Consumer Segmentation by Online Information Search Behavior in Yinchuan, China

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ABSTRACT— ***Consumers in China have increasingly relied on the Internet for product information, especially for high involvement product categories, such as automobiles. Although Chinese differ from Europeans in terms of their online information search behavior, little research has been conducted in an effort to investigate patterns of online information search on Chinese populations. The goal of this study was to identify patterns of online information search and profile each pattern. Data were collected from automobile consumers in Yinchuan, Ningxia Hui Autonomous Region, China. Three distinct search groups were identified. These three groups were profiled on a variety of characteristics. This study highlights online information search behavior as segmentation base and provides meaningful implications for communication strategies directed to consumers in certain cities in China.***

Keywords— Online information search, segmentation of consumers, China

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1. INTRODUCTION

Consumer information search is an enduring research area. The importance of information search stems from the fact that consumer information search furnishes a central link that connects individual consumers with businesses, manufacturers, retailers, and markets in general. The ability to locate and process information affects the selection of products and services that are to be bought, the resulting quality or value derived from purchases, and the subsequent satisfaction of individual needs.

Investigating patterns of consumers is a productive tool for gaining understanding of consumer behavior [1]. Prior research clearly indicated that consumers were distinguished in terms of their offline information search behavior and there were distinct patterns of information search ([2], [3]). Comparatively little research suggested that patterns of consumer information search might preserve in the online environment [4].

Extant research that probed patterns of information search has mostly conducted in the West. As Vuylsteke, Wen, Baesens, and Poelmans suggested, however, Chinese differed from Europeans in terms of their online information search behavior [5]. The differences occurred in frequency, goal, types of information sought, types of websites used, search engine. It was inadequate that only little research has been conducted to probe the patterns of consumers' online information search behavior in China despite the boom in consumption and Internet usage in China.

The present study intends to extend previous research in a few ways. Firstly, the present research was conducted on the population of automobile consumers in a small and medium-sized city in china. Some small and medium-sized cities in China have showed vigorous development and great potential regarding personal consumptions. Take automobile for example. The growth rate of automobile consumption in small and medium-sized cities was obviously marvelous due to

market saturation and automobile-purchase restrictions in metropolises in China. Therefore, Yinchuan was selected as research setting, as the capital city of the Ningxia Hui Autonomous Region, leading the automobile consumption nationwide. Secondly, the three clusters of online information search identified in this study may provide significant insights to design communication strategies to suit different segments of consumers based on their online information search behavior.

2. LITERATURE REVIEW

A heterogeneous population was composed of homogeneous subgroups or segments and each of segment responded differently to the marketing mix, which underlay the consumer typology approach [6]. Traditionally, demographic variables, geographic variables, psychographic variables, and behavioral variables served as segmentation bases [7]. Consumers were distinguished in terms of their information search behavior and, accordingly, patterns of information search among consumers have been identified in both offline and online contexts.

In the offline context, consumers consult numerous sources of information ([3], [8]). Some consumers might favor a particular source while others might be predisposed to alternative sources [9]. Westbrook and Fornell established distinctive patterns of information sources usage, including objective shoppers, moderate shoppers, store intense shoppers, and personal advice seekers. A consumer's age, education level, number of alternatives considered, and working condition of a previously purchased product were confirmed to be related to segment membership of information usage. In addition, consumers were discovered to show differentiated efforts directed to searching information [8]. Kiel and Layton developed clusters of consumer information search based on three dimensions of information search-source, time, and brand, which included a high search group, a low search group, and selective information seekers [3]. Furse extended prior research by incorporating the involvement of others in information search activity. Except for the low-search group, the high search group and the moderate search group identified, purchase-pal assisted group and high self-search group were developed for the first time [2].

In the online environment, Klein and Ford noticed that automobile consumers' information search patterns have been changing due to the presence of the Internet. Automobile consumers valued Internet information sources similarly to traditional sources over time. The dominant role of dealer source for providing automobile information was lessened by online sources [10]. Bhatnagar and Ghose confirmed the diversity of information consulted and efforts directed to search on the Internet for software, apparel, etc., in terms time spent and search frequency[4]. A consumer's age, education level, and income were suggested to associate with the patterns of online information search ([11], [12]).

