The Role of Product Recommendation Agents in Collaborative Online Shopping

Research-in-Progress

Shan Huang
University of British Columbia
2053 Main Mall, Vancouver, B.C.
Canada, V6T 1Z2
Cindy.Huang87@gmail.com

Izak Benbasat
University of British Columbia
2053 Main Mall, Vancouver, B.C.
Canada, V6T 1Z2
Izak.Benbasat@sauder.ubc.ca

Andrew Burton-Jones
University of British Columbia
2053 Main Mall, Vancouver, B.C.
Canada, V6T 1Z2
Andrew.Burton-Jones@sauder.ubc.ca

Abstract

Over the last decade, a wealth of research has examined the potential benefits of product recommendation agents (PRAs) for improving outcomes for e-commerce consumers and vendors. To date, however, this research has largely overlooked the fundamentally social nature of shopping. In particular, people often shop collaboratively (together) and for hedonic reasons (for enjoyment), but researchers have focused almost exclusively on isolated individuals using a PRA for utilitarian reasons. This study aims to extend past research by examining the effect of PRAs on both utilitarian and hedonic value in the context of collaborative online shopping (COS). Because communication is an inherent part of any collaborative activity, our model examines both the indirect effect of PRA use on shopping value through its effect on communication among shoppers, and the direct effect of PRA use on shopping value. We propose a moderated mediation model that predicts that: task-oriented communication (TOC) positively affects utilitarian shopping value, and social-emotional communication (SEC) positively affects hedonic shopping value; (2) PRA use reduces the amount of SECs, (3) PRA use reduces the importance of TOC; and (4) PRA use directly increases utilitarian value and directly reduces hedonic value. We describe an experiment where we are planning to test the proposed model, and its intended contributions for theory and practice.

Keywords: Recommendation agent, collaborative online shopping, hedonic, communication, process perspective

Introduction

By evaluating alternatives according to a consumer's personal preferences and offering her personalized advice, product recommendation agents (PRAs) facilitate online shopping tasks. A wealth of studies have explored the effects of PRAs on purchase-decision making and suggest that PRAs can help online consumers make more effective and efficient purchase decisions (Xiao and Benbasat 2007; Häubl and Murray 2006). However, two important aspects of PRA use have been overlooked in prior research. First, little is known about the role of PRAs in collaborative online shopping (COS), despite the fact that collaborative shopping is very common in everyday life. Second, limited research has examined the effect of PRA use on the hedonic value of online shopping, with most prior research focusing only on the utilitarian aspects of PRA (Xiao and Benbasat 2007). This study aims to fill these two gaps in research by studying the influence of PRAs on both the hedonic and utilitarian values obtained during COS. To scope our initial investigation, we define COS as an activity in which one shopper shops at an online store concurrently with one or more co-located shopping partners for a shared shopping goal (Zhu et al. 2010). This then provides a baseline for studying COS in contexts in which shoppers are connected only virtually, or when they have different shopping goals.

To provide a context for our study, consider two collocated individuals (perhaps co-workers, friends, or family members) who wish to buy a product or service online together (e.g., as a present for a common friend). Although this type of activity is undertaken frequently in real life, few systems are designed specifically to support it. Instead, systems like PRAs are traditionally designed for a single user using it for his/her individual task. As a result, even though a great deal of shopping is done collaboratively in real life, most e-commerce systems are designed for the solitary user who buys items for him/herself. The interpersonal communications that occur between collaborative shoppers (co-workers, friends, family members, etc.) are largely forgotten by such systems. How can systems be designed to facilitate collaborative shopping? In particular, given the positive effects of PRAs on shopping outcomes in individual online shopping according to past research, how could PRAs help in this context? Alternatively, could they, in fact, hinder the process? Although the collaborative use of technology has long been an important part of IS research and practice (Brown et al. 2010), we know of no online software designed particularly for supporting COS, and we know of only very limited research on COS. In order to facilitate collaborative shopping online, we need to know how online shopping software, such as PRAs, can influence collaborative shopping behaviors, and learn which of their features need to be improved for COS.

