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DEVELOPMENT OF AN INSTRUMENT TO STUDY THE USE OF RECOMMENDATION SYSTEMS

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Abstract

Web-based recommendation systems are becoming increasingly popular. Systems ranging from those like Siteseer that use user's bookmarks as surrogates for preferences to those that provide content-based and collaborative recommendations are gaining user's attention. This study proposes a validated instrument to measure such constructs as perceived usefulness, perceived ease of use, perceived content quality, and perceived content provider credibility of recommendation systems. Also the study assesses the effect of determinants on the usage of recommendation systems based on the model derived from an extension of the Technology Acceptance Model.

Keywords: Instrument development, e-commerce recommendation systems, assessment of e-commerce systems, technology acceptance model

Introduction

There has been a continuously increasing demand for tools that guide web users to the information that is relevant for them because of 'information overload'. Information overload, in the context of the Internet, refers to the overwhelming amount of information available to the web users (Dobson 1999). This information overload hampers customers from making well-informed buying decisions (Volkov 1999). Consumers make purchase decisions based on other consumers' opinions or from magazine reviews. But these are usually not customized to suit individual consumer tastes and preferences. There are websites that offer suggestions to consumers based on their own purchase patterns or based on the purchase patterns of consumers who have similar tastes and preferences. These are called as content-based and collaborative recommendation systems, respectively (Balabanovic and Shoham 1997). In general, recommendation systems make suggestions about artifacts to a user. Some sites like Siteseer use consumers' bookmarks and the organization of bookmarks within folders for predicting and recommending relevant pages (Rucker and Polanco 1997). Identification of the factors that predict the usage rate of such recommendation systems would facilitate development of better recommendation systems. The Technology Acceptance Model (Davis 1989) has been widely used to study the determinants of user acceptance of various technologies. In this article, we adapt the technology acceptance model by adding determinants specific to the technology under consideration, viz., recommendation systems, to study the determinants of the use of this technology.

The paper is organized as follows: Section 2 provides the necessary theoretical background for recommendation systems. Section 3 explains our theoretical model and its constructs based on the TAM model and prior studies on content quality / content provider credibility. Section 4 describes the methodology that we have followed to study the effects of the proposed determinants on system usage. The techniques that we have used to analyze the data are also discussed in section 4. Finally, Section 5 and 6 delineate implications for practice and research, and future directions of the research.

Recommendation Systems

A recommendation system is one that learns from customers and their preferences and recommends products that they would find most valuable (Schafer et al. 1999). Proliferation of product variety leaves the consumer with the onus of making decisions by processing a huge amount of information. Recommendation systems aid the typical consumer by providing suggestions that would help him/her make purchase decisions. Recommendation systems can also be seen to play a major role in automating the task of customer personalization since they help the site adapt itself to each customer. This is done by using one of the following parameters:

1. The actual quality of the product
2. Top sellers of a product
3. Past buying behavior of that particular customer or others who have similar preferences (Schafer et al. 1999)

Types of Recommendation Systems

Recommendation systems can be classified based on various characteristics. The matrix shown in Table 1 summarizes the various types of recommendation systems that are currently used by businesses.

Table 1. Types of Recommendation Systems

Discriminator	Types
Data used	• Collaborative filtering (people to people correlations) • Social filtering • Non-personalized recommendation systems • Attribute-based recommendations
Recommendation Interface	• Recommended browsing • Real time display of forgotten items or similar item recommendation • Email • Top N list • Ratings • Text comments
Direction of support	• Buyer-Side • Seller-Side
Source of data	• Customer reviews • Seller reviews • Third party reviews

These types of recommendation systems are described in detail elsewhere (Schafer et al. 1999). Commonly available recommendation systems use social filtering techniques or collaborative techniques in which the system maintains a database of individual user preferences and recommends items to users based on those of the users whose preferences match (Mooney and Roy 1999). The preferences are known by the ratings provided by the users, which are used as surrogates for the users' interest in a particular item. These ratings are derived from tacit knowledge and prior research has addressed the usage of agents to capture and externalize their interests (Stenmark 1999). Content-based recommending systems use individual preferences are recommend items based on their own preferences rather than their match's preferences. This avoids the problems faced with unrated items (Mooney and Roy 1999).