3. RESEARCH QUESTIONS

The overall objective of the study was to explore patterns of online information search behavior among consumers in small and medium-sized cities in China. Specifically, there were two basic research questions underlie this study: (1) Are there patterns of online information search behavior in China can be identified? (2) Can segments of consumers that share common patterns of online information search behavior be distinguished by demographic and socio-economics?

4. RESEARCH METHODS

4.1 Sample and Data Collection

The data were collected from consumers who have bought new automobiles and conducted online search for automobile information in Yinchuan, Ningxia Hui Autonomous Region, China. The product investigated in this study-automobile was a high involvement product that was purchased infrequently. The choice of automobile as research product in the current study mainly followed the trend set by a majority of the prior research and responded to the boom in automobile consumption and Internet usage in China. A stratified sampling technique was employed to approach 402 automobile consumers who were intercepted at the three branches of the local automobile administrative bureaus applying for license plates. There were 390 usable responses retained for the analysis in this study.

4.2 Criterion Variables

Information search on the Internet addresses the amount of consumer search information on the Internet. Items measuring information search on the Internet in the study were adopted from the established instruments and modified, which consisted of an overall measure of online search and measures of use of each of a range of possible Internet sources. The overall information search on the Internet was determined on a relative basis. In favor of measuring relative information search on the Internet, it was probably easier to estimate to what extent they used online sources compared to offline sources than to estimate the amount of time spent searching on the Internet [14]. In addition, six information sources on the Internet were included to capture respondent's search behavior on individual sources. The items measuring information search on the Internet were validated through Confirmatory Factor Analysis (CFA) and eventually, six items were maintained serving as criterion factors to identify online information search segments. The measurement

and CFA results of information search on the Internet are displayed in Table 1.

Table 1 Measurement and CFA result of information search on the Internet

No.	Information search on the Internet	Factor loading	AVE	CR
			0.5	0.853
1	Time spent in searching automobile information on the Internet compared to offline prior to making the purchase	0.605		
2	Retailers or manufacturers' websites	0.663		
3	Other consumers' review or testimony about automobiles on the Internet (e.g. review by previous users on e-pinion websites, or Bulletin Boards, or on Newsgroup)	0.729		
4	Discussion with other consumers over the Internet about automobiles (e.g. instant messenger, emails, chat rooms, or online community or Internet Forum)	0.536		
5	Ratings of automobiles by other consumers on the Internet (e.g. ratings on a scale of 1-5 stars, etc.)	0.734		
6	Online articles from official or organizational Consumer websites and editorial review without obvious commercial orientation for searching automobile information (e.g. Consumer Report online, editorial review on the Internet)?	0.909		

5. RESULTS OF THE ANALYSIS

Cluster analysis techniques were conducted to determine whether distinct patterns of information search on the Internet occurred based on the criterion variables discussed in the previous section. A two-stage sequence of analysis was employed, which was expected to combine the advantages that each technique offered.

5.1 Two-Stage Cluster Analysis for Developing Online Information Search Segments

A hierarchical cluster analysis using the Ward method and Squared Euclidean Distance, was conducted to subject these six online information search indicators to a hierarchical classification algorithm. Both the dendogram and agglomeration coefficient gave support to two-cluster solution or three-cluster solution as the potential cluster selection points

K-means cluster analysis was applied to the initial seed of two-cluster solution and three-cluster solution with six factors of information search on the Internet, to set the initial centroids and to proceed with the analysis. The three-cluster solution outperformed the two-cluster solution in terms of developing interpretable and meaningful segments. Moreover, the three-cluster analysis solution was preferred over the other as a more complex segmentation strategy may offer a highly disaggregated combination of consumers searching information on the Internet. In addition to that, the consistencies of the socio-demographics in every cluster have further supported the face validity of the three-cluster solution.

5.2 Segmentation of Information Search on the Internet

Based on the final cluster centers, ANOVA was administered with the aim of comparing differences among clusters in terms of information search on the Internet. As shown in Table 2, the F-values were ranging from 493.75 to 92.93 and the corresponding p-values obtained (p=.00) were less than the set alpha value of .05. Furthermore, the statistics tests for comparing the eta-squared values were obtained, which were ranging from .32 to .72. According to the principle suggested by Cohen (1998), the effect size obtained were assumed to be large, which also indicated the large mean differences between clusters [14]. Hence, the internal validity of cluster analysis was achieved since the three clusters significantly differed.