One possible reason why so few studies have examined the influence of PRA use on hedonic value is that PRAs are typically intended to improve the utilitarian value of shopping (e.g., improving decision quality, increasing convenience, and saving effort). However, understanding their effect on hedonic value as well is important for two reasons. First, we know that IT can have both intended and unintended consequences. Thus, it is important to study both the outcome that PRAs were designed for (utilitarian value) and the outcomes they were not designed for, but they may still affect, such as hedonic value. Second, we know that shopping value includes both utilitarian and hedonic dimensions (Childers et al. 2001; Babin et al. 1994) and that the hedonic (enjoyment) dimension is very important for shoppers (Bloch and Bruce 1984). Thus, if PRA use increases the utilitarian value of COS but reduces the hedonic value, they may not be appropriate technologies to use for COS. Researchers and practitioners should consider both types of shopping value when they try to design or understand the role of PRAs in online shopping.

To address these deficiencies, this study investigates the influence of PRA use on both the hedonic and utilitarian value of COS. It identifies three types of effects: the direct effects of PRA use on shopping value, the effects of PRA use on inter-shopper communications, and the effects of inter-shopper communications on shopping value. More specifically, it examines: the influence of the content of inter-shopper communications in COS on shoppers' shopping value; the influence of PRA use on the amount and importance of such communications; and the direct influence of PRA use on the hedonic and utilitarian value of shopping. Communication is a partial mediator in our study because although communication does not cover all sources of value in collaborative shopping, it is an inherent and critical part of any collaborative activity and can have a profound effect on the quality of group decision making (Gouran et al. 1983) and peoples' enjoyment of social processes (Arnold and Reynolds 2003). To the best of our knowledge, this study is among the first studies in IS research to evaluate the role of PRAs in COS,

and the first to specifically examine its dual effect on hedonic and utilitarian values and the mediating role of communication.

Literature Review and Background

PRA and Online Shopping

Online markets offer consumers abundant product information and great convenience. However, electronic information can easily overwhelm online consumers with large volumes of data. The abundance of information often strains human limits: attention, memory, motivation (Häubl and Murray 2006). In response to this challenge, PRAs that make recommendations according to consumers' personal preferences or interests have appeared online to assist in filtering and comparing alternatives (Xiao and Benbasat 2007). PRA use has been found to have the potential to reduce consumers' information overload and search complexity, thus at the same time improving their decision quality and reducing decision-making effort (Häubl and Murray 2006; Xiao and Benbasat 2007). Pereira et al. (2010) and Häubl and Trifts (2000) suggested that PRA use improves consumers' decision quality. Olson and Widing (2002) observed that the use of PRAs resulted in more satisfactory choices. Dellaert and Häubl (2005) found that PRA use reduces the size of the alternative sets. Many studies show that PRA users spent significantly less time in purchasing a product online (Hostler et al. 2005; Pedersen 2000). However, few studies have been concerned with how PRA use influences COS behaviors and the hedonic value of online shopping.

COS and Group Support Systems

To the best of our knowledge, only a few studies have examined COS. Zhu et al. (2010) investigated the design of a collaborative online shopping support tool and concluded that shared navigation and voice chat can significantly enhance the collaborative shoppers' perceptions of social presence. Kim and Eastin (2011) suggested that pre-purchase/post-purchase online communications are not affected by hedonic motivation. These studies have shown the potential for research on COS, but many other opportunities for research remain.

Although the influence of PRA on COS has not received much attention, the effects of Group Support Systems (GSSs) on group process and outcomes have been extensively studied. GSSs have been defined as systems that combine communication, computer, and decision technologies to support problem formulation and solution in groups (Desanctis and Gallupe 1987). When the PRA is brought into COS context, it becomes a type of GSS that supports purchase decision formulation and solution in collaborative shopping groups. Prior research shows that GSSs increase the depth of analysis, task-oriented communications, and efforts to clarify the task, leading to improved decision quality (Dennis et al. 1988; Nunamaker et al. 1991).

On the other hand, PRAs are different from traditional GSSs. GSSs are usually used to facilitate tasks in organizations, while PRAs are used for online shopping. Many scholars of group behavior argued that the nature of the task plays an important role in a group interaction process and performance (Poole et al. 1985). There are two major differences between organizational tasks and online shopping tasks. First, the utilitarian value of organizational tasks is far more important than the hedonic value, while the hedonic value is as important as the utilitarian value of online shopping (Babin et al. 1994). Second, the group interaction process in solving the organizational problems often focuses on the tasks themselves. However, more variations can be found in topics of the communications among shoppers during shopping (Lindsey-Mullikin and Munger 2011). Thus, the findings in past GSS research cannot be easily applied to predict the role of PRAs in COS. More research on the effects of the PRA use in COS is needed. In this paper, we thus focus on the group communications, the quality of group purchase decision making, and the hedonic shopping value.