Advantages of Recommendation Systems

Recommendation systems are found to enhance web sales by converting browsers into buyers and by improving cross-selling opportunities (Schafer et al. 1999). The latter is done by suggesting additional complementary or related products to those that are currently being purchased or browsed by the customer. Recommendation systems also enhance customer loyalty by building a strong relationship between the site and the customer. The process by which businesses learn about customers is operationalized by recommendation systems. Apart from suggesting additional products, customers are provided with negative ratings too by some sites. Data about returned products and time spent by customers in studying the product in detail in comparison to that spent by the customer in studying popular products complement these negative ratings.

Recommendation System Examples

Table 2 lists examples of recommendation systems along with their purposes and some of their characteristics.

Table 2. Recommendation System Examples

Example	Purpose and Characteristics
Amazon.com's book review section and Eyes	• Lists books that are frequently purchased by customers who have purchased the selected book • Email notifications about new items are sent to customers
CDNow's Album advisor and My CDNow	• System recommends related music albums • Customized music stores can be created by customers
Ebay's feedback profile	• Satisfaction ratings provide feedback on profiles of customers
Citeseer's research index	• Suggests related documents/articles
Levi's Style Finder	• Recommends clothing based on customer ratings
MovieFinder's 'MatchMaker' and 'We predict'	• Helps customers to locate movies with similar theme, mood, caste or genre • Recommends movies based on their interests

Theoretical Model

Our theoretical model is built based on the Technology Acceptance Model (TAM) as well as previous research on content quality and credibility. TAM is based on the theory of reasoned action (TRA) (Fishbein and Azjen 1975), which theorizes that beliefs influence attitude and intentions, and then generate behavior. In his work, Davis (1989) shows that TAM can explain the usage of information technology. He hypothesizes that belief-attitude-intention-behavior relationship predicts whether users accept technologies. TAM model has been further validated by numerous studies under various contexts.

Volkov (1999) discusses the relationship between content provider credibility and purchase intention of the consumer. But the study also analyzes the role played by content quality and the effects of consumers' attitude towards the product. Recommendation systems are gaining importance due to the fact that consumers' preferences are often complex, thereby restricting simplistic representation of such preferences (Mooney and Roy 1999). Our research is motivated by the fact that no single study looks into the underlying factors that encourage the users to use such recommendation systems. By embracing findings from TAM and content quality / credibility studies, we (1) develop and validate a reliable instrument to measure constructs of our theoretical model, and further (2) propose to test hypothesized causal relationships among those constructs.

Constructs and Hypotheses Derived from TAM

TAM posits two determinants of technology usage: *perceived usefulness*, and *perceived ease of use* (Davis 1989). The construct of perceived usefulness is defined as "the degree to which a person believes that a particular information system would enhance his or her job performance." Perceived ease of use is defined as "the degree to which a person believes that using a particular systems would be free of effort." The dependent variable of TAM is *system usage*, which is self-reported measure of time or frequency of using a certain technology. The original TAM model includes two other constructs; one is *attitude toward use*, and the other *behavioral intention to use*. However, many TAM studies report that these two constructs are not statistically significant; thereby the two constructs are often removed in theoretical models. The basic TAM is shown in Figure 1.

