perceived privacy/security protection, trust in the Web site, and perceived risk in providing personal information. Specifically, in structural model 2, a direct path leading from perceived privacy/security policy to perceived privacy/security protection was added and perceived privacy/security protection was redefined as an endogenous variable. The rationale for adding this path was that consumers' perceptions of a Web site's privacy/security policy might influence their perceptions of how well the Web site protected the privacy and security of their personal information. In other words, if consumers had high

opinions of a Web site's privacy/security policy, their perceptions of the privacy/security protection on this Web site would be expected to be higher.

The results showed that the new model had the model fit statistics identical with those of the original structural model 2, $\chi^2 = 349.63$, $df = 242$, $\chi^2/df = 1.45$, CFI = 0.93, RMSEA = 0.06. Hypotheses 4-6, hypothesis 14.2, and hypothesis 15 were still supported in the new model. The standardized β coefficient for trust in the Web site was 0.75 ($t = 6.15$, $p < 0.001$) in hypothesis 4 and 0.39 ($t = 2.70$, $p = 0.007$) in hypothesis 5. The standardized β coefficient for trust in the recommendation agent was 0.31 ($t = 2.03$, $p = 0.043$) in hypothesis 6. For hypothesis 14.2, the standardized β coefficient was -0.32 ($t = -2.04$, $p = 0.04$) for perceived privacy/security protection. For hypothesis 15, the standardized β coefficient was -0.35 ($t = -3.70$, $p < 0.001$) for perceived risk in providing personal information. Additionally, perceived privacy/security policy was found to have a strong, positive effect on perceived privacy/security protection, with a standardized β coefficient of 0.70 for perceived privacy/security policy ($t = 7.75$, $p < 0.001$). 49.3% of the variance in perceived privacy/security protection was accounted for by perceived privacy/security policy.

Additional analysis was also performed to further explore the effects of consumer participation to see if consumer participation had any direct effects on behavioral intentions. To do so, two paths leading from consumer participation were added in structural model 1. One path was from consumer participation to intention to return to the Web site and reuse the agent, and the other path was from consumer participation to intention to purchase based on the recommendations. The results showed that the chi-square difference between the new

model and the original model was not statistically significant, $\Delta\chi^2 = 4.53$, $\Delta df = 2$, $p > 0.05$. Furthermore, consumer participation was not found to have any direct effects on intention to return to the Web site and reuse the agent or intention to purchase.

Exploratory Analysis

As explained earlier in Chapter 3, an exploratory research issue in this dissertation was to examine whether financial risk involved in a purchase had any moderating effects on the effects of consumer participation and the effects of privacy/security disclosures. SEM could not be used to test the moderating effects due to the sample size constraint. Therefore, GLM was employed to examine whether financial risk involved in a purchase moderated the effects of consumer participation on trust in the Web site, trust in the recommendation agent, trust in recommendations, and perceived control.

The results showed several interesting findings. First, the financial risk manipulation, i.e., product type, was found to have a marginally significant main effect on trust in the Web site ($F = 3.58$, $p = 0.06$) and a significant main effect on trust in recommendations ($F = 4.15$, $p = 0.04$). Independent samples t-test was then used to examine the mean difference in trust in the Web site and the mean difference in trust in recommendations across the high and low financial risk groups. The results revealed that participants who were in the high financial risk group had a significant lower level of trust in the Web site ($M_{\text{High Financial Risk}} = 3.69$) compared to those who were in the low financial risk group ($M_{\text{Low Financial Risk}} = 3.95$), $t = -2.08$, $p = 0.04$. Similarly, participants who were in the high financial risk group had a significant lower level of trust in recommendations ($M_{\text{High Financial Risk}} = 3.69$) compared to those who

were in the low financial risk group ($M_{\text{Low Financial Risk}} = 4.02$), $t = -2.33$, $p = 0.02$.

Another finding was that the interaction of the consumer participation manipulation and the financial risk manipulation had a significant effect on trust in the Web site ($F = 5.07$, $p = 0.03$) and a significant effect on trust in recommendations ($F = 6.63$, $p = 0.01$). Further analysis showed that for the high participation group, the negative effect of financial risk on consumer's trust in the Web site and trust in recommendations became insignificant. On the other hand, the negative effect of financial risk on consumers' trust in the Web site and trust in recommendations was evident for the low participation group. T-test results showed that for the low participation group, participants who were in the high financial risk group had a significantly lower level of trust in the Web site ($M_{\text{High Financial Risk}} = 3.53$) than those who were in the low financial risk group ($M_{\text{Low Financial Risk}} = 4.05$), $t = -2.62$, $p = 0.01$. Similarly, for the low participation group, participants who were in the high financial risk group had a significantly lower level of trust in recommendations ($M_{\text{High Financial Risk}} = 3.49$) than those who were in the low financial risk group ($M_{\text{Low Financial Risk}} = 4.16$), $t = -3.53$, $p = 0.001$. See Figure 4.3 for an illustration of the interaction effects.

Another set of tests were conducted to examine whether financial risk moderated the effect of perceived privacy/security policy and that of perceived privacy/security policy on trust in the Web site and perceived risk in providing personal information. Perceived privacy/security policy and perceived privacy/security policy were first recoded into categorical variables using a median split. GLM was then run to test the moderating effects. The results did not support any of the moderating effects being tested.

Finally, perceived financial risk, after being recoded into a categorical variable using a median split, was also used in GLM to examine the moderating effects. But none of the moderating effects were significant.

Testing Mediating Effects

Mediation tests could not be performed to address the research question raised in Chapter 1, that is, whether perceived control and perceived risk in providing personal information mediated the effects of consumer participation and privacy/security disclosures. The mediation of perceived control was not established because consumer participation did not significantly affect perceived control as indicated by the rejection of hypothesis 10.

The mediation of privacy/security disclosures was checked for perceived privacy/security policy and perceived privacy/security protection separately. For perceived privacy/security policy, the mediation could not be validated because perceived privacy/security policy did not significantly affect perceived risk in providing personal information as indicated by the rejection of hypothesis 14.1. For perceived privacy/security protection, the mediation could not be validated either because perceived privacy/security protection did not significantly affect trust in the Web site as indicated by the rejection of hypothesis 13.2.

CHAPTER 5

DISCUSSION AND CONCLUSIONS

Discussion of Findings

This dissertation was guided by four sets of research questions. The findings are discussed as they relate to those research questions and presented below.

Research Question 1: Do consumer participation and privacy/security disclosures increase consumer trust when using recommendation agents? Do perceived control and perceived risk in providing personal information mediate these effects?

The first part of this research question was addressed by testing hypotheses 1-3 and hypothesis 13. The results showed that consumer participation in using a recommendation agent had a significant positive effect on consumers' trust in the agent, supporting hypothesis 2. This finding was consistent with previous research where participation was found to positively affect trust. For instance, Ouschan, Sweeney, and Johnson (2006) found that patients were more trusting of and committed to those physicians who let their patients participate more in the patient-physician consultations. Similarly but in a different research context, Wang and Wart (2007) found that public participation, through actively involving in the public policies and government operations, had a positive effect on public's trust in the administration.

However, the positive effect of consumer participation on trust in the Web site (i.e., hypotheses 1) and the positive effect of consumer participation on trust in recommendations (i.e. hypothesis 3) were not supported. A possible explanation for the insignificant effects of

consumer participation on trust in the Web site and trust in recommendations is that although a recommendation agent is embedded in and operating through its Web site, it is the agent that consumers directly interact with. The Web site that hosts the agent and the recommendations provided by the agent are distal objects compared to the agent itself. As a result, the positive effect of consumer participation on trust in the agent was not carried over into trust in the Web site or trust in the recommendations.

The hypothesized positive effect of privacy/security disclosures on trust in the Web site (i.e., hypothesis 13) was tested separately for perceived privacy/security policy and for perceived privacy/security protection. The results did not support either the positive effect of perceived privacy/security policy or that of perceived privacy/security protection on consumers' trust in the Web site. Thus, hypothesis 13 was rejected.

The second part of this research question was addressed by the mediation tests of perceived control and perceived risk in providing personal information. Because the positive effect of consumer participation on perceived control (i.e. hypothesis 10) was not supported, perceived control as a mediator between consumer participation and trust in the recommendation agent could not be validated. The insignificant effect of consumer participation on perceived control might be due to the lack of variation in participants' perceptions of control over using the recommendation agent. In fact, the variance for perceived control was 0.43 and the mean was 4.31, with a minimum value of 1.75 and a maximum value of 5. The homogeneity of the participants in this study might be s a possible reason for the lack of variation in perceived control. On the other hand, the fact that the

majority of the participants in this study were experienced Internet users contributed to the high mean for perceived control. This is because participants' familiarity with the Internet technology makes them feel a greater sense of control over using the recommendation technology on the Internet.

Perceived control was found to have a significant positive effect on consumers' intentions to return to the Web site and reuse the recommendation agent, supporting hypothesis 11. Perceived control was also found to have a marginally significant positive effect on trust in the recommendation agent. Therefore, hypothesis 12 was marginally supported. These findings provided converging evidence that perceived control is a salient factor that motivates consumers to use technology-based self-service (TBSS) options (e.g., Dabholkar 1996; Dabholkar and Sheng 2008; Dellaert and Dabholkar 2009) and helps consumers build trust in the technology (e.g., Kernal 1999; Wang and Benbasat 2008).

Perceived risk in providing personal information as a mediator between perceived privacy/security policy and trust in the Web site could not be validated as perceived privacy/security policy did not significantly affect trust in the Web site. Similarly, the mediation of perceived risk in providing personal information could not be established for perceived privacy/security protection as perceived privacy/security did not significantly affect trust in the Web site.

Research Question 2: Is there any difference between trust in a recommendation agent, trust in the website that hosts the recommendation agent, and trust in the recommendation provided by the agent? If so, what is the relationship between them?

The results from factor analysis showed that trust in the recommendation agent, trust in the Web site that hosts the agent, and trust in the recommendations provided by the agent were three distinctive constructs. The current study complemented past research where the recommendation agent was the sole trust referent by confirming the existence of the other two trust referents, i.e., the Web site and the recommendations. The finding that consumers developed trust at different levels and toward different entities was in fact consistent with online research where trust was found to function through both a cognitive and an affective process (e.g., Dabholkar, van Dolen, and de Ruyter 2009) and was consistent with offline research where trust with different trusting objects was studied (e.g., Doney and Cannon 1997; Fang, Palmatier, Scheer, and Li 2008; Wood, Boles, and Babin 2008).

Hypotheses 4-6 were proposed to examine the relationships among the three trust constructs. The results provided strong support for the hypothesized positive effect of trust in the Web site on trust in the recommendation agent (i.e., H4), the positive effect of trust in the recommendation agent on trust in the recommendations (i.e., H5), and the positive effect of trust in the Web site on trust in the recommendations (i.e., H6). This finding empirically verified the trust transference process proposed in this dissertation and therefore, successfully extended past research that studied the trust transference process within the offline, buyer-seller relationship context (e.g., Wood, Boles, and Babin 2008) to the online

context of consumers using recommendation agents. The finding also complemented past research that examined the trust transference process within the online context (e.g., Stewart 2003) through validating this process in the novel research context of consumers' using online recommendation agent. This transference process suggests that trust in the hosting Web site of a recommendation agent was transferred and thus led to a higher level of trust in the agent as well as a higher level of trust in the recommendations and that trust in the agent was transferred and thus led to a higher level of trust in the recommendations. The relationships among different trusts substantiated in the current study were consistent with past research where consumers' cognitive trust was found to positively affect their affective trust within the online group chat context (e.g., Dabholkar, van Dolen, and de Ruyter 2009).

Research Question 3: Do privacy/security disclosures reduce consumers' perceived risk in providing personal information?

The results did not support the negative effect of perceived privacy/security policy on consumers' perceived risk in providing personal information. But perceived privacy/security protection was found to have a significant negative effect on perceived risk in providing personal information. Thus, hypothesis 14 was only supported for perceived privacy/security protection.