COS and Shopping Value

As we have stated, shopping value comprises two dimensions: hedonic value and utilitarian value (Babin et al. 1994). Utilitarian value stems from achieving shoppers' instrumental goal (Childers et al. 2001). Hedonic value stems from emotional enjoyment (Hirschman and Holbrook 1982). Thus, utilitarian value is more related to outcomes of shopping; while hedonic value is linked to the process of shopping. Following Babin et al. (1994) and Childers et al. (2001), we measure the utilitarian value of shopping in terms of purchase decision quality and hedonic value in terms of shoppers' perceived enjoyment.

In COS, both interactive media and inter-shopper communications can affect online shopping value (Childers et al. 2001; Kim and Eastin 2011; Arnold and Reynolds 2003). For example, Childers et al. (2003) found that usefulness of shopping websites is a stronger predictor of attitude in a more utilitarian shopping environment, while enjoyment of shopping experience is more predictive of attitude in a more hedonic online shopping environment. Social interactions also influence both the enjoyment of shopping (Arnold and Reynolds 2003) and decision quality (Dennis et al. 1988). Thus, both utilitarian value and hedonic value are relevant and important in COS context. This paper studies both the direct effects of PRA use on shopping value and the effects of PRA use on shopping value partially mediated by inter-shopper communications.

Research Model and Hypotheses

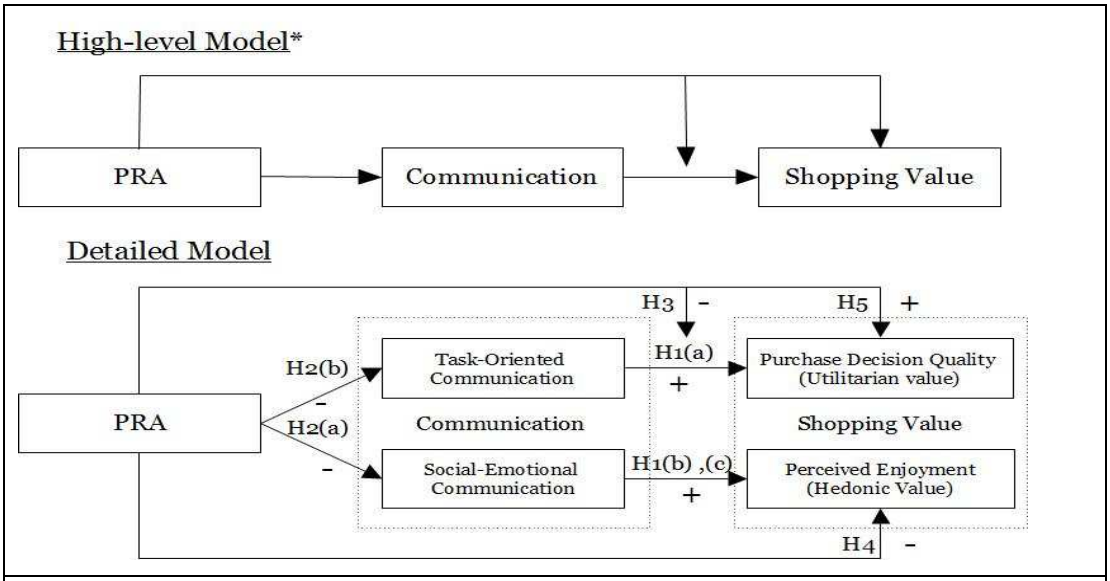

Figure 1. Research Model

*This is a moderated mediation model (Little et al. 2007, p 225) and "communication" in the figure refers to inter-shopper communications.

The Influence of Communication Process on Shopping Value

Bales' Interaction Process Analysis (IPA; Bales 1950) classifies the communication process in small groups into 12 categories, including two types of communications: task-oriented communications (TOCs) and social-emotional communications (SECs) (see Figure 2). Parson and Bales (1953) described that TOCs are "mostly directly relevant to the problems of adaptation and instrumental control" and SECs are "relevant to the problems of expression of emotional reactions and tensions and maintenance of group integration". According to qualitative research concerning communications during shopping (Lindsey-Mullikin and Munger 2011), we argue that these 12-category communications can be found in the inter-shopper communications in COS. Utilitarian value is concerned with the instrumental aspect of shopping, while hedonic value focuses on the social-emotional aspect of shopping. Positive SECs are associated with

the positive aspects of emotions, while negative SECs relates to negative emotional reactions. As such, we argue that TOCs positively affect the utilitarian value of shopping. Positive SECs positive affect the hedonic value of shopping, while negative SECs adversely affect the hedonic value of shopping.

