Empirical Research on the Effect of Online Product Recommendations on Consumers' Shopping Efficiency

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Abstract: *Online product recommendations (OPRs), which include provider recommendations (PRs) and consumer reviews (CRs), are widely used in e-business to improve consumers' shopping efficiency, which consists of product screening efficiency and product evaluation efficiency. We construct a research model to explore the effect of perceived quality of OPRs on consumers' shopping efficiency and the moderating role of product type, which usually includes search and experience product. Using an online questionnaire survey with 174 valid participants, our findings provide strong support for the proposed model. The empirical results reveal that higher perceived quality of OPRs is associated with higher consumer shopping efficiency. What's more, the impact of perceived quality of PRs on screening efficiency is stronger for experience products than for search products, but the effect of perceived quality of CRs on screening efficiency is stronger for search products than for experience products. However, the moderating effect of product type on the relationship between perceived quality of OPRs and evaluation efficiency is not significant.*

I. INTRODUCTION

In e-business, the absence of quality inspections has hindered many consumers' purchasing decisions. Therefore, many e-vendors provide system-filtered recommendations, called provider recommendations (PRs), which recommend products to consumers based on their past shopping behavior or on the preferences of other consumers. Another kind of recommendations is consumer reviews (CRs), which are written by consumers about the quality of products based on personal experiences with the products. More and more e-business websites are offering these online product recommendations (OPRs, including PRs and CRs) to assist buyers and sellers with reducing information overload and improve shopping efficiency[1]. The effects of PRs and CRs on consumers' shopping efficiency have been examined in previous literature[4-5], but the distinct effect mechanisms of both types of OPRs on consumers' online product shopping efficiency for different product types have not yet been explicitly contrasted.

In this paper, we take account of the moderating effect of product type on the relationship between quality of OPRs and consumers' shopping efficiency. Product has frequently been categorized into search and experience goods based on the possibility for consumers to assess the key qualities of a product before purchasing and consuming it[2]. Considering that consumers' behavior changes as product type changes[3], we argue that the impacts of different OPRs on shopping efficiency are different for different product type.

II. LITERATURE REVIEW

A. Provider Recommendations and Consumer Reviews

Provider recommendations(PRs) and consumer reviews(CRs) are defined as different types of online product recommendations (OPRs) on web sites [1]. As OPRs can provide customers with shopping assistance, they are important for both consumers and suppliers. PRs are System-filtered content extracted from statistical analyses while CRs are firsthand content provided by consumers

[3].

PRs come from automatically and statistically processing of past buying behaviors or interest profiles in addition to providing key product attributes and descriptions whereas CRs are based on consumers-created content, which are drawn from usage experiences and are directly reported by other consumers [4]. PRs are used to provide more or less personalized product items to consumers, but CRs focus on providing feedback on a given product item. Both PRs and CRs are widely used on web sites and can help customers to make shopping decisions, but how these two types of OPRs affect shopping efficient differently for different products still remains a questions ,which is the main focus of this paper.

B.   Product Screening Efficiency and Product Evaluation Efficiency

Product shopping is the process in which consumers engage in information search and processing to decide which product to purchase to meet their specific needs. We assess consumer product shopping efficiency using two components: product screening efficiency and product evaluation efficiency.

Firstly, in the product screening process, consumers screen a large set of relevant products, without examining any of them in great depth, and identify a subset that includes the most promising alternatives, labeled a consideration set. Subsequently, in the product evaluation process, the consumer evaluates alternatives in the consideration set in more depth, performs comparisons across products on important attributes, and makes a purchase decision[5]. Therefore, product screening efficiency is defined as the efficiency incurred and value derived from online product screening. Product evaluation efficiency is defined as the efficiency incurred and value derived from online product evaluation.

C.   Product type

In this study, we categorize the product into search and experience goods. The search product was defined that consumers had actually known the quality and suitability of the product before buying it[6]. The definition of experience products are: (1) because the consumers have no direct experience to know the principal attributes of the product before purchasing, (2) compared with the direct experience of the product, it's costly or difficult to search for relevant information with mainly attributes of products, such as clothes [7]. Perceived quality of search goods relates to the property objective nature, whereas the perception of experience good depends more on the subjective attributes with a matter of personal preference[8].

III.   RESEARCH MODEL AND HYPOTHESES

Based on the extant literature and semi-structure interviews, we propose a research model, as shown in Fig. 1.