Although perceived privacy/security policy did not significantly affect perceived risk in providing personal information, this insignificant effect in and of itself was an interesting finding. This finding suggests that compared to consumers' perceptions of a Web site's privacy/security policy, the perception of the privacy/security protection on a Web site is a

more salient factor in predicting perceived risk in providing personal information on that Web site. In other words, it is not enough to just have privacy/security policies displayed on Web sites as the inclusion of privacy/security policies has become a standard practice for most of the Web sites (e.g., Adkinson, Eisenach, and Lenard 2002).

Another interesting finding from post hoc analysis is that perceived privacy/security policy had a significant positive effect on perceived privacy/security protection. This finding suggests that although the inclusion of the privacy/security policy is not sufficient to build trust and decrease risk perceptions, it is still necessary as consumers' perceptions of a Web site's privacy/security policy determine how well they think their privacy and security are protected on that Web site.

Overall, the results from testing hypotheses 13 and 14 provided additional evidence for the important role of a Web site's privacy/security disclosures, reflected through consumers' perceptions of the privacy/security protection, in reducing consumers' perceptions of providing personal information on the Web site (e.g., Xie, Teo, and Wan 2006; Wang, Beatty, and Foxx 2004).

Research Question 4: What are the consequences of consumer participation and privacy/security disclosures in using recommendation agents?

A consequence of consumer participation in using a recommendation agent is its direct, positive effect on trust in the agent. Trust in the recommendation agent in turn, was found to have a positive effect on trust in recommendations as a result of the trust transference process. Moreover, trust in recommendations was found to have a significant positive effect on

consumers' intentions to purchase the product(s) recommended by the agent, supporting hypothesis 9.

Privacy/security disclosures, reflected through consumers' perceptions of the privacy/security protection, decreased consumers' perceived risk in providing personal information, which in turn led to an increased trust in the Web site. The results also showed that trust in the Web site positively influenced consumers' intentions to return to the Web site and reuse the agent, supporting hypothesis 7.

Therefore, the ultimate outcomes of consumer participation and privacy/security disclosures in using a recommendation agent are a greater likelihood that consumers will come back to the Web site and reuse the recommendation agent as well as make purchases based on the agent's product recommendations.

Additional Findings Based on Exploratory Analysis

The moderating effects of financial risk involved in a purchase were examined as an exploratory issue in this study. GLM results showed that the interaction of the financial risk manipulation and the consumer participation manipulation had a significant effect on trust in the Web site and a significant effect on trust in recommendations. Moreover, the financial risk manipulation was found to have a significant negative effect on consumers' trust in the Web site as well as trust in recommendations. Further analysis revealed that the negative effect of financial risk on consumers' trust in the Web site and trust in recommendations was supported only in the low participation group. For the high participation group, the negative effect of financial risk on trust in the Web site and trust in recommendations became

insignificant.

The finding that financial risk negatively affected consumers' trust makes intuitive sense because as the level of financial risk involved in a purchase increases, consumers will become more cautious of the Web site from which they might make the purchase and more cautious of what the agent recommends to them. The caution that consumers have under such a purchase situation in turn, makes them have less trust in the Web site as well as in the recommendations. Moreover, the negative effect of financial risk was only found to exist when consumers had a lower level of participation in using a recommendation agent. A possible explanation is that when consumers choose to participate less or are not given enough room to participate due to the design of the recommendation agent, consumers' understanding of how an agent works can be limited. This limited understanding contributes to the uncertainty and caution that consumers might have towards the Web site and the recommendations, which makes the negative effect of financial risk more evident. On the other hand, when consumers participate more by putting into more of their own work, effort, and time, they understand better the way the agent works and the reason why certain recommendations are made, which explains the insignificant negative effect of financial risk in the high participation group.

Theoretical Contributions

This dissertation made several theoretical contributions. First, this dissertation proposed that in addition to trust in the recommendation agent, trust in the hosting Web site of a recommendation agent and trust in the recommendations provided by the agent are the other

two important trust constructs. The results supported this proposition and showed that trust in the recommendation agent, trust in the Web site that hosts the agent, and trust in the recommendations are three distinctive but related constructs. This finding contributed to the extant literature on recommendation agents by presenting a fuller picture of the trust issue within the agent-mediated environment.

A second contribution is that the trust transference process was empirically tested and verified within the context of consumers' using online recommendation agents. Therefore, this dissertation successfully extended the trust transference process from the offline buyer-seller relationship context to the online context. Moreover, this dissertation also complemented past research that examined the online trust transference process by studying a different set of trusting objects and validating this process within the current research context. The results showed strong support for the trust transference process where trust in the Web site was carried over and led to a higher level of trust in the agent as well as a higher level of trust in the recommendations; and similarly trust in the agent was carried over and led to higher level of trust in the recommendations.

Third, a consumer-centric perspective was taken by bringing in the concept of consumer participation to examine the phenomenon of consumers' using online recommendation agents. Although consumer participation is an inherent part of technology-based self-service (TBSS) (cf., Dabholkar 1990), the role of consumer participation in using recommendation technology has been largely ignored in past research on recommendation agents. Therefore, through examining the role of consumer participation in using recommendation agents, this

dissertation contributed to the consumer participation literature by extending the concept of consumer participation from the traditional offline context into the current online context of using recommendation agents.

Furthermore, the role of consumer participation was empirically tested in this dissertation. Although consumer participation was found to have a significant positive effect only on trust in the recommendation agent, this finding contributed to the existing literature by identifying consumer participation as a factor that helps build consumers' trust in recommendation agents. Another contribution is that through examining the effects of perceived control, a salient construct in TBSS research, this dissertation provided additional evidence that perceived control is an important factor that motivates consumers to use TBSS options. At the same time, the finding that perceived control positively affected consumers' trust in the recommendation agent further substantiated the crucial role of perceived control in using technologies and thus, extended the TBSS research into a new technology context

The effects of a Web site's privacy/security disclosures, another neglected issue in past research into recommendation agents, were also examined in this dissertation. The finding that consumers' perceptions of a Web site's privacy/security disclosures were reflected not only in perceived privacy/security policy but also in perceived privacy/security protection provided a fuller picture in conceptualizing the construct of privacy/security disclosures. Moreover, the positive effect of perceived privacy/security policy on perceived privacy/security protection underscores the importance of providing privacy/security policies on Web sites.

Finally, in addition to intention to reuse the recommendation agent, the current study also included intention to return to the hosting Web site of the agent and intention to purchase based on the recommendations as the other two outcome variables. Therefore, this dissertation expanded the scope of the outcome variables that previous research focused on. Moreover, the current study found that intention to reuse the agent and intention to return to the Web site were in fact one construct as consumers did not differentiate between these two behavioral intentions. By studying intention to purchase as well as intention to return and reuse, the combined construct of intention to return to the Web site and intention to reuse the agent, this dissertation identified the factors that drove consumers to purchase the product(s) recommended by the agent and to return to the Web site as well as reuse the agent. In so doing, this dissertation contributed to the extant literature on recommendation agents by validating the important role of perceived control and trust in the Web site in determining consumers' intention to return to the Web site and reuse the agent and by verifying trust in recommendations as an important predictor of consumers' intention to purchase.

Managerial Implications

Managerial implications are discussed as they relate to the findings of this dissertation and are presented below.

A. Consumer Participation

Consumer participation was found to have a positive effect on trust in the recommendation agent. This suggests that in order to increase consumers' trust in recommendation agents, the agents need to be designed in such a way that allows more room

for consumers to participate. Letting consumers to answer more questions is one way to increase participation in consumers' interactions with a recommendation agent. Another possibility is to empower consumers with opportunities to ask the agent questions, which is another active way to engage consumers and increase consumers' participation. For example, a live chat function can be added to the Web site that hosts the recommendation agent so that consumers can initiate the dialogues with the agent and ask questions when needed.

Findings from the exploratory analysis indicated that the negative effect of financial risk on consumers' trust in the Web site and trust in recommendations only held when consumers were in the low participation group. Therefore, when a recommendation agent is designed to only allow limited participation from consumers, marketers need to take actions to offset the negative effect of financial risk on consumers' trust. For example, an explanation function can be added to a low-participation agent so that the agent can explain the reasoning of why certain product recommendations are made to consumers. In so doing, consumers' lack of understanding and uncertainty towards the recommendations can be resolved, which can help build consumers' trust and thus mitigate the negative effect of financial risk. Although the negative effect of financial risk on consumers' trust was insignificant for the high participation group, a better strategy for marketers to consider is to equip recommendation agents with the flexibility in adjusting the room for consumer participation according to the monetary value of a purchase. In order to do so, consumers' price preferences for a product should be captured first. For example, consumers' price preferences should be used as one of the screening questions on the homepage of a

recommendation agent's Web site. The agent can then customize the level of participation after getting the information on consumers' price preferences.

B. Privacy/security disclosures and perceived risk in providing personal information

The negative effect of perceived privacy/security protection on perceived risk in providing personal information suggests that marketers should employ strategies to improve consumers' perceptions of a Web site's capability in protecting consumers' privacy and security. Moreover, the positive effect of perceived privacy/security policy on perceived privacy/security protection suggests that consumers' perceptions of the privacy/security protection on a Web site are determined by their perceptions of the privacy/security policy. This chain of effects pointed out the importance of a Web site's privacy/security policy.

Therefore, to reduce consumers' risk perceptions in providing personal information and to increase consumers' perceived privacy/security protection, marketers should not only make the privacy/security policies available on their Web sites but also make the policies more comprehensible as the policy is generally perceived to be difficult to understand by consumers. In addition to making the privacy/security policy available and easy to understand, marketers also need to manage consumers' perceptions of how well their privacy/security is protected. Consumers often rely on information cues such as the appearance of the Web site and whether the Web site has seals of approval to make inferences about how well their privacy and security can be protected. Therefore, marketers should maintain a professional look of their Web sites and make the symbols of seals of approval such as BBBOnline and TRUSTe as well as symbols of security protection such as McAfee's

SECURE more visible on their Web sites.

C. Trust

Trust in the hosting Web site of a recommendation agent, trust in the recommendation agent, and trust in the recommendations provided by the agent were shown to be three different types of consumer trust within the agent-mediated environment. The relationships among these three trust constructs were explained by the trust transference process. That is, trust in the Web site was found to have a positive effect on trust in the agent as well as trust in the recommendations, and trust in the agent had a positive effect on trust in the recommendations.

Therefore within such a trust transference process, trust in the Web site became the "origin" and a driver for trust in the recommendation agent as well as trust in the recommendations, and trust in the agent became a driver for trust in the recommendations. This hierarchical view of trust suggests that marketers not only need to build trust at three different levels but also need to prioritize their efforts in building these trusts. Specifically, marketers should first start with building trust in the Web site. This is because after consumers develop their trust toward the hosting Web site of a recommendation agent, according to the trust transference process, consumers' trust in the Web site will be transferred and carried over to trust in the agent and trust in the recommendations. Moreover, as indicated by the negative effect of perceived risk in providing personal information on trust in the Web site, strategies that help reduce consumers' risk perceptions, such as the ones discussed previously, will also help build trust in the Web site.

D. Perceived Control

Perceived control over using a recommendation agent was found to have a positive effect on trust in the recommendation agent and a positive effect on consumers' intentions to return to the Web site and reuse the agent in the future. Based on this finding, it is suggested that marketers should employ different strategies to increase consumers' perceptions of being in control while using recommendation agents. For example, the design of recommendation agents should not be complex but easy to use as complexity has been shown to be a deterrent that keeps consumers from using technology-based self-service, both offline (Dabholkar 1994a) and online (e.g., Dellaert and Dabholkar 2009).

Additionally, the live chat function discussed earlier should also increase consumers' perceptions of control as the doubts or uncertainties that consumers might have while using a recommendation agent can be resolved by asking questions and getting answers right away from using this function. Similar to the logic that the negative effect of financial risk can be reduced by providing consumers explanations of why and how certain product recommendations are made, the addition of the explanation function can also be used to increase consumers' perceived control.