> **Hypothesis 1:** (a) TOCs positively affect utilitarian value; (b) Positive SECs positively affect hedonic value; (c) Negative SECs adversely affect hedonic value.

The Influence of PRA on Amount of Communications

PRAs impose a structure on shopping process and thus restrict the shoppers' communication processes (Wheeler and Valacich 1996). Silver (1988, 1990) argued that a system is restrictive if the number of system-supported processes is small relative to the number of possible processes. He defined restrictiveness as "the degree to which and the manner in which a decision support system limits its user's decision-making processes to a subset of all possible processes". The structural procedures and powerful algorithms of PRAs aim to assist shoppers to make purchase decision more effectively (Häubl and Murray 2006) and to accomplish a higher utilitarian value. Few features of PRAs are created based on hedonic motivations. Thus PRAs tend to restrict the shopping processes to more task-oriented processes. In the shopping task with PRAs, shoppers are likely to focus more on the instrumental aspect of shopping than the enjoyment of shopping process. PRA use may increase the relative weight of TOCs and decrease the relative weight of SECs. Moreover, because, PRA use reduces the time for completing the shopping task (Hostler et al. 2005; Pedersen 2000), and more communications can be accomplished in a longer period of time, PRA use tends to reduce the total amount of communications. PRA use tends to reduce the total amount of communications and decreases the relative weight of SECs, thus we predict that PRA use decreases the actual number of SECs.

Although we predict that PRA use increases the relative weight of TOCs, PRA use may still reduce the amount of TOCs for two reasons. First TOCs are mostly triggered by the products involved in the shopping tasks. Shoppers share product information, provide suggestions and make judgments, based on the alternative products they search and consider during the shopping task (Lindsey-Mullikin and Munger 2011). However, many researchers have suggested that fewer products are examined and less information is searched in the shopping task with PRAs (Xiao and Benbasat 2007; Häubl and Murray 2006; Häubl and Trifts 2000). Second, in the shopping task with PRAs, shoppers will also conduct task-oriented human-computer communications with the third party, namely, the PRA as a recommender of products, thus reducing the TOCs between shoppers.

> **Hypothesis 2:** (a) PRA use decreases the amount of SECs; (b) PRA use decreases the amount of TOCs.