Table 2 Segment of Consumers Searching Information on the Internet

Online search factor	Cluster Means			F-value	Sig.	Eta^2
	Cluster 1 (165)	Cluster 2 (147)	Cluster 3 (78)			
Total search	2.50	3.20	3.87	92.93	.00	.32
Portal	2.26	2.96	4.10	158.45	.00	.45
Online review	2.18	3.21	4.03	179.75	.00	.48
Online discuss	2.05	3.04	3.77	107.22	.00	.36
Online rating	2.21	3.10	4.22	227.50	.00	.54
Online article	1.64	2.95	4.32	493.75	.00	.72

Based on the specific information search behavior on the Internet of each cluster, the three clusters of information search on the Internet were labeled as follows:

I. The low-search group was the largest group, comprised 165 (42.31%) respondents, and was characterized by conducting the least online search generally and on each individual online source, especially the least use on online articles.

II. The moderate search group consisted of 147 (37.69%) respondents who conducted slightly over-average online search generally, made comparatively more use of online review and ratings, and less information search on automotive portals and online articles.

III. The high search group comprised 78 (20.00%) respondents, characterized by conducting the high extent of online search generally and making full use of all online sources, especially online articles.

5.3 Profiling Segments of Information Search on the Internet

With the purpose of profiling segments of consumer employing differentiating online search, comparisons among the three groups were conducted on a variety of descriptive variables, including demographic characteristics (age, gender, marital status), socio-economics (education, monthly income, number of automobile owned), and experience with the Internet. Chi-square test for independence was used to identify whether cluster membership was related to these characteristics. Interestingly, nearly all the socio-demographics and socio-economics were found insignificant, expect for age ($\chi 2$=17.96, p=.02) and experience with the Internet ($\chi 2$=12.56, p=.01). This indicated that there was no association between cluster memberships and genders, marital status, education, income, and car-ownership, while age and experience with the Internet were significantly associated with cluster membership.

A thorough examination of the Table 3 revealed that, in the low search group, 41.2% of respondents were aged from 35 to 44 years, followed by those aged from 25 to 34 years (33.3%), aged from 45 to 54 years (12.7%), aged from 18 to 24 years (9.1%), and older than 55 years (3.6%). In the moderate search group, the proportion of respondents aged from 35 to 44 years was reduced to 32%, followed by 31.3% aged from 25 to 34 years, 19.7% aged from18 to 24 years, 9.5% aged from 45 to 54 years, and 7.5% older than 55 years. Among respondents in high search group, 35.9% of respondents were aged from 25-34 years, followed by 30.8% aged from 35 to 44 years, 24.4% aged from 18-24 years, 6.4% aged 45-54, and 2.6% older than 55 years. It can be concluded that the proportions of respondents aged 25 to 34 years and 35 to 44 years in each search group were significantly different from the proportions of respondents aged at the other groups grouped in each search group.

In terms of experience with the Internet, in the low search group, 71.5% of respondents had experience with the Internet for 3 to 5 years, followed by 14.5% with 1 to 3 year experience, and 13.9% with experience less than one year. In the moderate search group, slightly more than half of respondents had experience with the Internet for 3-5 years, followed by 27.2% with 1-3 year experience, and 19.7% with experience less than one year. Among respondents in the high search group, 64.1% of respondents had experience with the Internet for 3-5 years, followed by 23.1% with 1-3 year experience, and 12.8% with experience less than one year. It was evident that the proportion of respondents with experience with the Internet for 3 to 5 years was higher in any search group than the proportion of respondents with less experience, especially in the low search group.

According to the effect size statistics suggested by Pallant (2010), the Cramer's V values indicated small effect size for both the relationships between search clusters and age (CV=.15), and the relationship between search clusters and experience with the Internet (CV=.13).