Limitations

One limitation of the current study is the use of student sample. Using student participants in marketing research has long been an issue of debate (e.g., Ferber 1977; Lamb and Stem 1980). But it has been widely documented that college students are a representative sample of today's online population (e.g., Gefen and Straub 2003; Pew/Internet 2009; Wang,

Beatty, and Foxx 2004). This is especially true for the current research context of using online recommendation agents. Nevertheless, the use of student sample still limits the generalizability of the findings from this study. Additionally, a related issue is that although the homogeneous student sample used in this study offered a stronger test of the research hypotheses, it also to some extent restricted the range of variation in certain variables. Therefore, caution needs to be taken when making interpretations of the research findings from this study and consumers from general population need to be recruited to participate in future studies to overcome this limitation.

Another limitation is the sample size constraint of the main study. Although 116 valid responses were a reasonable sample size for the 2 X 2 experiment design in this study, hypothesis testing had to be conducted in two parts with two structural models. Moreover, the small sample size made it impossible to use SEM to test the moderating effects. Therefore, sample size as guided by the research design and the method of analysis needs to be well planned and carefully considered for future research.

A third limitation is the issue of control group. In this study, no control group was used for the treatment of consumer participation, although the high consumer participation group and the low consumer participation group were in fact the control group for each other. Therefore, future research could include a control group in which consumers do not have any participation in using a recommendation agent. This way, the effect of consumer participation can be compared across the high, low, and control groups.

Finally, the purchase situation in this study was simulated and based on a projected

shopping scenario. Therefore, the effect of financial risk might be weakened as the level of financial risk involved in a simulated purchase will not be the same as that in a real purchase situation. To overcome this limitation, a survey method could be used in future studies to collect data from consumers who have purchased the products.

Future Research

One direction for future research is to study the drivers for consumer participation, that is, to understand what makes consumers want to participate and what keeps them from wanting to participate. Past studies conducted within the TBSS research paradigm have examined the influence of factors such as ease of use, usefulness, fun, and reliability on consumers' evaluations of the quality of the service delivered through technologies. These benefits from using a TBSS option might explain why consumers choose to participate. In addition to these factors, personality variables such as need for interaction might explain why consumers choose not to participate as they would prefer to have the face-to-face interactions with sales people. Therefore, future research could study how these factors influence consumer participation. This can be studied within the current context of using recommendation agents. It can also be studied within a broader context of using technology-based self services in general.

Another future research direction is to examine other outcome variables of consumer participation such as satisfaction. Past research in the offline context has substantiated the positive effect of consumer participation on consumer satisfaction. It would be interesting to reexamine the relationship between consumer participation and satisfaction within the

context of using online recommendation agents. This is particular important as consumer satisfaction is another neglected issue in past research in recommendation agents (Xiao and Benbasat 2007).

Future research could also study the determinants for trust in the hosting Web site of a recommendation agent, trust in the recommendation agent, and trust in the recommendations. Although consumer participation was identified as a contributing factor in building consumers' trust in a recommendation agent, more variables need to be examined. For example, an individual's disposition to trust, a personality variable, has been shown to affect the individual's trust in certain technology (e.g., McKnight, Choudhury, and Kacmar 2002; Wang and Benbasat 2008). Examining variables like this one is especially relevant for understanding the formation of initial trust when consumers do not have any prior experiences with a technology or a technology-based self-service option.

The trust transference process has been successfully validated within the offline and online context separately. It would be interesting to examine whether trust can be transferred across the offline and online contexts. An understanding of whether and how consumers' trust can be transferred across the offline and online contexts can be especially helpful to those businesses that only have brick-and-mortar stores offline or e-stores online. Such an understanding can provide meaningful guidance when offline only businesses plan to increase their customer base and expand their businesses to the online space by attracting customers who mainly shop online. Online only businesses can also benefit from such an understanding in a similar way.

Finally, other potential moderating variables could be studied in future research. For example, past research found that perceived effectiveness of a recommendation agent was contingent upon whether the product was a search product or an experience product (e.g., Aggarwal and Vaidyanathan 2005). Other research also examined consumers' product knowledge (e.g., Swaminathan 2003) and product complexity (e.g., Rathnam 2005) as the moderating variables in consumers' using recommendation agents. Future research could test whether the above discussed variables moderate the effect of consumer participation on consumers' trust in the agent and the effect of perceived privacy/security protection on perceived risk in providing personal information. Moreover, future research could study a price range that is higher than the one used in this study (i.e., $1000-1200) to see if the moderating effect of financial risk will be detected.

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APPENDICES

Appendix A: Tables and Figures

Table 3. 1: Measures and Sources

Perceived participation (Adapted from Bendapudi and Leone 2003; Fang 2008)
Item 1: When using this agent, the amount of information I provided was (very minimal/quite a lot)
Item 2: When using this agent, the level of effort I put in was (very minimal/quite a lot)
Item 3: When using this agent, the amount of work I did was (very minimal/quite a lot)
Item 4: The amount of time I spent in using this agent was (very minimal/quite a lot)
Perceived financial risk (Adapted from Biswas and Biswas 2004)
Item 1: It would involve a great deal of financial risk.
Item 2: I would not be concerned about the money for this product at that price range.
Item 3: The price for this product is something I can easily afford
Item 4: It would be risky for me to buy this product at that price.
Item 5: Spending this amount on this product would certainly be a high-risk purchase for me.
Privacy/security disclosures (Adapted from Bart, Shankar, Sultan, and Urban 2005)
Item 1: The general privacy policy is easy to find on this Web site.
Item 2: The text of the privacy policy is not easy to understand.
Item 3: This Web site clearly explains why user information is collected.
Item 4: This Web site clearly explains how my information will be shared with other companies.
Item 5: This Web site seems to have the technology to protect my privacy.
Item 6: This Web site seems very capable of protecting my privacy.
Item 7: It seems that this Web site invested a great deal of money in privacy protection.
Item 8: I believe my privacy is protected at this site.
Perceived risk in providing personal information (Adapted from Bart, Shankar, Sultan, and Urban 2005; Wang, Beatty, and Foxx 2004)
Item 1: I would feel very safe giving my personal information on that Web site.
Item 2: I would feel very comfortable sharing my personal information on that Web site.
Item 3: I feel uncertain about sharing my personal information on that Web site.
Item 4: It would be very risky for me to share any information on that Web site.
Item 5: My personal information might be misused if I share it on that Web site.
Item 6: This Web site might sell my personal information to other companies.

Table 3. 1: Measures and Sources (Continued)

Perceived control over using the recommendation agent (Adapted from Dabholkar 1996; Dabholkar and Sheng 2008; Yen 2005)
Item 1: I felt that I was in full charge while using this agent.
Item 2: I felt in absolute control throughout the process of using this agent.
Item 3: I did not feel comfortable at all in using this agent.
Item 4: At no time did I feel lost in using this agent.
Item 5: I felt that I directed this agent on finding out what I like.
Item 6: This agent let me change my preferences for a product at any time.
Item 7: This agent gave me product recommendations any time I wanted.
Trust in the Web site (Adapted from Bart, Shankar, Sultan, and Urban 2005; Schlosser, White, and Lloyd 2006; Wang, Beatty, and Foxx 2004)
Item 1: This Web site appears to be very trustworthy.
Item 2: This Web site can be relied upon.
Item 3: I do not believe the information on this Web site is correct.
Item 4: I am confident that this Web site can be trusted.
Item 5: My overall faith in this Web site is high.
Trust in the recommendation agent (Adapted from Komiak and Benbasat 2006; Wang and Benbasat 2005)
Item 1: This agent seems to be very knowledgeable about this product.
Item 2: This agent seems very capable of asking good questions about my preferences about this product.
Item 3: This agent seems to be able to understand my preferences for this product.
Item 4: This agent does not seem to be a real expert in assessing this product.
Item 5: I have great confidence about this agent's fairness in giving product recommendations.
Item 6: I can rely on this agent for my purchase decision.
Item 7: This agent appears to put my interests ahead of the retailers'.

Table 3. 1: Measures and Sources (Continued)

Trust in recommendations (Adapted from Bart, Shankar, Sultan, and Urban 2005; Komiak and Benbasat 2006; Rathnam 2005; Wang and Benbasat 2005)
Item 1: The recommendations about laptop computers appear to be unbiased.
Item 2: The recommendations about laptop computers seem to be accurate.
Item 3: I do not trust the recommendations about laptop computers.
Item 4: I feel very confident about the recommendations about laptop computers.
Item 5: I can rely on the recommendations for my purchase decisions.
Intention to reuse the recommendation agent (Adapted from Dabholkar 1996; Gentry and Calantone 2002; Komiak and Benbasat 2006; Wang and Benbasat 2005)
Item 1: I would use this agent to help with my future purchase decisions.
Item 2: I would never use this agent again.
Item 3: I would recommend this agent to my friends.
Item 4: I would let this agent assist me in searching for product information.
Item 5: I would use this agent as a guide for my product purchases in the future.
Intention to return to the Web site (Adapted from Bart, Shankar, Sultan, and Urban 2005; Dabholkar 1996; Dabholkar and Sheng 2008; Wang, Beatty, and Foxx 2004)
Item 1: I would come back to this Web site again.
Item 2: I would never use this Web site in the future.
Item 3: I would recommend this Web site to my friends.
Item 4: I would bookmark this Web site.
Intention to purchase
IntRec1: I would purchase the recommended product.
IntRec2: I do not think I would ever buy this product.
IntRec3: I would definitely follow the recommendation in the near future.
IntRec4: I would most probably purchase the product if I was ever in this situation.
IntRec5: It is very likely that I would buy the recommended product.

Table 4. 1: Pretest Data Distribution

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Perc Control_1	67	1.00	5.00	4.0299	.90403	-1.201	.293	2.237	.578
Perc Control_2	67	1.00	5.00	4.0746	.95843	-1.217	.293	1.725	.578
Perc Control_3	67	1.00	5.00	4.3134	.98794	-1.549	.293	2.229	.578
Perc Control_4	67	1.00	5.00	3.7612	1.23202	-.980	.293	-.077	.578
Perc Control_5	67	2.00	5.00	4.3433	.61674	-.770	.293	1.698	.578
Perc Control_6	67	2.00	5.00	4.4179	.78140	-1.290	.293	1.203	.578
Perc Control_7	67	1.00	5.00	4.3582	.88252	-1.598	.293	2.770	.578
Trust Agent_1	67	3.00	5.00	4.3731	.64751	-.544	.293	-.621	.578
Trust Agent_2	67	1.00	5.00	4.0746	.94249	-1.159	.293	1.224	.578
Trust Agent_3	67	1.00	5.00	4.0448	.92822	-1.262	.293	1.595	.578
Trust Agent_4	67	1.00	5.00	3.8806	.99274	-.808	.293	.143	.578
Trust Agent_5	67	2.00	5.00	3.8955	.80027	-.539	.293	.129	.578
Trust Agent_6	67	1.00	5.00	3.6716	.92749	-.816	.293	.799	.578
Trust Agent_7	67	1.00	5.00	3.7761	.88456	-.216	.293	-.032	.578
Int Agent_1	67	1.00	5.00	4.0448	.84267	-1.339	.293	2.638	.578
Int Agent_2	67	1.00	5.00	4.1493	.94153	-1.430	.293	2.471	.578
Int Agent_3	67	1.00	5.00	3.8358	.77062	-1.140	.293	2.537	.578
Int Agent_4	67	1.00	5.00	4.0149	.92920	-1.198	.293	1.947	.578
Int Agent_5	67	1.00	5.00	3.9254	.90977	-1.218	.293	2.082	.578

Table 4. 1: Pretest Data Distribution (Continued)