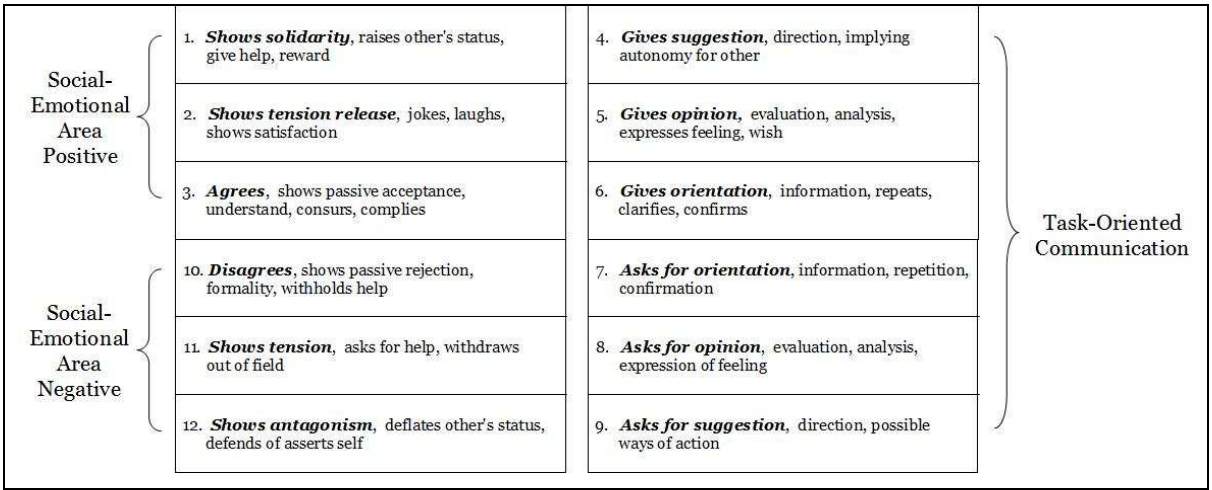

Figure 2. Bales Communication Categories

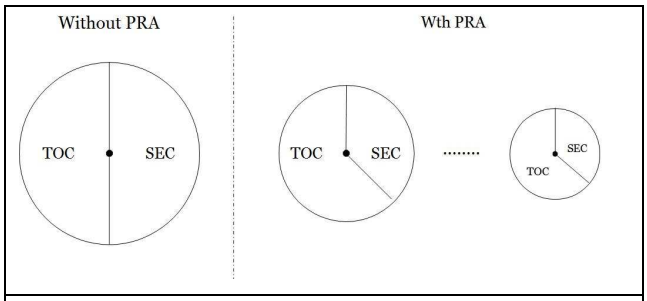

Figure 3. PRA Use Influences on Communications

*Figure 3 shows our prediction concerning the amount of communications (the area) and the proportion of TOC and SEC. We predict that PRA use reduces the proportion of SEC to TOC and the amount of TOCs and SECs. This figure shows only some of the possible instances of PRA's effects on communications based on our predictions.

The Moderating Influence of PRA on TOC

The relationship between communications and group-decision making quality is affected by the structure of the decision task presented to the group. When the task is simple, quality of group decision making is largely a function of individual skills, knowledge of group members and the amount of effort they put to complete the task (Hackman and Morris 1975). In simple tasks, individual members are more able to successfully work through the problem without interacting with other group members. Therefore, the decreased complexity of the task may decrease the importance of the communications for group decision making. COS is a group decision making task, in which shoppers make purchase decision collaboratively. The utilization of PRAs decreases the complexity of the shopping task by simplifying the shopping process and offering personalized recommendations. Therefore, TOCs between shoppers are less important in making a high-quality purchase decision (obtains high utilitarian value). As a result, we predict that PRAs will reduce the positive effect of TOCs on utilitarian value. Meanwhile, we haven't found enough theoretical evidence to predict the moderating effects of the PRA use on the relationship between SECs and hedonic value.

Hypothesis 3: PRA use decreases the positive effect of TOCs on utilitarian value.

The Influence of PRA on Perceived Enjoyment (Hedonic Value)

Although PRA use will have an important effect on shopping value by influencing communication among shoppers, as we have outlined, it should also have a direct effect on the shopping value. Childers et al. (2001) found that the process of self-directed navigation through the interactive environment contributes to an enjoyment of the shopping experience. Navigation is defined as the process of self-directed movement through media involving nonlinear search and retrieval methods that permit greater freedom of choice (Hoffman and Novak 1996). However, in the shopping task with PRAs, shoppers have to go through a programmed procedure, in which PRAs need to know the answers of all the required questions about product attributes before offering recommendations, so shoppers do not have much flexibility to conduct self-directed navigations. PRA use tends to restrict the shopping process to a structured procedure. Babin st al. (1994) also showed that adventurous aspects of shopping can produce hedonic shopping value. Thus, PRA use tends to adversely affect the perceived enjoyment of online shopping. Moreover, Arnold and Reynolds (2003) found that stress relief and tension reduction are related to hedonic value of shopping. But PRA use may make the shopping more like a work, and thus may decrease the hedonic value of shopping. For all these reasons, we predict that PRA use decreases the perceived enjoyment of COS.

Hypothesis 4: PRA use decreases shoppers' perceived enjoyment of COS.

The Influence of PRA on Purchase Decision Quality (Utilitarian Value)

Decision aids designed to screen large numbers of alternatives may reduce decision makers' cognitive effort (Todd and Benbasat 1994) and improve decision quality. PRAs enable consumers to easily locate and focus on alternatives matching their preferences (Xiao and Benbasat 2007), reduce the amount of superfluous information to be processed and thus improve human information processing capabilities (Häubl and Trifts 2000). Moreover, the powerful algorithms of PRAs also enhance the quality of the information that is processed by shoppers, improving decision quality by enabling individuals to make decisions with high accuracy (Singh and Ginzberg 1996). Finally, many researchers have already showed that PRAs are effective in improving decision quality of individual shoppers (Xiao and Benbasat 2007; Häubl and Murray 2006; Dellaert and Häubl 2005; Olson and Widing 2002). As such, we hypothesize that the use of PRAs will increase shoppers' purchase decision quality.

Hypothesis 5: PRA use increases shoppers' purchase decision quality of COS.

