Decision Support Systems 55 (2013) 883–893

Contents lists available at ScienceDirect

Decision Support Systems

journal homepage: www.elsevier.com/locate/dss

Assessing the moderating effect of consumer product knowledge and online shopping experience on using recommendation agents for customer loyalty

Victoria Y. Yoon [a], R. Eric Hostler [b], Zhiling Guo [c,*], Tor Guimaraes [d]

[a] Department of Information Systems, Virginia Commonwealth University, USA
[b] York College of Pennsylvania, York, PA 17403, USA
[c] Department of Information Systems, City University of Hong Kong, Hong Kong
[d] Department of Decision Sciences, Tennessee Tech University, USA

ARTICLE INFO

Available online 30 December 2012

Keywords:
Intelligent agents
Customer loyalty
Customer satisfaction with website
Customer value
Product knowledge
Online shopping experience

ABSTRACT

Social media technologies have greatly facilitated the creation of many types of user-generated information, e.g., product rating information can be used to generate preference-based recommendation. As a decision support tool, a Recommendation Agent (RA) has been widely adopted by many e-commerce websites. The impact of RAs on online shopping has been extensively examined in the IS literature. However, from Marketing and Social Media perspectives, the widely adopted cognitive–affect–conative–action framework of customer loyalty has not been tested in the presence of RAs. Moreover, there has been little research assessing the impact of increasing consumer knowledge about specific product domains on customer satisfaction and loyalty. Based on these important constructs, this study proposes and empirically tests a parsimonious model assessing the moderating effect of consumer product knowledge and online shopping experience on using RA for customer loyalty. The results show that consumer product knowledge relationship between RA's recommendations negatively impacts the recommendation quality and customer satisfaction, however, consumer online shopping experience does not have a significant effect on the relationship between customer satisfaction and customer loyalty. The results make a significant contribution to a better understanding of the constructs in our research model and provide evidence useful for the management of websites using RAs for product recommendations.

1. Introduction

In the last few years, user-generated information from ratings, tagging, and social networking support systems have allowed the development and improvement of preference-based, personalized recommender agent (RA) systems. In turn, as decision support tools, RAs have been widely adopted by many e-commerce websites and online applications. For example, Amazon and Netflix have used RAs extensively to support online consumers and these systems have demonstrated tremendous success as measured by increased sales and user satisfaction. Similarly, the social news site Digg uses history of likes and dislikes to deliver personalized recommendations to users, and Facebook's main recommender mechanism is its "Friend-of-Friend" algorithm. In general, the relatively high quality and relevant content provided by the RA systems are thought to significantly enhance the users' online experiences, which ultimately are expected to positively affect customer loyalty to the sites.

Customer loyalty has been widely recognized as a useful indicator for long-term business success. Previous studies have reported a powerful impact of customer loyalty on overall firm performance [40]. Rust, Zeithaml, and Lemon [52] reported a significant effect of customer loyalty on firm's performance, and that many companies consider customer loyalty an important source of competitive advantage. Further, Reinartz and Kumar [48] revealed a strong relationship between customer loyalty and a firm's profitability. Similarly, Fornell et al. [20] also discovered a strong positive relationship between customer loyalty and stock returns.

Due to the importance of customer loyalty for business success, academicians as well as practitioners have a keen interest in identifying the determinants of customer loyalty. The marketing literature has addressed various determinants of customer loyalty for over two decades [43], and the frequently reoccurring factors affecting customer loyalty include customer value, customer satisfaction, trust, and habit. A cognition–affect–conation–action conceptual framework with these determinants has been empirically validated in a variety of contexts, including B2C [58], B2B [32], mobile commerce [35], e-service [37], and internet-provider services [12]. Prior studies also have examined the impact of website design features on customer loyalty [13,39].

Originally, the concept underlying the use of RAs was to reduce customer information overload by recommending products that are likely to be of interest to them. The impact of RAs on online shopping has been extensively examined in the IS literature [6,27,28,45,61,63,64]. Prior studies have addressed how customers utilize RAs while shopping

* Corresponding author.
E-mail address: zhiling.guo@cityu.edu.hk (Z. Guo).

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http://dx.doi.org/10.1016/j.dss.2012.12.024

online, and what impact RA usage has on certain shopping behaviors. The nature of studies regarding RAs is diverse along several dimensions, and the experimental designs and shopping tasks used in the studies also vary greatly. However, from a marketing perspective, the widely adopted cognitive–affect–conative–action framework of customer loyalty has not yet been empirically tested in the context of RAs. This represents one of the main reasons for conducting this study. Another motivation for this study is that there has been little research assessing the effect of increasingly higher consumers' domain expertise on customer loyalty in the presence of RA usage. Because RA is designed to provide expert recommendations, a natural question is whether it is a substitute for consumers' domain expertise. If the answer to this question is positive to some extent, then consumers' evaluation for RA effectiveness may vary depending on consumers' expertise. Consequently, it may affect customer satisfaction and loyalty in the online shopping environment.