Table 3 Social-Demographic, Socio-Economics and Segments of Consumers Searching Information on the Internet

Characteristics	Group 1 low search 165(42.3%)	Group 2 moderate search 147(37.7%)	Group 3 high search 78(20%)	DF	*p*	CV
Age				8	.02*	.15
18-24 years old	15(9.1%)	29(19.7%)	19(24.4%)			
25-34 years old	55(33.3%)	46(31.3%)	28(35.9%)			
35-44 years old	68(41.2%)	47(32.0%)	24(30.8%)			
45-54 years old	21(12.7%)	14(9.5%)	5(6.4%)			
older than 55	6(3.6%)	11(7.5%)	2(2.6%)			
Gender				2	.15	.10
male	94(57.0%)	98(66.7%)	44(56.4%)			
female	71(43.0%)	49(33.3%)	34(43.6%)			
Marital status				4	.08	.10
Single	25(15.2%)	40(27.2%)	21(26.9%)			
Married	131(79.4%)	99(67.3%)	54(69.2%)			
Divorced	9(5.5%)	8(5.4%)	3(3.8%)			
Education				6	.35	.09
Diploma and below	14(8.5%)	20(13.6%)	6(7.7%)			
Advanced Diploma	62(37.6%)	43(29.3%)	30(38.5%)			
Bachelor	82(49.7%)	72(49.0%)	38(48.7%)			
Master's and over	7(4.2%)	12(8.2%)	4(5.1%)			
Income				6	.12	.11
less than 3000	37(22.4%)	34(23.1%)	26(33.3%)			
3001-5000	101(61.2%)	80(54.4%)	33(42.3%)			
5001-8000	22(13.3%)	22(15%)	13(16.7%)			
more than 8000	5(3.0%)	11(7.5%)	6(7.7%)			
Car-ownership				2	.61	.05
one car owned	143(86.7%)	132(89.8%)	67(85.9%)			
two or more cars owned	22(13.3%)	15(10.2%)	11(14.1%)			
Experience with the Internet				4	.01*	.13
less than 1 year	23(13.9%)	29(19.7%)	10(12.8%)			
1-3 years	24(14.5%)	40(27.2%)	18(23.1%)			
3-5 years	118(71.5%)	78(53.1%)	50(64.1%)			

Consumers in the low search group identified in prior studies were the most experienced, older, owned more automobiles and were satisfied with previous purchases. Their limited information search could be mainly attributed to more experience with automobile purchase [2]. However, more experience with products may not justify little online search identified in this study. The clusters of online information search for consumers in Yinchuan were proved associated with age and experience with the Internet. Consumers in Yinchuan who were older than 45 years old were likely to conduct less information search on the Internet than younger consumers did. Experienced consumers tended to search less on the Internet. As the Internet environment is relatively complex and new, an ability to locate and compare information on the Internet is indispensable [4]. Consumers may build ability via day-and-day experience with the Internet and get used to search engines, web navigation, and information present on the Internet. In addition, most of consumers in Yinchuan owned only one automobiles and did not have much experience with automobiles. Therefore, consumers' little information search in Yinchuan may be attributed to experience with the Internet.

6. DISCUSSION

Since a major challenge for online website operations is serving information that meets consumers' needs at a given point in their purchase process [15], the identification of distinctive patterns of information search on the Internet may infer several practical implications. Firstly, it calls attention to the fact that although consumers showed preference for

certain online sources, they rarely relied on sole source and actually, they made comprehensive use of various information sources. Retailers and manufacturers should keep attaching importance to various information sources, which may promote online searching.

Secondly, the proper targeting of market effort should be directed in response to consumers' differentiated online search behavior. Take online articles for example. The low-search consumers featured conducting the least search from online articles while the high-search made fully use of online articles. It was inferred that, for the average consumers, online articles may not be the most preferred information source probably due to lack of product knowledge. Retailers and manufacturers may put more emphasis on other online information sources than online articles to cater general consumers' information needs. Meanwhile, professional online articles may better serve the high-search group.

Thirdly, retailers and manufacturers may adjust the marketing effort according to consumers' demographics. Traditional information sources should be adapted to the old and some attempts should be made to facilitate the inexperienced consumers to search online.

Finally, consumers' limited online search indicated that consumers did not or cannot dedicate to all available information. Thus, prudent selection of information, in addition to a high quality presentation, was extremely vital for marketers.

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