Methodology

A laboratory experiment with a mixed 2*2 (collaborative shopping with/without PRA) * (two types of products) design will be implemented. Each collaborative group will be asked to purchase a gift for one of their mutual friend concerning two types of products: backpacks and earphones, and will be asked to release the name of the mutual friend and the reason why they want to purchase a gift for her/him. Each group will get $30 to purchase in the experiment concerning each product, but they will finally get only one of the products they purchased, to be randomly decided after the experiment, in order to encourage participants to seriously shopping for each product. If they want to buy a more expensive one, they can put the $30 forwards that purchase and pay for the remainder themselves. The subjects will also be informed that 10 randomly selected pairs are going to receive one of the products they purchase for free. We use this design to encourage variations in the product prices. The two collaborating partners will be located in the same place and use one common computer to shop online. We will design four experimental shopping systems for this study (one for each group). In order to examine the process of shopping, we will audiotape the communication process of the shopping task and screen tape the searching behavior. More specifically, 40 persons (20 pairs) will participate in a pilot study. 300 (150 pairs) participants will take the main task. Each person who volunteers will be asked to invite a friend to participate.

The coding of the communication process will be conducted according to the Bales IPA (Bales 1950). We measure the amount of communications as the number of Bales units that each group conducts during the shopping process and measure the communication process based on the Bales Categories of Communications. The two outcome variables are: (1) purchase decision quality measured by the survey instrument adapted from Widing and Talarzyk (1993), and also by whether shoppers will change their mind and switch to another alternative when given an opportunity to do so (Häubl and Trifts 2000); (2) perceived enjoyment measured by the survey instrument adapted from Babin et al. (1994). Control variables, such as rapport between shopping partners, product knowledge and user experience, will also be measured. Another key issue in the measurement of shopping value is to choose an appropriate level of analysis (Gallivan and Benbunan-Fich, 2005). In this paper, we will measure the shopping value in group level under the discussion method (Guzzo et al., 1993), since the focus of this paper is collaborative shopping value. Under such a method, each group was presented with an instrument scale and instructed to discuss and provide a single response (as a group) to each of the questions pertaining to the constructs being assessed. Decision quality and perceived shopping enjoyment will be assessed using this technique. Following Chan (1998), we use "we" and "us" in the items to capture the group-level measure (i.e., a referent-shift approach).

Conclusion and Implications

This study offers both theoretical and practical contributions. Its main contribution to research and practice is fourfold. First, to the best of our knowledge, this is the first study to focus on the role of PRA in COS, which opens up a new and promising opportunity for the future research and practice. As online shopping becomes a type of social activity, more research is needed to know whether the traditional

online shopping aids, such as PRA, can work in the COS context and how to improve these shopping aids for COS. This research-in-progress paper proposed a research model to investigate how the PRA affects the hedonic and utilitarian shopping value of COS. The findings of this research can be used to inform the future design of PRA used for COS.

Second, this paper proposes the hypotheses on the effect of PRA use on the hedonic value of COS and the effect of SECs on the hedonic value. Since reduced hedonic shopping value may adversely affect the adoption of PRAs (Childers et al. 2001), both researchers and practitioners should pay attention to the hedonic aspects of the PRA use. The effect of SECs on the hedonic value indicates that IT features that trigger SECs may in turn affect the hedonic value of COS, providing a good direction for the future design of PRAs.

Third, it sheds light on understanding the influence of PRA use on both the COS process: inter-shopper communications and the COS outcomes: shopping value. This is important in a sense that previous research on the effects of PRA use, has primarily focused on the directly effects of PRA use on the outcome variables of online shopping, such as decision quality. However, process variables, such as communication process among shoppers in COS, can also play a very important role in affecting the shopping value (Hiltz et al. 1986). In terms of theory, we connected inter-shopper communications with the shopping value of COS. In particular, we hypothesized that TOCs contribute to utilitarian shopping value, while SECs are associated with hedonic shopping value. Understanding the influence of PRA use on the COS process can help researchers to further investigate the effect of PRA use on the shopping value of COS. This paper thus provides future researchers with a useful foundation for studying the phenomena related to COS.

Fourth, it predicts that PRA use reduces the positive effects of TOCs on utilitarian value, and that PRAs use directly improves the utilitarian value. These predictions indicate that the features of PRAs are very important factors that affect utilitarian value of COS, more important than inter-shopper communications. According to this indication, the future designers of the PRA used in COS should focus more on the utilitarian features of PRA than on the features that facilitate the TOCs.