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Privacy_1	67	.00	5.00	3.3134	1.46896	-.773	.293	.142	.578
Privacy_2	67	.00	5.00	2.7910	1.35442	-.475	.293	.138	.578
Privacy_3	67	.00	5.00	2.9701	1.47679	-.820	.293	-.033	.578
Privacy_4	67	.00	5.00	2.8657	1.45535	-.580	.293	-.285	.578
Privacy_5	67	.00	5.00	3.1194	1.34302	-1.269	.293	1.142	.578
Privacy_6	67	.00	5.00	2.9104	1.36772	-1.116	.293	.465	.578
Privacy_7	67	.00	5.00	2.5672	1.25799	-.957	.293	.451	.578
Privacy_8	67	.00	5.00	3.0000	1.37069	-1.092	.293	.488	.578
Trust Site_1	67	2.00	5.00	3.9254	.74495	-.558	.293	.488	.578
Trust Site_2	67	2.00	5.00	3.8358	.66508	-.442	.293	.655	.578
Trust Site_3	67	1.00	5.00	4.1493	.90877	-1.178	.293	1.493	.578
Trust Site_4	67	2.00	5.00	3.7761	.75520	-.035	.293	-.456	.578
Trust Site_5	67	2.00	5.00	3.6567	.78917	-.253	.293	-.229	.578
Int Site_1	67	1.00	5.00	3.9851	1.03708	-1.482	.293	2.261	.578
Int Site_2	67	1.00	5.00	4.1045	1.11647	-1.626	.293	2.307	.578
Int Site_3	67	1.00	5.00	3.7910	.91349	-1.288	.293	2.361	.578
Int Site_4	67	1.00	5.00	2.7015	1.16794	.200	.293	-.897	.578

Table 4. 1: Pretest Data Distribution (Continued)

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Trust Recom_1	67	2.00	5.00	3.9701	.81594	-.634	.293	.195	.578
Trust Recom_2	67	2.00	5.00	4.0299	.77792	-1.048	.293	1.551	.578
Trust Recom_3	67	2.00	5.00	4.1791	.75730	-.745	.293	.466	.578
Trust Recom_4	67	2.00	5.00	3.8806	.78860	-.738	.293	.609	.578
Trust Recom_5	67	2.00	5.00	3.7612	.79942	-.821	.293	.502	.578
Int Recom_1	67	1.00	5.00	3.7612	.76057	-1.056	.293	2.230	.578
Int Recom_2	67	1.00	5.00	4.1343	.88584	-1.079	.293	1.418	.578
Int Recom_3	67	1.00	5.00	3.4925	.80478	-.604	.293	.521	.578
Int Recom_4	67	1.00	5.00	3.7164	.83132	-.888	.293	1.150	.578
Int Recom_5	67	1.00	5.00	3.4328	1.07624	-.648	.293	-.244	.578
Perc Parti_1	67	1.00	7.00	4.8806	1.63783	-.656	.293	-.368	.578
Perc Parti_2	67	1.00	7.00	4.0149	1.52248	-.212	.293	-.771	.578
Perc Parti_3	67	1.00	7.00	3.6269	1.36887	.018	.293	-.435	.578
Perc Parti_4	67	1.00	7.00	3.7164	1.35743	-.063	.293	-.402	.578
Perc Risk_1	67	1.00	5.00	3.0448	1.10690	-.022	.293	-.794	.578
Perc Risk_2	67	1.00	5.00	3.2388	1.10220	-.144	.293	-.891	.578
Perc Risk_3	67	1.00	5.00	3.0746	1.07750	-.152	.293	-.998	.578
Perc Risk_4	67	1.00	5.00	2.8955	1.04641	.133	.293	-.646	.578
Perc Risk_5	67	1.00	5.00	2.9701	1.05845	-.097	.293	-.593	.578

Table 4. 1: Pretest Data Distribution (Continued)

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Perc Risk_6	67	1.00	5.00	2.8657	1.22963	.264	.293	-.797	.578
Perc FinRisk_1	67	1.00	5.00	2.6119	1.24262	.591	.293	-.726	.578
Perc FinRisk_2	67	1.00	5.00	3.0149	1.26122	.158	.293	-1.202	.578
Perc FinRisk_3	67	1.00	5.00	2.4627	1.19758	.609	.293	-.686	.578
Perc FinRisk_4	67	1.00	5.00	2.4627	1.21016	.566	.293	-.751	.578
Perc FinRisk_5	67	1.00	5.00	2.3284	1.33016	.561	.293	-1.060	.578
Valid N (listwise)	67								

Table 4. 2: **Pretest Exploratory Factor Analysis and Reliability (Subgroup 1)**

Items	Factors		
	TrustRA α = 0.80	**TrustSite α = 0.85**	**TrustRec α = 0.86**
TrRa1: This agent seems to be very knowledgeable about this product.	**.431**	.330	.274
TrRa2: This agent seems very capable of asking good questions about my preferences about this product.	**.836**	.177	-.091
TrRa3: This agent seems to be able to understand my preferences for this product.	**.835**	.061	.257
TrRa4: This agent does not seem to be a real expert in assessing this product.	**.708**	.203	.261
TrRa5: I have great confidence about this agent's fairness in giving product recommendations.	.393	.297	.534
TrRa6: I can rely on this agent for my purchase decision.	.083	.261	.662
TrRa7: This agent appears to put my interests ahead of the retailers'.	.037	.112	.681
TrSite1: This Web site appears to be very trustworthy.	.174	**.851**	.136
TrSite2: This Web site can be relied upon.	.106	**.816**	.218
TrSite3: I do not believe the information on this Web site is correct.	.515	.226	.338
TrSite4: I am confident that this Web site can be trusted.	.365	**.751**	.260
TrSite5: My overall faith in this Web site is high.	.254	**.800**	.257
TrRec1: The recommendations about laptop computers appear to be unbiased.	.029	.441	.447
TrRec2: The recommendations about laptop computers seem to be accurate.	.219	.051	**.795**
TrRec3: I do not trust the recommendations about laptop computers.	.270	.314	**.661**
TrRec4: I feel very confident about the recommendations about laptop computers.	.296	.258	**.727**
TrRec5: I can rely on the recommendations for my purchase decisions.	.280	.524	**.606**

Note: α = Cronbach's alpha; TrustRA = Trust in the recommendation agent; TrustSite = Trust in the Web site; TrustRec = Trust in the recommendations.

Table 4. 2: Pretest Exploratory Factor Analysis and Reliability (Subgroup 2)

Items	Factors		
	IntRA α = 0.89	**IntSite α = 0.82**	**IntPurch α = 0.80**
IntRa1: I would use this agent to help with my future purchase decisions.	**.607**	.424	.089
IntRa2: I would never use this agent again.	**.785**	.120	.201
IntRa3: I would recommend this agent to my friends.	**.707**	.525	.094
IntRa4: I would let this agent assist me in searching for product information.	**.639**	.427	.268
IntRa5: I would use this agent as a guide for my product purchases in the future.	**.682**	.515	.149
IntSite1: I would come back to this Web site again.	**.837**	.148	.177
IntSite2: I would never use this Web site in the future.	**.823**	-.032	.266
IntSite3: I would recommend this Web site to my friends.	**.799**	.417	.128
IntSite4: I would bookmark this Web site.	.222	.801	.146
IntRec1: I would purchase the recommended product.	.043	.359	**.720**
IntRec2: I do not think I would ever buy this product.	.582	-.010	.516
IntRec3: I would definitely follow the recommendation in the near future.	.361	.126	**.746**
IntRec4: I would most probably purchase the product if I was ever in this situation.	.202	-.110	**.836**
IntRec5: It is very likely that I would buy the recommended product.	.087	.441	**.604**

Note: α = Cronbach's alpha; IntRA = Intention to reuse recommendation agent; IntSite = Intention to return to the Web site; IntPurch = Intention to purchase based on the recommendations.

Table 4. 2: Pretest Exploratory Factor Analysis and Reliability (Subgroup 3)

Items	Factors		
	PSecurity α = 0.90		InfoRisk α = 0.89
	PSecurity1	PSecurity2	
P/S1: The general privacy policy is easy to find on this Web site.	**.773**	.310	.055
P/S2: The text of the privacy policy is not easy to understand.	**.777**	.125	.131
P/S3: This Web site clearly explains why user information is collected.	**.734**	.359	.032
P/S4: This Web site clearly explains how my information will be shared with other companies.	.547	.604	-.081
P/S5: This Web site seems to have the technology to protect my privacy.	.249	**.873**	-.086
P/S6: This Web site seems very capable of protecting my privacy.	.142	**.948**	-.067
P/S7: It seems that this Web site invested a great deal of money in privacy protection.	.187	**.854**	.040
P/S8: I believe my privacy is protected at this site.	.223	**.896**	-.084
PInfoRisk1: I would feel very safe giving my personal information on that Web site.	.186	-.076	**.853**
PInfoRisk2: I would feel very comfortable sharing my personal information on that Web site.	.024	-.043	**.875**
PInfoRisk3: I feel uncertain about sharing my personal information on that Web site.	-.288	.154	**.554**
PInfoRisk4: It would be very risky for me to share any information on that Web site.	.148	-.062	**.859**
PInfoRisk5: My personal information might be misused if I share it on that Web site.	.104	-.012	**.872**
PInfoRisk6: This Web site might sell my personal information to other companies.	-.039	-.162	**.808**

Note: α = Cronbach's alpha; PSecurity = Privacy/security disclosures; InfoRisk = Perceived risk in providing personal information.

Table 4. 2: Pretest Exploratory Factor Analysis and Reliability (Subgroup 4)

Items	Factors		
	PControl α = 0.31	**PParti α = 0.83**	**FinRisk α = 0.92**
PC1: I felt that I was in full charge while using this agent.	**.814**	-.210	-.053
PC2: I felt in absolute control throughout the process of using this agent.	**.778**	-.172	-.046
PC3: I did not feel comfortable at all in using this agent.	.083	.057	-.015
PC4: At no time did I feel lost in using this agent.	-.031	-.503	-.157
PC5: I felt that I directed this agent on finding out what I like.	.234	-.348	-.071
PC6: This agent let me change my preferences for a product at any time.	-.064	.298	.212
PC7: This agent gave me product recommendations any time I wanted.	**.455**	.231	.273
PParti1: When using this agent, the amount of information I provided was (very minimal/quite a lot)	-.164	**.717**	.040
PParti2: When using this agent, the level of effort I put in was (very minimal/quite a lot)	.051	**.837**	-.191
PParti3: When using this agent, the amount of work I did was (very minimal/quite a lot)	.065	**.816**	-.142
PParti4: The amount of time I spent in using this agent was (very minimal/quite a lot)	.129	**.778**	.012
PFinRisk1: It would involve a great deal of financial risk.	-.027	.096	**.879**
PFinRisk2: I would not be concerned about the money for this product at that price range.	-.196	-.185	**.794**
PFinRisk3: The price for this product is something I can easily afford	.049	-.070	**.858**
PFinRisk4: It would be risky for me to buy this product at that price.	.068	.144	**.894**
PFinRisk5: Spending this amount on this product would certainly be a high-risk purchase for me.	.028	.087	**.896**

Note: α = Cronbach's alpha; PControl = Perceived control; PParti = Perceived participation; FinRisk = Perceived financial risk.

Table 4. 3: Pretest Correlation Matrix

	PParti	PControl	TrustRA	TrustSite	TrustRec	IntRA	IntSite	IntPurch	InfoRisk	PSecurity	FinRisk
PParti	1.000	-.176	-.074	-.155	-.076	-.370**	-.196	-.261*	-.064	.266*	-.045
PControl	--	1.000	.291*	.351**	.218	.007	.118	.090	-.342**	.037	-.013
TrustRA	--	--	1.000	.642**	.652**	.544**	.487**	.379**	-.230	.005	-.060
TrustSite	--	--	--	1.000	.683**	.445**	.514**	.308*	-.446**	.032	-.093
TrustRec	--	--	--	--	1.000	.575**	.601**	.459**	-.236	.118	-.133
IntRA	--	--	--	--	--	1.000	.832**	.562**	-.017	-.121	-.020
IntSite							1.000	.557**	-.144	-.042	.007
IntPurch	--	--	--	--	--	--		1.000	-.017	-.058	-.062
InfoRisk	--	--	--	--	--	--		--	1.000	-.029	.196
PSecurity	--	--	--	--	--	--		--	--	1.000	-.110
FinRisk	--	--	--	--	--	--		--	--	--	1.000

Note: PParti = Perceived participation; PControl = Perceived control; TrustRA = Trust in the recommendation agent; TrustSite = Trust in the Web site; TrustRec = Trust in the recommendations; IntRA = Intention to reuse recommendation agent; IntSite = Intention to return to the Web site; IntPurch = Intention to purchase based on the recommendations; InfoRisk = Perceived risk in providing personal information; PSecurity = Privacy/security disclosures; FinRisk = Perceived financial risk.

