Abstract—The author aims at studying the influence of comments and recommendation on online shopping behaviours. With 285 study subjects, the author used experimental research design to study comments and recommendation system on online shopping experience, online shopping satisfaction, online shopping intention and items chosen. The data is analyzed by SPSS 15.0 and LISREL 8.8. The results show that comments and recommendation influence online shopping experience, online shopping satisfaction and online shopping intention directly. Online shopping experience and online shopping satisfaction influence online shopping intention significantly. There is remarkable positive relation between online shopping intention and items chosen.

Index Terms—comments and recommendation system, online shopping experience, online shopping satisfaction, online shopping intention

I. INTRODUCTION

In Web 2.0 era, the Internet has played a more and more important role in people’s daily life. It has made the online shopping a common thing, beside, the consumers can also express their opinions conveniently on the website, including the quality, the price, and the style of the product, the service of the website and the online sellers and the delivery speed. The research shows that the potential online consumers may refer to other consumers’ comments and recommendation when they are about to shop. Our (Chen & Li 2009) research shows that the online comments published in the shopping websites’ BBS has an influence on the online consumers’ trust in the shopping websites.

It is popular for online traders to set up their recommendation and comments system to satisfy people’s needs of expressing themselves, establishing relationships, communicating each other, and exchanging information or opinions. According to the comments and recommendation system, online retailers can not only influence consumers, but also can find their shortages and defects in all stages much more easily, and improve their services timely and effectively. Comments and recommendation system has become a part cannot be missed by any successful online retailer.

However, despite the accumulated knowledge and the continuing investigation in this subject, the author finds there aren’t many researchers studying the influence mechanism of online shopping comments and recommendation system on online shopper buying behaviours. Some researchers paid attention to the influence of the comments and recommendation systems. But how do the comments and recommendation systems affect online shopper behaviours? What is the influence mechanism? The purpose of this paper is to research in the relationship between comments and recommendation system and online shopping behaviours.

II. LITERATURE REVIEW

A. The classification of comments and recommendation

Liu et al. studied about 284 Korean adult consumers who have the online shopping experience in the past year and found that: (1) When shopping online, consumers mainly consider the four factors of comments, the first factor is related to the product returned, restitution, after-sales service, namely dissatisfaction solution factor; The second factor is related to the delivery time, the accuracy of product delivered, product packaging, namely the product delivery factor; The third factor is that with the product quality, product attributes, product design, namely the product attributes factor; The fourth factor is related to the product price, delivery costs and payment, namely money factor. (2) The factors associated with the product attributes and the after-sale dissatisfaction solutions are very influential on the online shopping. On the contrary, the product delivery factor and the money factor did not affect the online shopping intention.

In my research (Chen, 2009), I studied about 1,000 comments of consumers on BBS and virtual communities of shopping sites after their shopping behaviours. I classified the contents of comments could be divided into four dimensions: Service, Product and price, Self-display and After-sale action. Another my research (Chen, 2010) found out that, comment has influence on the trust in the consumer websites.
B. The influence of comments and recommendation on online shopper’s buying behaviours

Some researchers found comments from others have great influences, ranging from initial purchase intention to final decision making. Research (Kim et al, 2004 [5]) indicated interactions between online shoppers play an unimaginable role in consumers’ choice and shopping tasks, and the comments would impacts purchase intention directly. Studies from Adamic and Ader (2003) [6] showed reviews and evaluation from previous customers can help online shopper make his/her final purchase decision. More important, online shoppers pay information from comments more trust than the ones from other resources (Young and Jaideep, 2007 [7], Bickart & Schindler, 2001 [8]).

It is also proved by Ni Yegang in his paper after an empirical study that the content of the comments has a significant influence on the consumer trust. He arrived at the conclusion: "Consumers have more trust on the product on which comments are allowed to express.”

Markopoulos and Kephart (2002) postulated that the information provided by comments and recommendation have greater value to consumers if the accuracy and timeliness of the information could be assured.

The research of Häubl and Trifts (2000) suggested that comments and recommendation improved the consumer’s confidence in their choice, as well as reduced their search effort and increased the quality of both their consideration sets and purchase decisions. Felfernig and Gula (2006) concluded that subjects who interacted with some form of recommendation system reported more positive shopping outcomes than those who did not utilize a recommender system. Li, et al. (2006) also reported that the use of comments and recommendation had a positive impact on shopper’s behaviors. They found that the comments and recommendation was successful at recommending music of interest to the user.