In e-commerce transactions, by guiding consumers to a set of more relevant products that are likely to match their needs, OPRs enable them to manage the large amount of information and choices available in electronic environments[9] which lead to the improvement of screening efficiency and evaluation efficiency[10]. When the PRs have a utility function that is close to that of a consumer, it can sort through thousands of options and narrow them to a handful that best match the need of the consumer. Thus, higher quality PRs enhance consumers' product screening efficiency and evaluation efficiency. Besides, consumer review are rich and influential sources of information that customers perceive as useful sources of additional information[11]. CRs possess the capability to reduce the cognitive burden of sifting through multiple options, which consequently helped better evaluate product items[12].
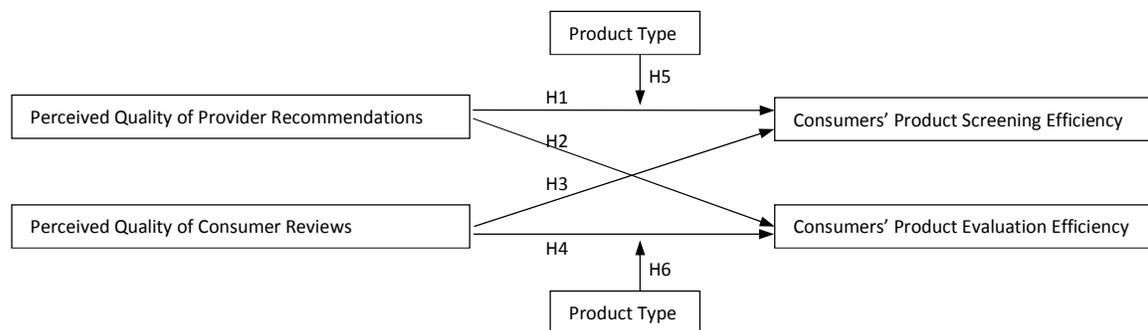
Figure 1. Research Model

Based on the above discussion, we propose the following hypotheses:

H1: Consumers' perceived quality of provider recommendations will positively affect their product screening efficiency.

H2: Consumers' perceived quality of provider recommendations will positively affect their product evaluation efficiency.

H3: Consumers' perceived quality of consumer reviews will positively affect their product screening efficiency.

H4: Consumers' perceived quality of consumer reviews will positively affect their product evaluation efficiency.

The difference between search product and experience product is not the ability of consumers to evaluate products related attributes before and after purchasing, but the methods to deal with the searched information in the shopping process. Consumers will pay more attention to the width of searching and browse more websites to acquire the product attributes in the purchase of search product. Whereas to buy experience product, consumers will emphasize the depth of searching and look over the feedback from other

consumers to obtain the product experience attributes. In light of Aggarwal, PRs may better match the information needs of search goods[13].

Based on the above discussion, we propose the following hypotheses:

H5: The product type moderates the effect of consumers' perceived quality of provider recommendations on their product screening efficiency.

H6: The product type moderates the effect of consumers' perceived quality of provider recommendations on their product evaluation efficiency.

H7: The product type moderates the effect of consumers' perceived quality of consumer reviews on their product screening efficiency.

H8: The product type moderates the effect of consumers' perceived quality of consumer reviews on their product evaluation efficiency.

IV. METHODOLOGY

We tested the research hypotheses through a descriptive survey using the online questionnaire in www.sojump.com. This survey included 3 sections. The first section consisted of demographic questions and online shopping behaviors. The second section was the screening question which asked the participants whether he/she pays attention to provider recommendations/consumer reviews on the website. If they answered this question as "Never", then this set of data would be eliminated during data analysis so as to remain data validity. The last section included the questions that measure the theoretical constructs. The respondents were asked to rate their level of agreement with the statements regarding their online shopping experience using a 5-point Likert-type scale response format.

182 students in university were invited to complete the survey. Of these respondents, percent of male students and female students were almost the same, 48.09 percent and 51.91 percent respectively. To ensure the data effectiveness, we eliminated the date of respondents who said they never pay attention to provider recommendations or consumer reviews and who finished the questionnaire within 90s. Based on this, we eliminated 8 sets of data and remained 174 sets of data. What's more, each set of data included the measurement of the theoretical constructs for search product and experience product both, which were divided into two sets of data later. As a result of it, ultimately there are 348 sets of data available in the data analysis.

V. RESULTS

A. The Reliability Analysis

SPSS statistical software 17.0 was used to conduct the questionnaire reliability analysis. We use Cronbach Alpha coefficients to examine the reliability. Table 1 shows the results of reliability analysis.