** Correlation is significant at the 0.01 level (2-tailed);
* Correlation is significant at the 0.05 level (2-tailed).

Table 4. 4: Main Study Data Distribution

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Perc Control_1	116	2.00	5.00	4.3707	.79706	-1.401	.225	1.855	.446
Perc Control_2	116	1.00	5.00	4.2155	.88274	-1.442	.225	2.509	.446
Perc Control_3	116	1.00	5.00	4.2586	.88584	-1.451	.225	2.443	.446
Perc Control_4	116	1.00	5.00	3.8793	1.16586	-.900	.225	-.251	.446
Perc Control_5	116	2.00	5.00	4.1897	.84353	-1.081	.225	.898	.446
Perc Control_6	116	2.00	5.00	4.4569	.75056	-1.232	.225	.799	.446
Perc Control_7	116	1.00	5.00	4.1552	1.01813	-.922	.225	-.173	.446
Trust Agent_1	116	2.00	5.00	4.0776	.72413	-.538	.225	.318	.446
Trust Agent_2	116	1.00	5.00	4.0259	1.00832	-1.192	.225	1.270	.446
Trust Agent_3	116	2.00	5.00	4.0000	.83406	-.732	.225	.252	.446
Trust Agent_4	116	1.00	5.00	3.8017	.93455	-.698	.225	.020	.446
Trust Agent_5	116	1.00	5.00	3.6379	.94544	-.595	.225	-.318	.446
Trust Agent_6	116	1.00	5.00	3.6121	.94888	-.515	.225	-.416	.446
Trust Agent_7	116	1.00	5.00	3.6724	.91153	-.140	.225	-.460	.446
Int Agent_1	116	1.00	5.00	4.0345	.94115	-1.534	.225	2.679	.446
Int Agent_2	116	2.00	5.00	4.1897	.86390	-1.038	.225	.616	.446
Int Agent_3	116	1.00	5.00	3.8103	1.11053	-1.089	.225	.747	.446
Int Agent_4	116	1.00	5.00	3.9397	.93519	-1.371	.225	2.480	.446
Int Agent_5	116	1.00	5.00	3.9397	1.04081	-1.337	.225	1.582	.446

Table 4. 4: Main Study Data Distribution (Continued)

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Privacy_1	116	.00	5.00	2.8621	1.39500	-.532	.225	-.200	.446
Privacy_2	116	.00	5.00	2.7672	1.34719	-.803	.225	.259	.446
Privacy_3	116	.00	5.00	2.8190	1.32271	-.715	.225	.098	.446
Privacy_4	116	.00	5.00	2.6034	1.34410	-.399	.225	-.359	.446
Privacy_5	116	.00	5.00	3.0172	1.43849	-.815	.225	-.066	.446
Privacy_6	116	.00	5.00	3.2328	1.28102	-1.028	.225	1.046	.446
Privacy_7	116	.00	5.00	2.8621	1.26420	-.629	.225	.499	.446
Privacy_8	116	.00	5.00	3.3621	1.29478	-.876	.225	.576	.446
Trust Site_1	116	2.00	5.00	3.8276	.74921	-.589	.225	.440	.446
Trust Site_2	116	1.00	5.00	3.8276	.80516	-.794	.225	1.025	.446
Trust Site_3	116	2.00	5.00	4.0345	.85395	-.749	.225	.136	.446
Trust Site_4	116	2.00	5.00	3.6724	.85237	-.340	.225	-.413	.446
Trust Site_5	116	1.00	5.00	3.6121	.90190	-.595	.225	.178	.446
Int Site_1	116	1.00	5.00	4.1379	.90310	-1.503	.225	2.846	.446
Int Site_2	116	1.00	5.00	4.1897	.90327	-1.467	.225	2.402	.446
Int Site_3	116	1.00	5.00	3.7500	1.01189	-.964	.225	.726	.446
Int Site_4	116	1.00	5.00	2.5948	1.23696	.171	.225	-1.132	.446

Table 4. 4: Main Study Data Distribution (Continued)

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Trust Recom_1	116	1.00	5.00	3.7155	1.05341	-.631	.225	-.466	.446
Trust Recom_2	116	1.00	5.00	3.9397	.78340	-.997	.225	1.794	.446
Trust Recom_3	116	1.00	5.00	3.8276	1.00672	-.790	.225	.240	.446
Trust Recom_4	116	2.00	5.00	3.6638	.75693	-.574	.225	.130	.446
Trust Recom_5	116	1.00	5.00	3.5603	.90687	-.717	.225	.073	.446
Int Recom_1	116	1.00	5.00	3.5431	1.03329	-.911	.225	.364	.446
Int Recom_2	116	1.00	5.00	4.0431	.91739	-.843	.225	.343	.446
Int Recom_3	116	1.00	5.00	3.4138	1.03057	-.516	.225	-.361	.446
Int Recom_4	116	1.00	5.00	3.4224	1.01425	-.472	.225	-.425	.446
Int Recom_5	116	1.00	5.00	3.3793	1.09270	-.560	.225	-.520	.446
Perc Parti_1	116	1.00	7.00	4.9655	1.67815	-.754	.225	-.277	.446
Perc Parti_2	116	1.00	7.00	3.9828	1.49191	-.146	.225	-.506	.446
Perc Parti_3	116	1.00	7.00	3.6724	1.51385	.176	.225	-.562	.446
Perc Parti_4	116	1.00	7.00	3.5948	1.38927	.246	.225	-.434	.446
Perc Risk_1	116	1.00	5.00	3.3362	1.02951	-.181	.225	-1.148	.446
Perc Risk_2	116	1.00	5.00	3.3621	1.02488	-.236	.225	-.916	.446
Perc Risk_3	116	1.00	5.00	3.4397	1.05739	-.378	.225	-.777	.446
Perc Risk_4	116	1.00	5.00	2.9741	1.09910	.132	.225	-.691	.446
Perc Risk_5	116	1.00	5.00	3.0000	.97802	-.170	.225	-.416	.446

Table 4. 4: Main Study Data Distribution (Continued)

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Perc Risk_6	116	1.00	5.00	3.0259	1.14559	-.298	.225	-.656	.446
Perc FinRisk_1	116	1.00	5.00	3.0000	1.25802	-.080	.225	-1.229	.446
Perc FinRisk_2	116	1.00	5.00	3.3276	1.26337	-.142	.225	-1.228	.446
Perc FinRisk_3	116	1.00	5.00	2.9828	1.23699	.089	.225	-1.073	.446
Perc FinRisk_4	116	1.00	5.00	2.6207	1.22051	.444	.225	-.916	.446
Perc FinRisk_5	116	1.00	5.00	2.7845	1.31086	.290	.225	-1.121	.446
Valid N (listwise)	116								

Table 4. 5: Main Study Exploratory Factor Analysis

	PControl	TrustRA	IntSiteRA	TrustSite	TrustRec	IntRec	PS1	PS2	InfoRisk	PParti	FinRisk
PC1	**.815**	.164	.293	.184	-.033	.079	.108	-.075	-.088	.046	.092
PC2	**.806**	.058	.245	.127	-.030	.061	.098	-.035	-.255	.014	.057
PC3	.210	.210	-.014	.118	-.179	-.029	.027	-.259	.085	.125	.099
PC4	.285	.073	.076	.040	.049	-.075	.228	-.093	-.122	-.014	-.069
PC5	**.674**	.066	.001	.323	-.163	.168	.075	-.086	.114	-.006	.005
PC6	**.529**	.067	.167	-.062	.084	.306	-.038	.046	.152	.143	-.165
PC7	**.403**	.260	.016	.167	.224	.119	-.028	.268	-.124	.077	-.092
TRA1	.161	**.676**	.152	.126	.190	.134	.121	-.164	.104	.072	.010
TRA2	.398	**.547**	.092	.084	.271	.203	.098	-.021	-.048	.120	-.042
TRA3	.275	**.542**	.316	.105	.077	.348	.006	-.140	.041	-.099	-.030
TRA4	-.015	**.612**	.154	.267	-.014	.293	.110	.091	.069	.096	-.196
TRA5	.063	**.658**	.249	.211	.024	.090	.218	.097	-.090	.186	-.150
TRA6	.098	.410	.297	.427	-.121	.312	.023	.072	-.108	.026	-.118
TRA7	.026	**.484**	.113	.319	.074	.130	.132	-.161	-.308	-.037	-.131
IntRA1	.239	.147	**.809**	-.037	-.008	.207	-.011	.072	-.084	.011	.014
IntRA2	.216	.031	**.719**	.193	-.116	.053	-.065	.041	-.122	.075	-.037
IntRA3	.067	.004	**.790**	.106	.159	.253	.049	-.114	-.058	.077	-.031
IntRA4	.110	.201	**.774**	.076	.048	.089	.106	.029	-.010	-.061	.022
IntRA5	.019	.161	**.833**	.147	.048	.178	.082	.074	-.015	-.064	-.086

Table 4. 5: Main Study Exploratory Factor Analysis (Continued)

	PControl	TrustRA	IntSiteRA	TrustSite	TrustRec	IntRec	PS1	PS2	InfoRisk	PParti	FinRisk
TRSite1	.442	.204	.124	**.655**	.134	.093	.040	.079	-.115	-.122	.026
TRSite2	.183	.235	.198	**.692**	.004	.336	.048	.164	-.110	-.032	-.082
TRSite3	.145	.120	.313	**.465**	.137	.034	.187	.069	-.080	-.173	-.176
TRSite4	.118	.110	.290	**.711**	.062	.178	.191	.114	-.262	-.028	-.112
TRSite5	.373	.130	.376	**.500**	.124	.397	.127	.203	-.078	-.003	-.074
IntSite1	.063	.015	**.843**	.056	-.037	.104	.046	-.065	-.127	-.002	-.012
IntSite2	.050	.192	**.706**	.185	.021	.056	.045	-.143	-.162	-.012	-.039
IntSite3	.035	-.044	**.794**	.182	.126	.283	.075	.051	-.047	.050	-.081
IntSite4	.097	.315	**.432**	.123	-.063	.222	.067	.261	-.194	-.130	.110
TRec1	-.076	.159	.055	.109	**.782**	.204	.019	-.033	-.078	.051	-.157
TRec2	.015	.167	.250	.408	**.515**	.349	.175	-.154	-.005	.102	-.047
TRec3	.042	.216	.315	.360	.103	.369	.136	-.234	-.145	-.011	-.028
TRec4	.213	.244	.335	.449	.315	.327	.140	.049	-.100	-.027	-.063
TRec5	.028	.196	.306	.409	.068	.585	.074	-.037	-.050	.099	-.090
IntRec1	.148	.044	.258	.147	.043	**.741**	.088	.092	-.183	.016	-.079
IntRec2	.073	.018	.151	.290	-.249	**.662**	.057	-.138	-.072	-.039	-.067
IntRec3	.088	.134	.286	.122	.105	**.763**	.067	-.062	-.138	-.025	.041
IntRec4	.149	.182	.203	.067	.207	**.767**	.024	.058	-.226	-.042	-.060
IntRec5	.068	.147	.109	.008	.149	**.858**	-.002	.048	-.172	-.035	.010

Table 4. 5: Main Study Exploratory Factor Analysis (Continued)