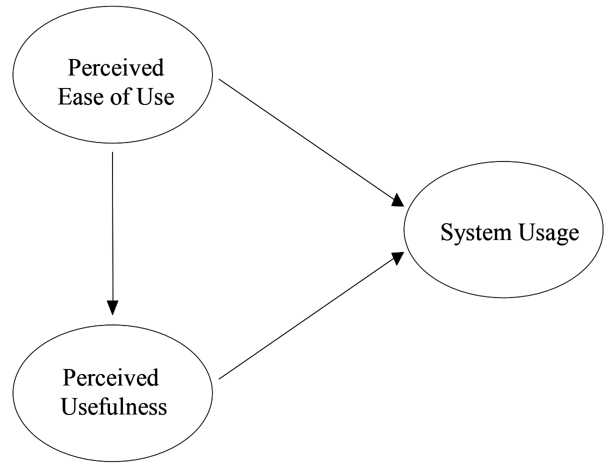

Figure 1. Basic TAM Model (Davis 1989)

TAM describes use acceptance of technologies as belief sets that are meant to be readily generalized to different computer systems and user population. The validity of TAM has been tested under different contexts, using various applications such as spreadsheet (Mathieson 1991), e-mail (Adams et al. 1992; Gefen and Straub 1997), Word (Chau 1996), voice mail (Straub et al. 1995), et cetera. TAM has also been applied to technologies related to the Web. For example, Morris and Dillon (1997) examine acceptance of Netscape, and Lederer et al. (2000) study Web site acceptance. Both studies report significant results.

Since the objective of this research is to examine what lead users to accepting web-based recommendation system, we adopt TAM as the basic model. In the context, we define system usage as whether and how often users are willing to use recommendation systems to make purchase decisions. We derive the first three hypotheses from TAM as follows:

H1: Perceived ease of use of recommendation systems would have an effect on system usage.

H2: Perceived usefulness of recommendation systems would have an effect on system usage.

H3: Perceived ease of use would have an effect on perceived usefulness.

Content Quality

Information quality has been studied in the information system research field as one of the important antecedents that lead information system success (DeLone and McLean 1992). To measure information quality, researchers operationalize such constructs as relevance, timeliness, accuracy, and completeness. In addition, past research shows that information quality affects perceived usefulness of an information system and user satisfaction. Information quality is believed to help users make decision more quickly, with greater confidence. As defined in Volkov (1999), *content* consists of two important components, information and form. Since information is the main product of web-based recommendation system, we hypothesize the relationships between perceived content quality and system usage, and between perceived content quality and perceived usefulness.

H4: Perceived content quality of recommendation systems has an effect on acceptance of the system.

H5: Perceived content quality of recommendation systems has an effect on perceived usefulness.

Credibility

Recently the importance of trust has drawn more attention from researchers. Trust is regarded as an important factor that affects consumer behaviors in E-commerce because it may involve lots of uncertainty and risks. Trust is defined as "an attitude that leads one to commit to a potential loss, depending on future behavior of the other person (Lagace and Gassenheimer 1991)." McAllister (1995) define trust as "the extent to which a person is confident in, and willing acts on the basis of the words, actions, and decisions of another." Trust is generally conceived as a critical factor that enables people to take actions under uncertainty and potential risks. The construct of trust has been applied to e-commerce studies; for example, Volkov (1999) show that consumers must have enough trust to make purchase online.

Any activity that occurs on the Web space has some degrees of risk because there is no effective way to check partner's identity and intentions. Relying on information supplied by recommendation system has the same problems regarding content providers. When facing uncertainty, people tend to rely on information supplied from trusted sources.

Trust is formed by perceived characteristics and behaviors of the trusted party. It is based on one's perception of trusted party's expertise, reliability, and intention (Giffin 1967). People's trust comes from trusted party's past and current behaviors. A party that behaved in a trustworthy manner in the past is more likely to be continuously trusted in the future.

In the context of the web, the way user perceives content providers' credibility should correspond to user's belief that supplied content is trustworthy. Therefore, credibility of source of recommendation can influence usage of web-based recommendation system. As documented in marketing literature, the credibility of information sources has great influence on consumers' attitudes toward products. Consumers are more likely to perceive the contents from known providers as of high quality than from unknown providers (Hanover 1998). Rieh (2002) also shows that credibility of content providers strongly influence perceived content quality. The relationship is that if a consumer perceives information provided as trustworthy, he or she is more likely to view the content as qualified. Hence, the last hypothesis is:

> H6: Perceived content provider credibility has effect on perceived content quality.