TABLE 1. RELIABILITY OF MEASUREMENT SCALES

Construct	Items	Alpha
Perceived Quality of Provider Recommendations	4	0.855
Perceived Quality of Consumer Reviews	4	0.862
Consumers' Product Screening Efficiency	3	0.874
Consumers' Product Evaluation Efficiency	3	0.893

B. The Validity Analysis

We use the extraction method of principal component analysis and the rotation method of varimax with Kaiser Normalization to analyze the validity. As shown in TABLE 2, the scale has a fairly good structural validity.

TABLE 2. ROTATED COMPONENT MATRIX

	Component			
	1	2	3	4
PR1	.136	**.810**	.145	.096
PR2	.170	**.836**	.058	.193
PR3	.245	**.748**	.215	.050
PR4	.186	**.779**	.002	.236
CR1	**.848**	.127	.157	.196
CR2	**.835**	.119	.182	.143

CR3	**.706**	.302	.096	.074
CR4	**.789**	.222	.136	.132
SE1	.244	.264	.313	**.690**
SE2	.170	.175	.311	**.839**
SE3	.138	.164	.339	**.822**
EE1	.157	.144	**.832**	.292
EE2	.160	.119	**.879**	.253
EE3	.234	.108	**.764**	.353

C. Test of Hypotheses

We use the structural equation model software LISREL 8.70 to test the research hypotheses H1-H4. As shown in Figure 2, hypotheses H1-H4 are all supported.
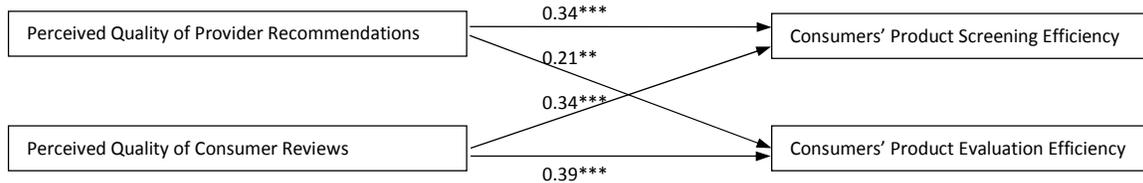
Figure 2. The Testing of Research Model

Using Awad and Ragowsky's method [14], in order to show that a path in search product data set is significantly different from that in experience product data set, we fixed the given path in search product data set and forced the coefficient of this path to be as it was estimated in experience product data set. We then re-estimated the model for search product data set with the given changes and compared the chi-square of the model with the given path fixed to the chi-square of the model relative to the model with the given path free. If the difference in chi-squares is significant, then the path is significantly different between search product and experience product. Product type differences are shown in Table 3.

TABLE 3. SIGNIFICANCE ANALYSIS OF PRODUCT TYPE DIFFERENCE

Path	Former chi-square	New chi-square	Difference of freedom degree	Significance of difference in chi-square
Perceived Quality of Provider Recommendations → Product Screening Efficiency	146.63	151.65	1	5.02*
Perceived Quality of Provider Recommendations → Product Evaluation Efficiency	146.63	146.85	1	0.22
Perceived Quality of Consumer Reviews→ Product Screening Efficiency	146.63	150.93	1	4.30*
Perceived Quality of Consumer Reviews→ Product Evaluation Efficiency	146.63	146.64	1	0.01

According to the analysis results in Table 3, we get the following results:

(1)For experience products, there is a more positive correlation between perceived quality of provider recommendations and product screening efficiency.

(2)There isn't significant product type difference in the effect of perceived quality of provider recommendations on product evaluation efficiency.

(3) For search products, there is a more positive correlation between perceived quality of consumer reviews and product screening efficiency.

(4) There isn't significant product type difference in the effect of perceived quality of consumer reviews on product evaluation efficiency.

Therefore, hypotheses H5 and H7 are supported, but H6 and H8 are not supported.

IV. DISCUSSION

The goal of this study is to deal with the following questions: What's the relationship between perceived quality of OPRs and consumers' online shopping efficiency? And do product type moderates the relationship between perceived quality of OPRs and consumers' online shopping efficiency and, if so, how? Based on the background knowledge extracted from previous literature, we extended a rich theoretical framework which explains the mechanisms how perceived quality of OPRs influence consumer's loyalty and how product type played the moderating role. Using a survey research with 174 valid participants, our findings provide strong support for the proposed model and explain significant variance in the dependent and moderating variables. And the results of this study provide several important practical implications. For instance, as the impact of PRs quality on screening efficiency is stronger for experience products than for search products, it's more suitable for online retailers to improve quality of PRs for the promotion of experience products.

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