	PControl	TrustRA	IntSiteRA	TrustSite	TrustRec	IntRec	PS1	PS2	InfoRisk	PParti	FinRisk
Privacy1	.076	.060	.098	-.066	.032	.009	**.843**	.026	-.074	-.065	.007
Privacy2	.002	.005	-.038	.136	.045	.023	**.778**	-.062	-.012	.056	-.094
Privacy3	.014	.190	.083	-.030	-.092	.125	**.793**	.217	.050	.040	-.007
Privacy4	.105	.075	.064	.112	.062	.054	**.825**	.101	.015	.005	-.074
Privacy5	.053	.018	-.017	.108	-.075	.025	.447	**.767**	-.009	-.064	.018
Privacy6	-.029	.063	-.036	.152	.003	.133	.223	**.892**	-.076	-.052	.004
Privacy7	.013	.038	.189	.215	.070	.020	.586	.595	-.069	.142	-.102
Privacy8	.151	.220	.091	.110	.207	.062	.190	**.839**	-.161	-.042	.026
InfoRisk1	-.030	-.074	-.194	-.048	-.149	-.221	-.017	.154	**.816**	.064	.040
InfoRisk2	-.045	-.048	-.276	-.020	-.108	-.192	.040	.081	**.833**	.083	.034
InfoRisk3	-.099	.027	-.046	-.162	.030	-.184	-.036	.026	**.798**	.114	-.058
InfoRisk4	.021	.071	.000	-.140	.078	-.076	-.070	.179	**.832**	-.029	.112
InfoRisk5	-.008	-.057	-.099	-.025	.052	-.042	-.014	.649	.488	.027	.187
InfoRisk6	-.114	-.067	-.086	.017	-.114	.041	-.028	.733	.341	.076	.142
PParti1	.046	.280	.106	.137	-.016	.128	.138	-.127	.097	.333	-.069
PParti2	.058	.106	-.095	-.045	.041	-.036	.073	.005	.085	**.876**	.002
PParti3	.063	-.022	-.047	.037	.086	-.038	.012	-.018	.074	**.900**	.079
PParti4	-.019	.059	.122	-.105	-.052	.021	-.037	.093	.025	**.789**	-.004

Table 4. 5: Main Study Exploratory Factor Analysis (Continued)

	PControl	TrustRA	IntSiteRA	TrustSite	TrustRec	IntRec	PS1	PS2	InfoRisk	PParti	FinRisk
FinRisk1	.046	-.094	.028	-.027	-.070	-.104	-.106	.113	-.007	.035	**.839**
FinRisk2	-.006	-.098	-.112	.060	-.028	-.119	.032	.144	-.036	-.011	**.731**
FinRisk3	-.075	-.073	-.167	.014	-.062	.100	.056	-.014	.051	.031	**.849**
FinRisk4	.015	.026	.026	-.175	-.029	-.013	-.078	.006	.084	-.001	**.877**
FinRisk5	.028	.006	.050	-.094	.003	-.030	-.103	-.009	.062	.023	**.912**

Note: PControl = Perceived control; TrustRA = Trust in the recommendation agent; IntSiteRA = Intention to reuse the Web site and the recommendation agent; TrustSite = Trust in the Web site; TrustRec = Trust in the recommendations; IntPurch = Intention to purchase based on the recommendations; PS1 = Factor 1 extracted from privacy/security disclosures; PS2 = Factor 2 extracted from privacy/security disclosures; InfoRisk = Perceived risk in providing personal information; PParti = Perceived participation; FinRisk = Perceived financial risk.

Table 4. 6: Main Study Correlation Matrix

	PParti	PControl	TrustRA	TrustSite	TrustRec	IntSiteRA	IntPurch	InfoRisk	PSPolicy	PSProtect	FinRisk
PParti	1.000	.073	.113	-.101	.088	-.025	-.046	.147	.027	-.070	.046
PControl	--	1.000	.452**	.547**	.140	.394**	.357**	-.172	.173	.192*	-.029
TrustRA	--	--	1.000	.629**	.486**	.455**	.503**	-.204*	.296**	.314**	-.218*
TrustSite	--	--	--	1.000	.445**	.512**	.541**	-.363**	.279**	.376**	-.196*
TrustRec	--	--	--	--	1.000	.274**	.446**	-.207*	.171	.187*	-.212*
IntSiteRA	--	--	--	--	--	1.000	.440**	-.271**	.127	.109	-.092
IntPurch	--	--	--	--	--	--	1.000	-.396**	.147	.204*	-.108
InfoRisk	--	--	--	--	--	--	--	1.000	-.057	-.187*	.105
PSPolicy	--	--	--	--	--	--	--	--	1.000	.612**	-.101
PSProtect	--	--	--	--	--	--	--	--	--	1.000	-.044
FinRisk	--	--	--	--	--	--	--	--	--	--	1.000

Note: PParti = Perceived participation; PControl = Perceived control; TrustRA = Trust in the recommendation agent; TrustSite = Trust in the Web site; TrustRec = Trust in the recommendations; IntSiteRA = Intention to reuse the Web site and the recommendation agent; IntPurch = Intention to purchase based on the recommendations; InfoRisk = Perceived risk in providing personal information; PSPolicy = Privacy/security policy; PSProtect = Privacy/security protection; FinRisk = Perceived financial risk.

** Correlation is significant at the 0.01 level (2-tailed);
* Correlation is significant at the 0.05 level (2-tailed).

Table 4. 7: Main Study Item Loadings and Construct Reliability

Construct	λ	α
Perceived Participation		0.85
1. When using this agent, the level of effort I put in was (very minimal/quite a lot)	.88	
2. When using this agent, the amount of work I did was (very minimal/quite a lot)	.92	
3. The amount of time I spent in using this agent was (very minimal/quite a lot)	.62	
Perceived Control		0.81
1. I felt that I was in full charge while using this agent.	.98	
2. I felt in absolute control throughout the process of using this agent.	.82	
3. I felt that I directed this agent on finding out what I like.	.65	
4. This agent let me change my preferences for a product at any time.	.41	
Trust in the Recommendation Agent		0.82
1. This agent seems to be very knowledgeable about this product.	.69	
2. This agent seems very capable of asking good questions about my preferences about this product.	.61	
3. This agent seems to be able to understand my preferences for this product.	.68	
4. This agent does not seem to be a real expert in assessing this product.	.70	
5. I have great confidence about this agent's fairness in giving product recommendations.	.71	
6. This agent appears to put my interests ahead of the retailers'.	.56	
Trust in the Web site		0.88
1. This Web site appears to be very trustworthy.	.73	
2. This Web site can be relied upon.	.82	
3. I do not believe the information on this Web site is correct.	.61	
4. I am confident that this Web site can be trusted.	.80	
5. My overall faith in this Web site is high.	.88	

Note: λ = Item loading; α = Cronbach's alpha; all item loadings are significant at $p < 0.001$.

Table 4. 7: Main Study Item Loadings and Construct Reliability (Continued)

Construct	λ	α
Trust in Recommendations		r = 0.65*
1. The recommendations about this product appear to be unbiased.	.56	
2. The recommendations about this product seem to be accurate.	.91	
Intention to Return to the Web site and Reuse the RA		0.91
1. I would come back to this Web site again.	.84	
2. I would never use this Web site in the future.	.74	
3. I would use this agent to help with my future purchase decisions.	.83	
4. I would never use this agent again.	.72	
5. I would let this agent assist me in searching for product information.	.80	
6. I would use this agent as a guide for my product purchases in the future.	.87	
Intention to Purchase		0.90
1. I would purchase the recommended product.	.82	
2. I do not think I would ever buy this product.	.63	
3. I would definitely follow the recommendation in the near future.	.81	
4. I would most probably purchase the product if I was ever in this situation.	.89	
5. It is very likely that I would buy the recommended product.	.87	
Perceived Privacy/Security Policy		0.88
1. The general privacy policy is easy to find on this Web site.	.79	
2. The text of the privacy policy is not easy to understand.	.64	
3. This Web site clearly explains why user information is collected.	.91	
4. This Web site clearly explains how my information will be shared with other companies.	.87	

Note: λ = Item loading; α = Cronbach's alpha; all item loadings are significant at $p < 0.001$.

* Correlation is reported for trust in recommendations.

Table 4. 7: Main Study Item Loadings and Construct Reliability (Continued)

Construct	λ	α
Perceived Privacy/Security Protection		0.86
1. This Web site seems to have the technology to protect my privacy.	.90	
2. This Web site seems very capable of protecting my privacy.	.86	
3. I believe my privacy is protected at this site.	.72	
Perceived Risk in Providing Personal Information		0.90
1. I would feel very safe giving my personal information on that Web site.	.94	
2. I would feel very comfortable sharing my personal information on that Web site.	.96	
3. I feel uncertain about sharing my personal information on that Web site.	.71	
4. It would be very risky for me to share any information on that Web site.	.67	
Perceived Financial Risk		0.91
1. It would involve a great deal of financial risk.	.81	
2. I would not be concerned about the money for this product at that price range.	.62	
3. The price for this product is something I can easily afford.	.80	
4. It would be risky for me to buy this product at that price.	.90	
5. Spending this amount on this product would certainly be a high-risk purchase for me.	.93	

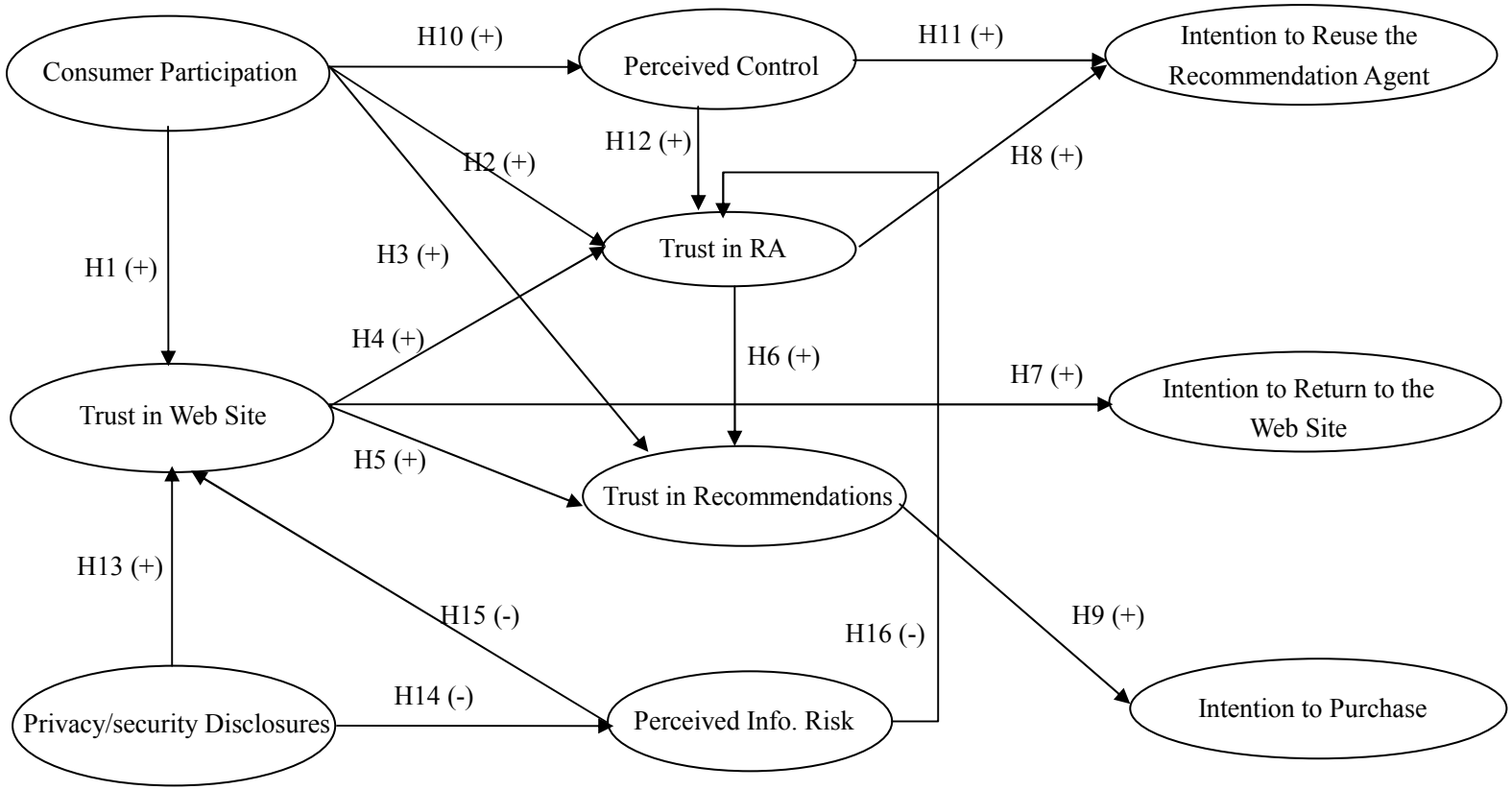
Note: λ = Item loading; α = Cronbach's alpha; all item loadings are significant at $p < 0.001$.