Drawing on the IS, Marketing and Social Psychology literature, we propose and empirically test a theoretical model examining the effects of an RA on customer loyalty and the moderating effect of product knowledge and online shopping experience on the model. In order to fill a gap in our collective knowledge about the use of RAs in e-commerce and its effects on customer loyalty, we created a simulated online shopping environment in which data can be collected to empirically study the impact of RA usage in an online retail environment and the moderating effect of consumers' expertise on the research model. Examining these variables is increasingly important as current RA practice seldom treats individuals differently based on user expertise. The next section addresses the theoretical foundations for this study. That is followed by sections discussing the research model; the research methodology; results; and summary, conclusions and recommendations for practitioners and researchers.

2. Theoretical background

In developing the theoretical framework for this study, we utilize several theories. The first theoretical basis is the more traditional theory of customer loyalty. Dick & Basu [15] presented the attitude-based framework of customer loyalty, which represents three phases – customer belief, affect, and intention – in the customer attitude structure. Oliver [43] extended this framework by adding the fourth phase of action, representing the progressive development of customer loyalty through

$$\text{Cognition} \rightarrow \text{Affection} \rightarrow \text{Conation} \rightarrow \text{Action}.$$

Oliver [43] argued that customers first become loyal in a cognitive sense based on prior knowledge or experience-based information regarding brand attributes. He refers to this stage as cognitive loyalty. Customers then become loyal in an affective sense. The second phase of affective loyalty represents the pleasure dimension of the customer satisfaction — affection toward a brand. Customers later become loyal in a conative manner, reflecting the customer's intention and desire to rebuy the brand. Customers become loyal finally in a behavioral manner — actual commitment to rebuying [43].

Based on the cognition–affect–behavior model, Lam et al. [32] proposed a conceptual framework that includes customer perceived value, customer satisfaction, switching costs, and customer loyalty in a B2B setting. The study results reveal that customer value has a positive impact on customer satisfaction, and customer satisfaction has a positive effect on customer loyalty. They also reported the significant mediating effect of customer satisfaction between customer value and customer loyalty. Numerous studies also proposed and empirically validated theoretical models drawn on this customer loyalty model in various contexts, including B2C [58], mobile commerce [35], e-service [37], and Internet Service Provider [12]. These studies also reported customer perceived value, customer satisfaction, trust and habit as the antecedents of customer loyalty.

The second theoretical basis of this study is the theory of human information processing that describes the limited cognitive capacity to process information [38,62]. The advance of e-commerce enables customers to access excessive volumes of information. Large amount of information is beneficial in the sense that more information is available for analysis to provide insight and alternatives. However, the effect of voluminous information is detrimental, causing information overload and challenging humans' cognitive abilities. The ability to utilize this information will require techniques that allow larger volumes of information to be analyzed. As a result, many different approaches have been proposed to assist with information overload including personalization, information filtering, and recommendation agents. RAs are particularly effective in addressing the information overload problem by providing assistance in a decision making context [34]; evaluating the potentially overwhelming number of alternatives and recommending items that are likely to be of interest to the customer. RAs are particularly useful for decision-makers where decisions must be made in a short time period and the effort required for interacting with the system is limited [51]. By supplying a recommendation based on some predictive elements relevant to the customer, RAs augment the customer's processing capacity for decision making process. Such RAs may have potential for influencing customer purchase action. It would be intriguing to analyze their effects on customer purchase behavior.

The theory of interpersonal similarity provides another theoretical basis for this study. Interpersonal similarity is viewed as a form of social distance in which an individual perceives similar persons as socially close to oneself than dissimilar ones [36]. As a form of social distance, interpersonal similarity, which is similar in attitudes, personality or background, develops a sense of closeness between individuals and thereby affects information processing about each other. Many studies have reported that higher levels of similarity lead to attraction [9]. A collaborative filtering recommendation agent recommends products to consumers with similar tastes and preferences [1]. He et al. [24] suggested that using collaborative filtering techniques to recommend a product that one consumer found attractive, to another consumer who has similar tastes to the former, is an effective technique for increasing sales. Drawing upon the similarity and attraction relationship that the interpersonal similarity theory posits, we argue that better recommendation leads to more customer satisfaction on the product recommended by the RA, which in turn positively affect customer loyalty.

Last, this study is also based on prior research of RA use in e-commerce. Previous studies have analyzed the effectiveness and impact of RAs on Internet e-commerce [63 for extensive review; 28, and 64 for more recent works]. These studies have examined RAs that make recommendations to aid the consumer in selecting a specific product within a product category (product brokering) or selecting an online merchant to purchase from (merchant brokering). The results suggest that the application of RAs in certain aspects of e-commerce can be effective in helping online consumers by providing additional decision support while shopping. Specific results include that RAs save decision time [27,61] and increase important factors such as decision effectiveness [6], decision quality [22,27,31], decision confidence [26], impulse purchase [28], sales [45], and loyalty [64]. Wang and Doong [62] analyzed the impact of customers' cognitive differences on the success of recommendation agents.

In this research, we position our study in the stream of collaborative filtering recommendation agents. Collaborative filtering (CF) is one of the most popular techniques for recommender systems. It relies on user-generated content such as ratings on items (e.g., movies, music, books, etc.) that the user has experienced, based on which the system identifies persons who have similar interests and then recommend to the user items that are preferred by these like-minded neighbors. This is in contrast with the content-based RA that generates recommendations