As shown in Figure2, our research model has constructs that are derived mainly from TAM (Davis 1989) and Volkov's work (1999). We have omitted two constructs (valence of the product and attitude towards the product) from Volkov's model, as we are not measuring purchase intention of a particular product. For instance, the construct, valence of the product indicates whether the content about a particular product is negative or positive. This would affect the attitude of the buyer towards the product, which would thereby affect the purchase intention. But this would not affect system usage, i.e., system usage is not likely to be affected by the nature of information about a product.

Methodology

In order to test the conceptual model, we developed a measurement instrument to assess all five of the constructs described previously. As suggested by prior research (Boudreau et al. 2001; Churchill 1979; Straub 1989), the following three general steps were employed to ensure reliable and valid measures: (1) comprehensive item generation; (2) pilot study testing of the items followed by item refinement; and (3) use of the revised instrument in a full study.

Item Generation

The objective of this step was to create items for measuring each construct, and to ensure content validity. Content validity assesses how well the items capture the range of meanings included in the construct, i.e. its sampling adequacy of the construct domain (Carmine and Zeller 1979). It is not a statistical property, but rather a matter of judgment by expert parties.

Using previous research (Davis 1989; Davis et al. 1989; Lederer et al. 2000; Volkov 1999), we derived items to measure each construct in the model: Perceived usefulness (PU) – 8 items; Perceived ease of use (PEU) – 11 items; System Usage (SU) – 1 item; Perceived Content Provider Credibility (PCPC) – 10 items; and, Perceived Content Quality (PCQ) – 6 items. (See Appendix) for the initial specific items. Using the items, a preliminary survey questionnaire was developed. Each item in the instrument was assessed using a seven-point Likert scale with end points of "strongly disagree" and "strongly agree." To evaluate the comprehensiveness and clarity of the initial instrument, it was subjected to a qualitative pretest with several graduate students enrolled in a large southeastern university. Respondents were invited to comment on the length of questions, the wording and meaning of items, the instrument instructions, as well as the completion time. The pretest feedback resulted in removing some items, adding some items, and rewording others thereby increasing content validity.

Pilot Test

Based upon the results of the pretest, a new survey instrument was developed. The questionnaire was pilot tested to make an initial reliability assessment of the scales, and to provide a testing ground for development and administration of a final survey instrument. The new instrument included a total of 28 items. Direct questions were used to measure basic respondent demographic data, (i.e. gender, highest educational degree, current job title), and as in the pretest, items were assessed using a seven-point Likert scale with end points of “strongly disagree” and “strongly agree.”

Respondents were mostly undergraduate and graduate students enrolled in computer information systems courses at a large southeastern university. Participation was voluntary, as there were no incentives provided. We acknowledge that the use of students may cause concern for sampling bias (i.e. external validity problem); however, we believe that the students are active Internet users, and represent an influential consumer base in the use of recommendation systems. Furthermore, we recognize the distinction between *theory application* and *effects application* as emphasized by Calder et al. (1981). In this study, we are primarily focused on theory application, which is intended to obtain scientific theory that can be generalized through the design of theory-based interventions that are viable in the real world. Our next step would be effects application, which focuses on obtaining findings that can be generalized directly to a real-world situation of interest.

Tan and Teo (2000) posited that web based surveys are appropriate when the target subjects are Internet users, and a short time frame for responses is required. Hence, this study was conducted using a web-based survey because our study focuses on the use of Internet based recommendation systems. A cover letter was emailed to respondents. The cover letter explained the purposes and goals of the survey, and directed the respondents to the questionnaire that was posted on a server controlled by the authors. Responses were captured in a Microsoft access database. The pilot lasted about three weeks, and elicited a total of 30 usable responses.