Limitations and Future Research

As a first step in this area, our study's scope is limited in several ways and could be extended in future. First, the application of this study's findings to other types of PRAs requires caution. This study focuses on one type of PRA-namely, a content-filtering-based PRA (e.g. Wang and Benbasat, 2007). This type of PRAs uses consumers explicitly stated preferences for attributes in identifying products most suites to their needs and thus makes recommendations. Explanations that are embedded in other types of PRAs might differ and thus lead to different outcomes (Wang and Benbasat, 2007). For example, collaborative-filtering-based PRAs suggest products of interest to consumers based on past purchases of similar consumers. Second, this paper only studies the simplest situation of COS. Future research can focus on other possible instances of COS, such as two remotely located shoppers shopping together. For this context, future researchers could refer to the studies on technology-mediated communications. (e.g. Hiltz et al. 1986). Third, although we study the direct effects of PRA use on shopping value, this study does not pay very much attention to the PRA's influence on human-computer interactions, such as the amount and content of interactions with the PRA. Fourth, this paper does not study the influence of shopping value on the adoption of PRAs, an important research question on PRAs and a promising direction for future research. Fifth, our study only examines verbal communications between shoppers. In future, researchers can discuss both the verbal and non-verbal communications to capture a deeper understanding of PRA use effects on communications between shoppers and the effects of non-verbal communications on the shopping value.

References

Arnold, M. J., and Reynolds. K. E. 2003. "Hedonic Shopping Motivations," *Journal of Retailing* (79:2), pp. 77-95.

Babin, B. J., W. R. Darden, and Griffin. M. 1994a. "Work and/or Fun: Measuring Hedonic and Utilitarian Shopping Value," *The Journal of Consumer Research* (20:4), pp. 644-56.

Bales, R. F. 1950. *Interaction Process Analysis*, *Cambridge, Mass*.

Bloch, P. H., and Bruce. G.D. 1984. "Product Involvement as Leisure Behavior," *Advances in Consumer Research* (11:1), pp. 197-202.

Bo, X., and Benbasat, I. 2007. "E-Commerce Product Recommendation Agents: Use, Characteristics, and Impact," *MIS Quarterly* (31:1), pp. 137-209.

Brown, S. A., Dennis, A. R., and Venkatesh.V.2010. "Predicting Collaboration Technology Use: Integrating Technology Adoption and Collaboration Research," *Journal of Management Information Systems* (27:2), pp. 9-54.

Chan, D. 1998. "Functional Relations among Constructs in the Same Content Domain at Different Levels of Analysis: A typology of compositions models," Journal of Applied Psychology (83), pp234-246.

Childers, T. L., Carr, C.L., Peck, J. and Carson. S. 2001. "Hedonic and Utilitarian Motivations for Online Retail Shopping Behavior," *Journal of Retailing* (77:4), pp. 511-35.

Dellaert, B. G., and Häubl. G. 2005. "Consumer Product Search with Personalized Recommendations," *Unpublished Working Paper, Department of Marketing, Business Economics and Law, University of Alberta*.

Dennis, A. R., George, G.F., Jessup, L.M., Nunamaker Jr, J.F., and Vogel, D.R. 1988. "Information Technology to Support Electronic Meetings," *MIS Quarterly*, pp. 591-624.

Desanctis, G., Gallupe, B.R.1987. "The Foundation for the Study of Group Support Systems," *Management Science*, pp. 589-609

Gallivan, M.J., Benbunan-Fich, R.2005." A Framework for Analyzing Levels of Analysis Issues in Studies of E-Collaboration," *IEEE Transactions on Professional Communication*, pp. 87-104

Gouran, D. S., Hirokawa, R.Y. and Mander, MS. 1983. "The Role of Communication in Decision-Making Groups: A functional perspective," *Communications in Transition*, pp.168-85.

Guzzo, R. A., Yost, P. R., Campbell, R. J., and Shea, G. P. 1993. "Potency in Groups: Articulating a Construct," *British Journal of Social Psychology*, 32, pp87–106.

Hackman, J. R., and Morris, C.G. 1975. "Group Tasks, Group Interaction Process, and Group Performance Effectiveness: A Review and Proposed Integration1," *Advances in Experimental Social Psychology* 8, pp. 45-99.

Häubl, G., and Murray, K.B. 2006. "Double Agents: Assessing the Role of Electronic Product-Recommendation Systems," *Sloan Management Review* (47:3), pp. 8–12.

Häubl, G., and Trifts, V. 2000. "Consumer Decision Making in Online Shopping Environments: The Effects of Interactive Decision Aids," *Marketing Science*, pp. 4-21.