Table 4. 8: Summary of Results for Hypothesis Testing

Hypothesis	Standardized Estimate	*t*-value	*p*-value	Result
H1: Consumer participation →(+) Trust in the Web site	-0.09	-0.84	0.40	Not supported
H2: Consumer participation →(+) Trust in the recommendation agent	0.18	2.00	0.046	Supported
H3: Consumer participation →(+) Trust in the recommendations	0.06	0.63	0.53	Not supported
H4: Trust in the Web site →(+) Trust in the recommendation agent	0.70	6.05	<0.001	Supported
H5: Trust in the Web site →(+) Trust in the recommendations	0.50	3.37	<0.001	Supported
H6: Trust in the recommendation agent →(+) Trust in the recommendations	0.37	2.43	0.015	Supported
H7: Trust in the Web site →(+) Intention to return and reuse	0.32	2.27	0.02	Supported
H8: Trust in the recommendation agent →(+) Intention to return and reuse	0.19	1.32	0.19	Not supported
H9: Trust in the recommendation agent →(+) Intention to purchase	0.72	6.13	<0.001	Supported
H10: Consumer participation →(+) Perceived control	0.08	0.86	0.39	Not supported
H11: Perceived control →(+) Intention to return and reuse	0.25	2.77	0.006	Supported
H12: Perceived control →(+) Trust in the recommendation agent	0.14	1.75	0.08	Marginally Supported
H13.1: Perceived privacy/security policy →(+) Trust in the Web site	0.15	1.08	0.28	Not supported
H13.2: Perceived privacy/security protection →(+) Trust in the Web site	0.23	1.55	0.12	Not supported
H14.1: Perceived privacy/security policy →(-) Perceived risk in providing personal info.	0.20	1.34	0.18	Not supported
H14.2: Perceived privacy/security protection →(-) Perceived risk in providing personal info.	-0.32	-2.04	0.04	Supported
H15: Perceived risk in providing personal info. →(-) Trust in the Web site	-0.35	-3.70	<0.001	Supported
H16: Perceived risk in providing personal info. →(-) Trust in the agent	0.04	0.49	0.62	Not supported

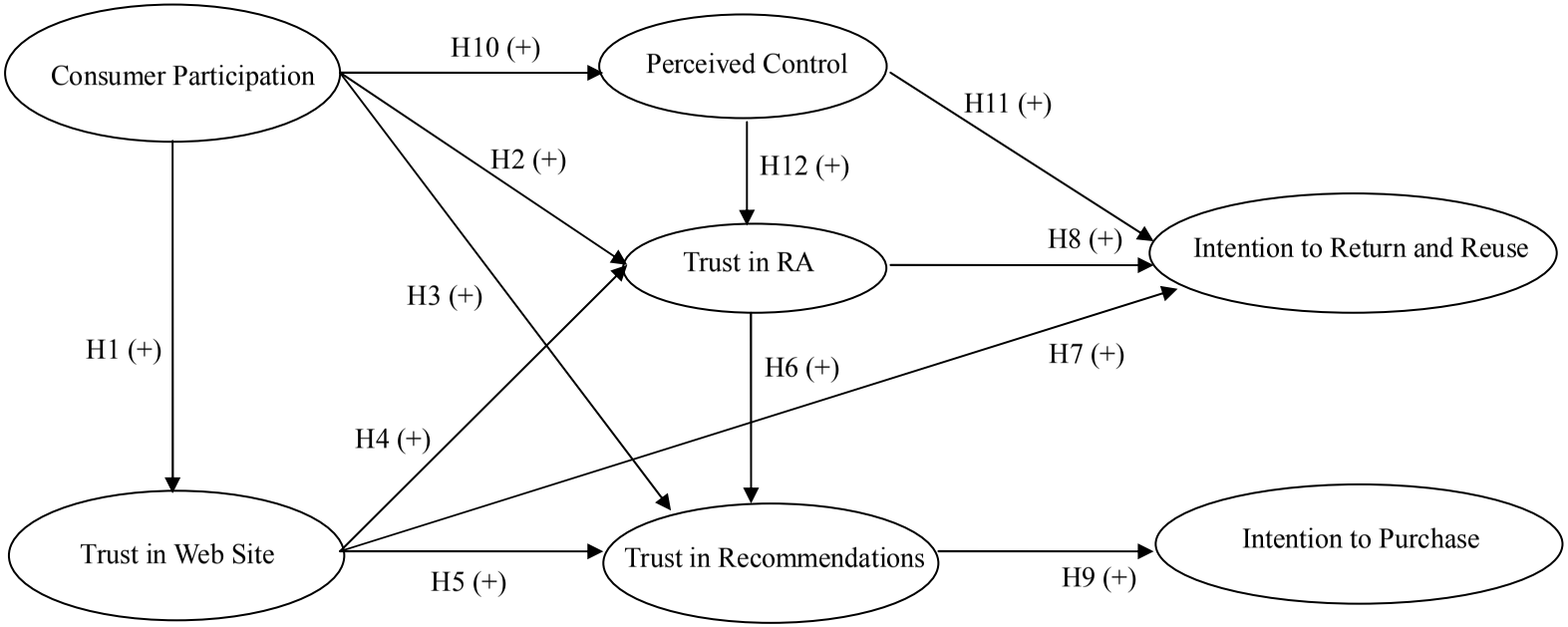
Note: Intention to return and reuse is used to test hypotheses 7, 8, and 10; perceived privacy/security policy and perceived privacy/security protection are used to test hypotheses 13 and 14 separately.

Figure 2. 1: Full Research Model



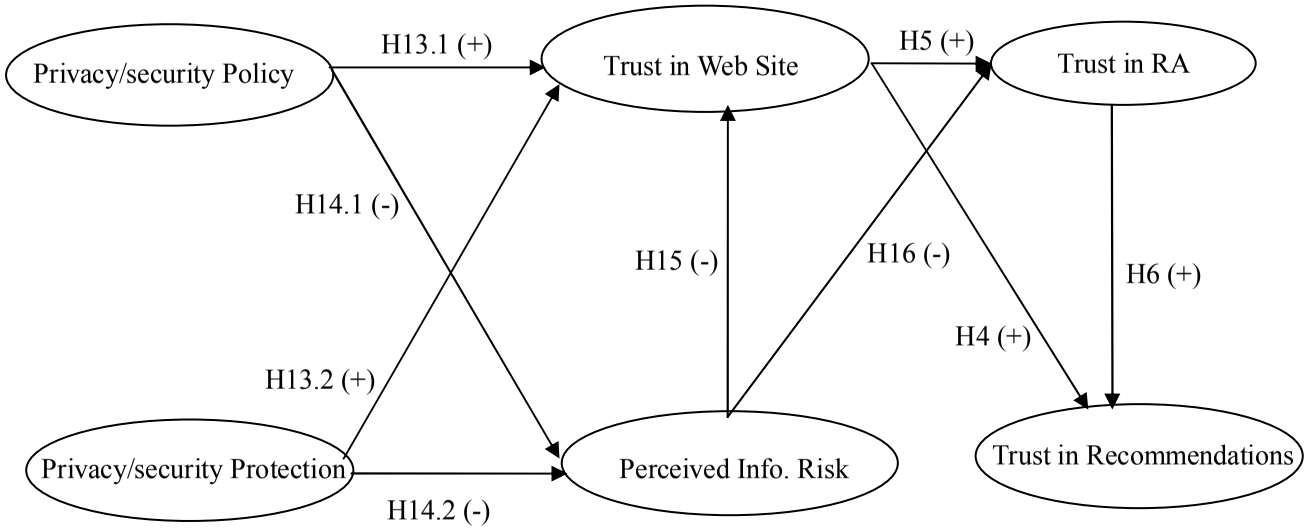
Note: Trust in RA = Trust in the recommendation agent; Perceived Info. Risk = Perceived risk in providing personal information.

Figure 4. 1: Structural Model 1



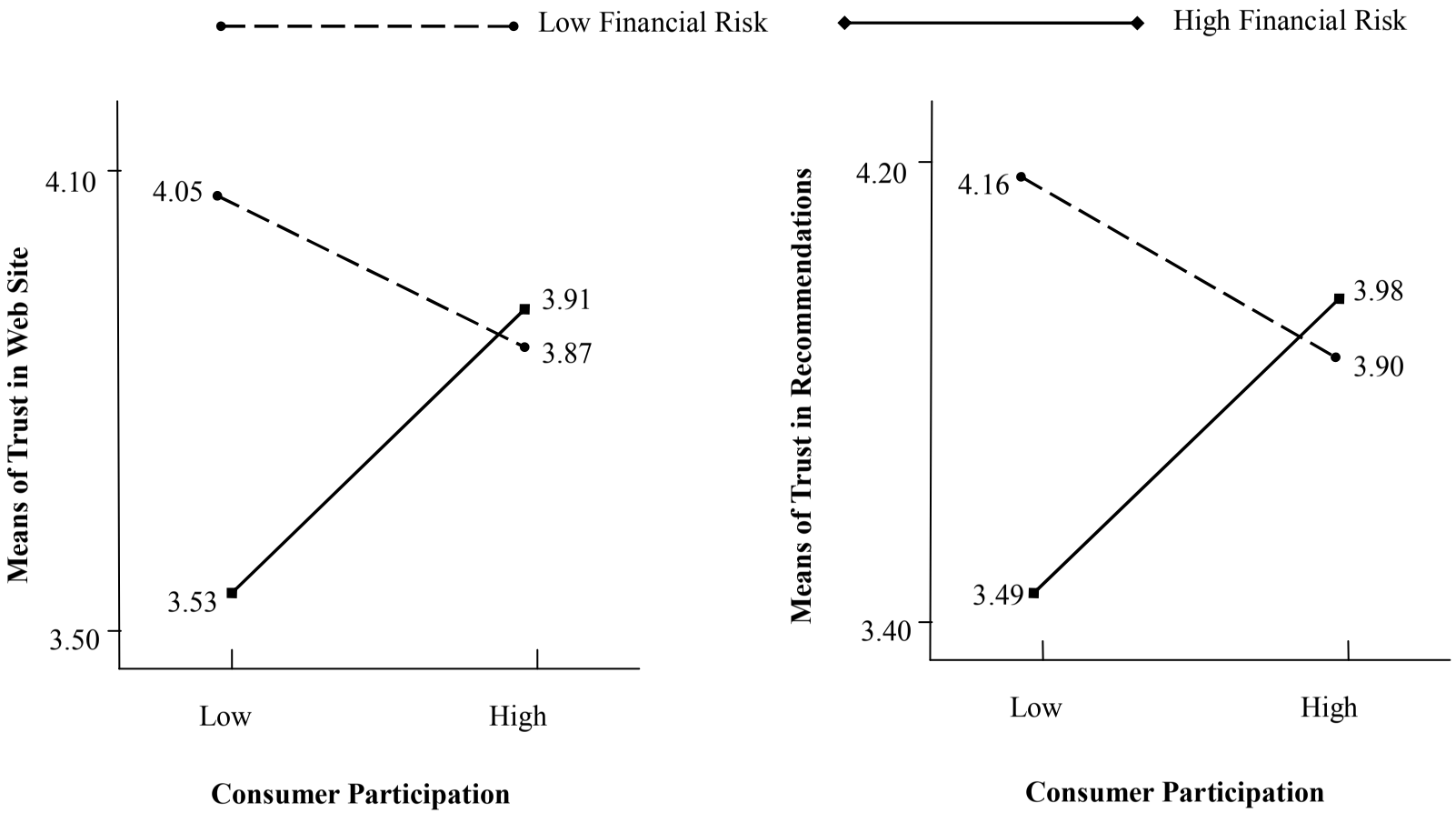
Note: Trust in RA = Trust in the recommendation agent; Intention to Return and Reuse is the combined factor of intention to reuse the recommendation agent and intention to return to the Web site.