Pilot Test Data Analysis

The data of survey participants is summarized in the Table 3 below. Thirty participants voluntarily took the online survey. Among them, fifty-seven percent are female. Seventy-two percent of participants are younger than thirty years old. Fifty percent of them are enrolled in the undergraduate program. Twenty-six percent have B.S degrees, and twenty-four percent have Master degrees. Twenty percent of participants report that they do online shopping quite often. Thirty-four percent report that they occasionally shop online. The other forty-six percent report that they either rarely shop online or never shop online. Though the percentage of those who shop online is not very high, the number of participants who frequently surf online is quite high. Forty-nine percent of participants surf online at least 20 hrs a week. Those who surf online less than four hours a week only account for seventeen percent.

Table 3. Survey Participants Statistic Summary

Gender	57% Female	43% Male			
Age	28% >30	72% <30			
Higest Education Background	8% has Associate degree	26% has B.S.	24% has Master Degree	42% has High School Degree	
Online buying time	very frequently (once a week) 6%	quite frequently(once in a two week) 14%	occasionally (once a month) 34%	Rarely (once in 6 months) 26%	never 20%
surfing time	20 hr or more per week 49%	10-19 hr per week 17%	5-9 hr 17%	2-4 hrs 6%	less than 2 hrs 11%

Traditionally construct validity consists of establishing convergent and discriminant validity. Two phases of data analysis were conducted on the pilot data to assess construct validity. In the first phase, the data was examined using exploratory factor analysis on all items in the data set. We used principal components extraction with Varimax rotation. Scree plots generated as a result of separate factor analyses, combined with using items that were expected to load on the independent and dependent variables respectively, showed the need for a solution comprised of four independent factors and one dependent factor. As an additional check, a factor analysis using an oblique rotation was performed, and it yielded similar results. The use of the oblique rotation was justified because it is unrealistic to assume that there is no correlation between the factors (Hair et al. 1995).

The four-factor structure accounted for 65% of the total variance. Items that failed to load on the correct factor, items that loaded on multiple factors, and items that failed to load on a single factor at 0.60 or greater were dropped. Thus, twenty-eight items remained, and all loaded at 0.60 or higher on a single factor. Two items that were slightly below the 0.60 threshold were retained.