Hiltz et al. 1986. " Experiments in Group Decision Making Communication Process and Outcome in Face-to-Face versus Computerized Conferences," *Human Communication Research,* pp. 225-252

Hirschman, E. C., and Holbrook, M.B. 1982. "Hedonic Consumption: Emerging Concepts, Methods and Propositions," *The Journal of Marketing*, pp. 92-101.

Hoffman, D. L., and Novak, T.P. 1996. "Marketing in Hypermedia Computer-Mediated Environments: Conceptual foundations," *The Journal of Marketing* (60:3), pp. 50-68.

Hostler, R. E., Yoon, V.Y., and Guimaraes, T. 2005. "Assessing the Impact of Internet Agent on End Users' Performance," *Decision Support Systems* (41:1), pp. 313-23.

Kim, S., and Eastin, M.S. 2011. "Hedonic Tendencies and the Online Consumer: An Investigation of the Online Shopping Process," *Journal of Internet Commerce* 10, (1), pp. 68-90.

Koufaris, M., Kambil.A., and LaBarbera, P.A. 2001. "Consumer Behavior in Web-Based Commerce: An Empirical Study," *International Journal of Electronic Commerce* (6:2), pp. 115-38.

Lei, Z., Benbasat, I., and Jiang, Z. 2010. "Let's shop online together: An Empirical Investigation of Collaborative Online Shopping support," *Information Systems Research* (21:4), pp72-91.

Lindsey-Mullikin, J., and Munger, J.L. 2011. "Companion Shoppers and the Consumer Shopping Experience," *Journal of Relationship Marketing* (10:1), pp. 7-27.

Little, T. D., Card, N.A., Bovaird, J.A., Preacher, K.J. and Crandall, C.S. 2007. "Structural Equation Modeling of Mediation and Moderation with Contextual Factors," *Modeling Contextual Effects in Longitudinal Studies*, pp. 207-30.

Nunamaker, J. F., Dennis, A.R., Valacich, J.S., Vogel, D. and George. J.F. 1991. "Electronic Meeting Systems," *Communications of the ACM* (34:7), pp. 40-61.

Olson, E. L., II Widing, and Robert, E. 2002. "Are Interactive Decision Aids Better than Passive Decision Aids? A Comparison with Implications for Information Providers on the Internet," *Journal of Interactive Marketing* (16:2), pp. 22-33.

Pedersen, P. E. 2000. "Behavioral Effects of Using Software Agents for Product and Merchant Brokering: An Experimental Study of Consumer Decision-Making," *International Journal of Electronic Commerce* (5:1), pp. 125-41.

Pereira, T. A. B., dos Santos, V.S., Ribeiro, B. L. and Elias, G. 2010. "A Recommendation Framework for Allocating Global Software Teams in Software Product Line Projects," *Paper presented at Proceedings of the 2nd International Workshop on Recommendation Systems for Software Engineering*.

Poole, M. S., Siebold, D. R., and McPhee, R.D. 1985. "Group Decision-Making as a Structurational Process," *Quarterly Journal of Speech* (71:1), pp. 74-102.

Silver, M.S. 1990."Decision Support Systems: Directed and Nondirected Change", *Information Systems Research,* pp. 47-70

Singh, D. T., and Ginzberg, M. J. 1996. "An Empirical Investigation of the Impact of Process Monitoring on Computer-Mediated Decision-Making Performance," *Organizational Behavior and Human Decision Processes* (67:2), pp. 156-69.

Todd, P., and Benbasat, I. 1994. "The Influence of Decision Aids on Choice Strategies: An Experimental Analysis of the Role of Cognitive Effort," *Organizational Behavior and Human Decision Processes* (60:1), pp. 36-74.

Weiquan, W., and Benbasat, I. 2007, "Recommendation Agents for Electronic Commerce: Effects of Explanation Facilities on Trusting Beliefs," *Journal of Management Information Systems*, pp. 217-246

Wheeler, C., Valacich,J.S. "Facilitation, GSS, and Training as Sources of Process Restrictiveness and Guidance for Structured Group Decision Making: An Empirical Assessment," *Information Systems Research,* pp. 429-450.

Widing, R. E., and Talarzyk, W. W. 1993. "Electronic Information Systems for Consumers: An Evaluation of Computer-Assisted Formats in Multiple Decision Environments," *Journal of Marketing Research* (30:2), pp. 125-41.