Figure 4. 2: Structural Model 2



Note: Privacy/security policy and privacy/security protection are used to test hypotheses 13 and 14 separately; Trust in RA = Trust in the recommendation agent; Perceived Info. Risk = Perceived risk in providing personal information.

Figure 4. 3: Interaction Effects



Appendix B: Sample Scenario and the Survey Instrument

Please read the following scenario carefully and fully imagine yourself in this exact situation.

Scenario for purchasing a laptop computer

You have been using your laptop computer for almost four years. Recently your computer has started running slower and experiencing some technical problems. Worried about losing all your work if the computer breaks down, you have decided to buy a new laptop, priced at $1000 - $1200. Considering the expense, you decide to carefully look for information and advice on various laptop computers. You remember your friend had mentioned a Web site, www.MyProductAdvisor.com, which gives product recommendations for laptop computers. You decide to explore this Web site right away.

Now with this scenario in mind, please go to the Web site of www.MyProductAdvisor.com and use this Web site to search and get recommendations for a laptop computer that fits this scenario.

Now that you have used the recommendation agent on this Web site, please read the following questions carefully and answer each one.

1. How much control did you feel about using the recommendation agent on www.MyProductAdvisor.com? (Please indicate how strongly you agree or disagree with each statement.)

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I felt that I was in full charge while using this agent.	[ ]	[ ]	[ ]	[ ]	[ ]
I felt in absolute control throughout the process of using this agent.	[ ]	[ ]	[ ]	[ ]	[ ]
I did not feel comfortable at all in using this agent.	[ ]	[ ]	[ ]	[ ]	[ ]
At no time did I feel lost in using this agent.	[ ]	[ ]	[ ]	[ ]	[ ]
I felt that I directed this agent on finding out what I like.	[ ]	[ ]	[ ]	[ ]	[ ]
This agent let me change my preferences for a product at any time.	[ ]	[ ]	[ ]	[ ]	[ ]
This agent gave me product recommendations any time I wanted.	[ ]	[ ]	[ ]	[ ]	[ ]

2. Based on your experience of using the recommendation agent on www.MyProductAdvisor.com, please tell us how strongly you agree or disagree with the following statements.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
This agent seems to be very knowledgeable about laptop computers.	[ ]	[ ]	[ ]	[ ]	[ ]
This agent seems very capable of asking good questions about my preferences for laptops.	[ ]	[ ]	[ ]	[ ]	[ ]
This agent seems to be able to understand my preferences for laptop computers.	[ ]	[ ]	[ ]	[ ]	[ ]
This agent does not seem to be a real expert in assessing laptop computers.	[ ]	[ ]	[ ]	[ ]	[ ]
I have great confidence about this agent's fairness in giving product recommendations.	[ ]	[ ]	[ ]	[ ]	[ ]
I can rely on this agent for my purchase decision.	[ ]	[ ]	[ ]	[ ]	[ ]
This agent appears to put my interests ahead of the retailers'.	[ ]	[ ]	[ ]	[ ]	[ ]

3. Would you use this recommendation agent again? (Please check your response for each item.)

	Very unlikely	Somewhat unlikely	Neither	Somewhat likely	Very likely
I would use this agent to help with my future purchase decisions.	[ ]	[ ]	[ ]	[ ]	[ ]
I would never use this agent again.	[ ]	[ ]	[ ]	[ ]	[ ]
I would recommend this agent to my friends.	[ ]	[ ]	[ ]	[ ]	[ ]
I would let this agent assist me in searching for product information.	[ ]	[ ]	[ ]	[ ]	[ ]
I would use this agent as a guide for my product purchases in the future.	[ ]	[ ]	[ ]	[ ]	[ ]

4. What is your overall impression of privacy protection at MyProductAdvisor's Web site? (Please indicate how strongly you agree or disagree with each statement.)

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Not Applicable
The general privacy policy is easy to find on this Web site.	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
The text of the privacy policy is not easy to understand.	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
This Web site clearly explains why user information is collected.	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
This Web site clearly explains how my information will be shared with other companies.	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
This Web site seems to have the technology to protect my privacy.	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
This Web site seems very capable of protecting my privacy.	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
It seems that this Web site invested a great deal of money in privacy protection.	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
I believe my privacy is protected at this site.	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

5. Please tell us how strongly you agree or disagree with the following statements.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
MyProductAdvisor's Web site appears to be very trustworthy.	[ ]	[ ]	[ ]	[ ]	[ ]
MyProductAdvisor's Web site can be relied upon.	[ ]	[ ]	[ ]	[ ]	[ ]
I do not believe the information on MyProductAdvisor's Web site is correct.	[ ]	[ ]	[ ]	[ ]	[ ]
I am confident that MyProductAdvisor's Web site can be trusted.	[ ]	[ ]	[ ]	[ ]	[ ]
My overall faith in MyProductAdvisor's Web site is high.	[ ]	[ ]	[ ]	[ ]	[ ]

6. If you came across MyProductAdvisor's Web site in the future, would you use it again? (Please check your response for each item.)

	Very unlikely	Somewhat unlikely	Neither	Somewhat likely	Very likely
I would come back to this Web site again.	[ ]	[ ]	[ ]	[ ]	[ ]
I would never use this Web site again.	[ ]	[ ]	[ ]	[ ]	[ ]
I would recommend this Web site to my friends.	[ ]	[ ]	[ ]	[ ]	[ ]
I would bookmark this Web site.	[ ]	[ ]	[ ]	[ ]	[ ]

7. What do you think about the product recommendations that you received from MyProductAdvisor's agent? (Please indicate how strongly you agree or disagree with each statement.)

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
The recommendations about laptop computers appear to be unbiased.	[ ]	[ ]	[ ]	[ ]	[ ]
The recommendations about laptop computers seem to be accurate.	[ ]	[ ]	[ ]	[ ]	[ ]
I do not trust the recommendations about laptop computers.	[ ]	[ ]	[ ]	[ ]	[ ]
I feel very confident about the recommendations about laptop computers.	[ ]	[ ]	[ ]	[ ]	[ ]
I can rely on the recommendations for my purchase decisions.	[ ]	[ ]	[ ]	[ ]	[ ]

8. Assuming you are really in the situation described in the scenario that you just read, how likely are you to make a purchase based on the recommendations? (Please indicate how strongly you agree or disagree with each statement.)

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I would purchase the recommended product.	[ ]	[ ]	[ ]	[ ]	[ ]
I do not think I would ever buy this product.	[ ]	[ ]	[ ]	[ ]	[ ]
I would definitely follow the recommendation in the near future.	[ ]	[ ]	[ ]	[ ]	[ ]
I would most probably purchase the product if I was ever in this situation.	[ ]	[ ]	[ ]	[ ]	[ ]
It is very likely that I would buy the recommended product.	[ ]	[ ]	[ ]	[ ]	[ ]

9. Please circle the number that best indicates your response below.

	Very minimal						Quite a lot
When using MyProductAdvisor's agent, the amount of information I provided was	1	2	3	4	5	6	7
When using MyProductAdvisor's agent, the level of effort I put in was	1	2	3	4	5	6	7
When using MyProductAdvisor's agent, the amount of work I did was	1	2	3	4	5	6	7
The amount of time I spent in using MyProductAdvisor's agent was	1	2	3	4	5	6	7

10. If you are asked to give personal information on MyProductAdvisor's Web site, what would your feelings be? (Please indicate how strongly you agree or disagree with each statement.)

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I would feel very safe giving my personal information on that Web site.	[ ]	[ ]	[ ]	[ ]	[ ]
I would feel very comfortable sharing my personal information on that Web site.	[ ]	[ ]	[ ]	[ ]	[ ]
I feel uncertain about sharing my personal information on that Web site.	[ ]	[ ]	[ ]	[ ]	[ ]
It would be very risky for me to share any information on that Web site.	[ ]	[ ]	[ ]	[ ]	[ ]
My personal information might be misused if I share it on that Web site.	[ ]	[ ]	[ ]	[ ]	[ ]

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
MyProductAdvisor's Web site might sell my personal information to other companies.	[ ]	[ ]	[ ]	[ ]	[ ]

11. Do you normally read privacy policies when you are on the Internet and use Web sites? Yes [ ] No [ ]

If yes, please tell us why you read privacy policies:

_____

_____

_____

If no, please tell us why you do not read privacy policies:

_____

_____

_____

12. For you to purchase a laptop computer at the price range of $1000 - $1200, how much financial risk would be involved? (Please indicate how strongly you agree or disagree with each statement.)

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
It would involve a great deal of financial risk.	[ ]	[ ]	[ ]	[ ]	[ ]
I would not be concerned about the money for a laptop computer at that price range.	[ ]	[ ]	[ ]	[ ]	[ ]
$1000-$1200 for a laptop computer is something I can easily afford.	[ ]	[ ]	[ ]	[ ]	[ ]
It would be risky for me to buy a laptop at that price range.	[ ]	[ ]	[ ]	[ ]	[ ]
Spending $1000-$1200 on a laptop would certainly be a high-risk purchase for me.	[ ]	[ ]	[ ]	[ ]	[ ]

13. Please circle the number that best indicates your response to the items below.

	Very minimal						Quite a lot
When using MyProductAdvisor's agent, the number of questions I was asked was	1	2	3	4	5	6	7
	Very cheap						Very expensive
The product that I was trying to get recommendations for was	1	2	3	4	5	6	7

14. Please check the item from each pair below that applies to the scenario you read earlier.

I was asked a lot of questions when using MyProductAdvisor's agent. [ ] OR I was asked very few questions when using MyProductAdvisor's agent. [ ]

The laptop computer was expensive. [ ] OR The laptop computer was not expensive. [ ]

15. The following questions are about your Internet usage. Please provide your response in the space provided or circle the number that best describes your usage situation.

Approximately how long have you been using the Internet? _____ years.

Approximately how many hours do you spend on the Internet on a daily basis? _____ hours.

How often do you use the Internet for the following situations?

	Rarely	Sometimes	Often	Frequently
Buy a product or service	1	2	3	4
Research a product or service before buying it	1	2	3	4
Do any type of research for your job	1	2	3	4

16. Have you used any online recommendation agents before? Yes [ ] No [ ]

If yes, which agents have you used? Please list all, and indicate approximately how long you have used each one.

_____

_____

17. Finally, a few questions on demographics:

What is your gender? Female [ ] Male [ ]

What is your age? _____ years.

What is your ethnicity?

Asian [ ] African-American [ ] Caucasian [ ] Hispanic [ ] Native American [ ] Other [ ] _____

Thank you very much for your participation!

VITA

Xiaojing Sheng holds a Master of Science Degree in Business Administration from Texas Tech University and a dual degree of Bachelor of Arts in English and Economics from Wuhan University in China. Her primary research interests include consumer behavior within the e-commerce context, consumer adoption of technology-based products and services, attitude formation and change, Internet marketing, and cross-cultural research. She has presented at American Marketing Association, Society for Marketing Advances, Consumer Satisfaction, Dissatisfaction, and Complaining Behavior, International Academy of Business and Public Administration Disciplines, and Decision Science Institute conferences. Her research has been published in *Journal of Business Research*, *Journal of Marketing Theory and Practice*, and the *Service Industries Journal*. Prior to coming to the United States to pursue her Master's and doctoral degree, Xiaojing has 4 years of professional experience that includes 2 years working for Ping He (Hui Kai) Import & Export Co. in Chengdu China and 2 years working for Perkin-Elmer Inc. in Wuhan China.

In the summer of 2009, Xiaojing completed the requirements for the Ph.D. in Business Administration with a major in Marketing and minor in Psychology at the University of Tennessee. She is presently employed as an Assistant Professor in the Department of Management, Marketing and International Business at the University of Texas – Pan American.