C. Consumer decision making in E-commerce

In traditional consumer behavior domain, there are mainly three models which discussed about the decision making process. The Howard-Sheth (1972) model includes an input, a processing and an output component. Bettman’s (1979) model contains six major components, which include processing capacity, motivation, attention, information acquisition, decision processes, and consumption and learning processes. The Engel-Blackwell (1978) model of consumer behavior includes five phases. The five phases include problem recognition, internal search and alternative evaluation, external search and alternative evaluation, purchasing processes, and outcomes.

All three of the buyer behavior models presented here have some similarities. First, they all think that the process begins with the consumer’s realization of purchasing need. Second, they all include information search, internal and external search. Third, they all include not only the purchase decision, but the overt act of completing a purchase transaction as well. Finally, they all include the effects of learning to some degree.

Maes, et al. (1999) developed a model that could easily be applied in an e-commerce context. The model included six stages of consumer behavior. They are need identification, product brokering, merchant brokering, negotiation, payment and delivery, and service and evaluation. He et al. (2003) used Maes et al.’s (1999) model and extended the model by adding a new phase, which is called the buyer coalition formation phase. This phase is placed between the product brokering and merchant brokering phases. In this research, I focus on the need identification stage.

III. RESEARCH HYPOTHESIS

Several studies have been done on the effectiveness and impact of comment and recommendation in Internet e-commerce (Häubl and Murry, 2001; Häubl and Trifts, 2000; Vijayasarathy and Jones, 2000, Schafer et al., 1999). Almost all of these studies have focused on comments and recommendation aiding the consumer in selecting a specific product or selecting an online merchant influence. The research of Lynch et al., (2001), Häubl and Trifts, (2000), Vijayasarathy and Jones (2000) suggests that the application of comments and recommendation in certain aspects of e-commerce can be effective in helping online consumers by providing additional decision support during shopping. Although these studies suggest that comments and recommendation can be effective in helping online consumers with product and merchant selection decisions, there has been no research to assess the path of their effectiveness and influence in system.

My theoretical model attempts to assess what the impact of comments and recommendations are, and what type of impact on shopping outcomes online businesses can realistically expect if they decide to implement such systems on their websites.

Häubl and Trifts (2000) examined the effectiveness of comments and recommendation system in their research and found some promising results. They found that comments and recommendation system improved consumers’ confidence in their purchase decisions, increased the quality of the set of products the consumers considered purchasing, and improved the quality of purchase decisions (Häubl and Trifts, 2000). I propose that if the comments and recommendation system is effective, then it will promote the online consumer shopping behaviours. Since the research of Häubl and Trifts (2000) suggests that comments and recommendation system are effective at recommending products, I hypothesize that comments and recommendation system will enhance the online consumer buying behaviours. Given the previous discussion, hypothesis one is presented as:

Hypothesis 1: The use of comments and recommendation system to help online consumers will promote online consumer’s shopping experience.

Schafer et al (1999) state that websites that make recommendations that are perceived as helpful and useful by its customers will increase their level of satisfaction with shopping at that site and the increase in their level of
Hypothesis 2: The use of comments and recommendation system to help online consumers will promote online consumer’s online shopping satisfaction.

The results of Hausman’s (2000) study suggest that consumers do shop to satisfy their desires for fun, novelty and variety. When consumers are satisfied with the online shopping, they often have positive feelings about buying something for themselves that they feel that they deserved (Hausman, 2000; Rook and Fisher, 1995; Rook, 1987). Hausman (2000) noted that consumers shopping intention enhance when they satisfy with the shopping environment. The positive feelings that consumers get from buying environment would seem to logically contribute to their intention and outcomes of shopping. Rook’s (1987) study of impulse purchasing behavior, forty-one percent of the participants reported feeling satisfied with their impulse purchases. The literature suggests that shopping enjoyment and satisfaction can contribute to customer shopping intention, consequently, I hypothesize:

Hypothesis 3: The use of comments and recommendation system to help online consumers will promote online consumer’s online shopping intention.

Hypothesis 4: The online shopping experience has a significant positive influence on online shopping satisfaction.

Hypothesis 5: The online shopping experience has a significant positive influence on online consumer’s online shopping intention.

Hypothesis 6: The online shopping satisfaction has a significant positive influence on online consumer’s online shopping intention.