Table 4. Factor Analysis with Varimax Rotation for Pilot

	DV1	DV2	*DV3*	DV4	DV5	DV6	DV7	*DV8*	*DV9*	DV10	DV11		
PU	0.60355	0.58642	*0.66463*	0.84109	0.86729	0.68851	0.79712	*0.62168*	*0.68680*	0.69075	0.64781		
PCPC	0.10798	0.28864	*0.39939*	0.17019	0.16955	0.22918	0.15686	*0.14178*	*0.08045*	0.07618	0.15062		
PEU	-0.19326	-0.12529	*0.24260*	0.10073	0.02807	0.07126	0.11477	*0.12423*	*0.12094*	0.37723	0.35023		
PCQ	0.03487	0.10693	*0.13446*	-0.07299	-0.17206	0.21158	0.05115	*0.52429*	*0.57415*	0.16028	0.05911		
	DV12	*DV13*	*DV14*	*DV15*	*DV16*	DV17	DV18	DV19	DV20	DV21	DV22	DV23	DV24
PU	*0.43123*	*0.14323*	*0.41549*	*0.16064*	*0.32387*	-0.11505	-0.21634	0.02135	0.23550	0.35566	0.36230	0.06917	0.37670
PCPC	*-0.65843*	*-0.45320*	*-0.41666*	*-0.46425*	*-0.10735*	0.09914	0.13262	0.16380	-0.00059	0.27548	0.00310	0.39520	0.13586
PEU	*-0.29353*	*-0.45035*	*-0.16019*	*-0.56991*	*-0.36215*	0.77670	0.84281	0.82109	0.88286	0.76721	0.78818	0.64014	0.71283
PCQ	*-0.19889*	*-0.27129*	*-0.15916*	*-0.13481*	*-0.30796*	-0.22966	-0.10079	-0.18057	0.07949	0.10048	0.22265	0.22422	0.25889
	DV28	DV29	DV30	*DV31*	DV32	DV33	DV34	*DV35*	DV36	DV37			
PU	*0.27987*	0.16084	0.10551	*0.10013*	0.17328	0.37709	0.42441	*0.55169*	0.49162	0.29123			
PCPC	*0.44925*	0.67498	0.60665	*-0.43796*	0.80938	0.61831	0.80684	*0.52291*	0.69690	0.64724			
PEU	*0.59084*	0.30231	0.40747	*0.04369*	0.18051	0.01290	0.10310	*0.24188*	0.10852	0.14648			
PCQ	*0.07510*	0.30702	0.17845	*0.41734*	0.01853	0.03626	0.01109	*0.28399*	0.28624	-0.12338			
	DV38	DV39	DV40	*DV41*	DV42	DV43							
PU	*-0.11031*	*0.51819*	*0.23200*	*0.39591*	0.33451	-0.06804							
PCPC	*-0.59894*	*0.62824*	*0.66238*	*0.75677*	0.43261	-0.29834							
PEU	*-0.06608*	*0.01453*	*0.22725*	*0.22609*	-0.01461	-0.04465							
PCQ	*0.56564*	*0.27342*	*0.06199*	*0.05534*	0.59087	-0.68604							

Variance Explained: 65.18% (PU 36.25%, PCPC 14.13%, PEU 8.94%, PCQ 5.86%)
Eigenvalues: PU 14.50, PCPC 5.65, PEU 3.57, PCQ 2.34
Note: Italicized items were dropped for failing to load on the correct factor, loading on multiple factors, or failing to load on a single factor at 0.60 or greater.

The rotated factor solution was evaluated based on the simplicity and interpretability of the solution, as well as the percentage of variance explained. As shown in Table 4, after applying the above criteria, the loadings were generally clean, and the factor structure simple.

In the second phase of pilot data analysis, we used partial least squares (PLS) to assess the reliability of the constructs by calculating the internal consistency (IC) (Gefen et al. 2000). Typically one would use Cronbach's coefficient alpha to assess construct reliability. Cronbach's coefficient alpha is a statistic ranging form 0 (completely unreliable) to 1 (completely reliable). However, Cronbach's alpha assumes a priori, that each item contributes equally, whereas the IC measures take into account the individual loadings of each item on the construct (Barclay et al. 1995; Venaik et al. 2001). Table 5 lists the IC measures for all five constructs. As shown in Table 4, all constructs had an IC well above the 0.70 threshold prescribed by Nunally and Bernstein (1994).

Table 5. Measures of Internal Consistency

Construct	Internal Consistency (Fornell and Larcker 1981)
PEU	.940195
PCQ	.902611
PU	.917
PCPC	.938013
SU	.827323

Finally, we assessed the discriminant validity of the constructs using the measure of average variance extracted (AVE). The AVE measures the amount of variance captured by construct relative to the amount of variance due to its measurement error. To satisfy the requirements of discriminant validity, the square root of a construct's AVE must be greater than the correlation between that construct and other constructs in the model. The correlation matrix in Table 6 shows that the diagonal elements are greater than the corresponding off-diagonal elements (Gefen et al. 2000; Venaik et al. 2001). In all cases, the requirements for discriminate validity were satisfied, indicating that the measures distinguished between distinct constructs. Consequently, the instrument shows adequate validity for use in the full study.

Table 6. Discriminant Validity

	PEU	PCQ	PU	PCPC	SU
PEU	**0.815629**				
PCQ	0.259	**0.907111**			
PU	0.429	0.338	**0.765319**		
PCPC	0.473	0.504	0.505	**0.827457**	
SU	0.631	0.387	0.648	0.604	**0.784241**

Implications for Practitioners and Researchers

Knowledge about the determinants of the acceptance of a particular technology would help the technology developers to design and implement systems that would suit its users. Such a study would provide a bearing on those aspects that are to be carefully considered during the implementation of any technology. This study, which focuses on recommendation systems, would provide a handle on the factors that affect the widespread usage of such systems. Recommendation system developers could concentrate on the specific factors that have an effect on system usage rather than just on all system-related factors, for alleviating the system of its problems. The factors that emerge as those that have a significant effect on system usage should be those under careful scrutiny by the developers. This study could trigger a series of studies on recommendation systems and their acceptance, categorizing these based on the various aspects like the techniques used for coming up with suggestions by various recommendation systems, the nature of products for which suggestions are made and the possible outcome of such suggestions.

Future Research

The TAM is an important framework regarding how individuals use and relate to technology (Davis 1989; Davis et al. 1989). This research extended TAM to the context of recommendation systems, developed a conceptual model incorporating this extension, and developed an instrument to test hypotheses related to user acceptance of web-based recommendation systems. Efforts thus far comprise intermediate steps in our overall study. In future research, we will use this instrument in conducting a full survey. Our goals include assessing the performance of this instrument, as well as testing our hypotheses.

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Appendix

Perceived Usefulness:

1. It would be difficult to make decisions (for example, decision to purchase a book or to visit a restaurant) without this recommendation system.
2. Using this recommendation system gives me greater control over my decision-making process.
3. This web-based recommendation system addresses my reviewing needs.*
4. Using this recommendation system saves me time.
5. This recommendation system helps me make decisions more quickly.
6. This recommendation system supports critical aspects of my decision-making process.
7. Using this recommendation system reduces the time I spend searching for related products.
8. The use of this recommendation system makes my decision-making more effective.†*
9. I find this web-based recommendation system useful in making my decisions.†*
10. I find this web-based recommendation system useful in locating relevant information.†
11. This web-based recommendation system helps me spend my resources more effectively.

Perceived Ease of Use:

12. I often become confused when I use this web-based recommendation system.*
13. Interacting with this recommendation system is often frustrating.*
14. Interacting with this recommendation system requires a lot of my mental effort.*
15. This recommendation system often behaves in unexpected ways.*
16. I find it cumbersome to use this recommendation system.*
17. My interactions with this recommendation system are easy for me to understand.
18. It is easy for me to remember how to use this recommendation system.
19. This recommendation system provides helpful guidance in how to use the system.
20. This recommendation system uses understandable terms and notations.
21. The information I need is easy to find using the recommendation system.
22. This recommendation system uses terms familiar to me.†
23. This recommendation system makes it easy to recognize key information.†
24. Overall, I find this recommendation system easy to use.

System Usage:

25. I use this recommendation system frequently.
26. I turn off the recommendation system whenever possible.†
27. I ignore the results provided by the recommendation system.†

Perceived Content Provider Credibility:

28. This content provider is competent in providing recommendations.*
29. The content provider is trustworthy.
30. The content provider does not make false claims in his/her opinions.
31. The content provider may not make recommendations in the best interests of readers.*
32. The content provider's recommendations accurately represent the quality of the product.
33. The content provider's product advice is based on his/her best judgment.
34. The content provider's recommendations are reliable.
35. The content provider's recommendations are useful in making decisions.*
36. The content provider's advice about products is trustworthy.
37. The content provider means well when he/she recommends products.

Perceived Content Quality:

38. The content provider may give recommendations that are not accurate.*
39. Product ratings provided by the content provider are useful in evaluating products.*
40. Product ratings usually give me sufficient information to evaluate products.*
41. The content provider provides high quality recommendations.*
42. Product ratings are important to me.
43. Product ratings are irrelevant to my evaluation of products.

†Items added after pretest.
*Items dropped after pilot test.