Hypothesis 7: The items displayed can be entirely selected based on the items in which a customer has shown an interest.” Zhang et al.’s (2006) found that buyer intention is an important indicator of a shopper’s buying items online. I believe that, besides shopping intention, using comments and recommendation system will increase an online consumer’s interest to products in the online merchant’s inventory that will be of interest to them, thereby encouraging them to buy a greater quantity or variety of products than they otherwise might have. Based on the previous discussion, Hypothesis six and seven are presented here as:

Hypothesis 7: The online shopping intention has a significant positive influence on items chosen online.

Hypothesis 8: The use of comments and recommendation system to help online consumers has a significant positive influence on items chosen online.

A. Research Samples

A convenience sample of undergraduate students in Economic and Management School in a university was used for the study. Participants were randomly distributed between the treatment and control groups in the experiment.

<table>
<thead>
<tr>
<th>Group</th>
<th>Treatment</th>
<th>Control</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>147</td>
<td>138</td>
<td>285</td>
</tr>
<tr>
<td>Male</td>
<td>86</td>
<td>75</td>
<td>161</td>
</tr>
<tr>
<td>Female</td>
<td>61</td>
<td>63</td>
<td>124</td>
</tr>
<tr>
<td>Mean Age</td>
<td>20.5</td>
<td>20.2</td>
<td>20.3</td>
</tr>
<tr>
<td>Experience as the Internet browser(years)</td>
<td>3.2</td>
<td>3.1</td>
<td>3.15</td>
</tr>
<tr>
<td>Online shopping experience (years)</td>
<td>2.1</td>
<td>2.0</td>
<td>2.05</td>
</tr>
</tbody>
</table>

B. Research Design and Process

To test the effects of comments and recommendation system on the need recognition phase of the buyer behavior model, study subjects were asked to complete a simulated online shopping task in a controlled experimental e-commerce website. There were 20 books on the web pages, which were published from 2008 to 2010 and mainly about marketing management; the price of all of the books was around RMB 30. So the control variables are price, contents of books, publisher and publication time. There were only covers of books, instructions and one chapter of books on the web pages of the control group. Besides contents of control group, there were also comments and recommendation about books on the web pages for the treatment group. All of the comments and recommendation data were from the reader on Internet. The study subjects had 30 minutes to browse the books’ information and compared that information. After that, they were asked to fill in 4 questionnaires next mentioned.

C. Research Materials

The data which depended on Likert scale survey items was collected using paper and pen based questionnaires.

1. Shopping experience
The variable “shopping experience” was measured using a scale adapted from Nysveen and Breivik (2005). The scale includes nine items measured using seven point Likert scales. The scale items ask the participant to rate their level of agreement with nine items related to their shopping experience on the web pages. The statements relate to the subject’s attitude towards the recommendations, their attitude towards the books that were recommended to them.

2. Satisfaction
A measurement scale adapted from the Customer Satisfaction Index (CSI) was adapted for measuring the dependent variable “satisfaction”. It includes twelve items which cover the information content of the website, the usability of the website, and the participant’s level of satisfaction with the outcomes of the shopping process. The participants were asked to indicate their level of agreement using seven point Likert scales.

3. Shopping intention
The variable “shopping intention” was measured using a scale from my previous research, which was certified acceptable reliability and validity. It includes five items which also use seven point Likert scales. The study subjects were asked to evaluate the shopping intention after browsing the web pages.

4. Items Chosen
The participants were also asked to rent how many “items” they would like choose and choose those items on the given sheet with book names.

V. RESEARCH RESULT

A. The reliability of the questionnaires
A Cronbach’s alpha score was computed for each scale to test the scale’s internal consistency. The result was in Table II. All indicated a high level of reliability.

<table>
<thead>
<tr>
<th></th>
<th>Cronbach’s alpha</th>
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<tbody>
<tr>
<td>Shopping experience</td>
<td>0.937</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>0.924</td>
</tr>
<tr>
<td>Buying intention</td>
<td>0.821</td>
</tr>
</tbody>
</table>

B. The result of variance analysis
To test the influence of comments and recommendation system on the online buying behaviours, I used variance analysis to analyze the difference of shopping behaviours between the treatment group and the control group. The differences between the treatment and control groups are summarized in Table IV. For each of the four study variables, the group means for the treatment group are higher than the means of the control group. The different of shopping experience between them is statistic significant. This result supports Hypothesis 1. The presence of the comments and recommendation had a positive influence on the study participants’ perception of the shopping experience. In general, subjects in the treatment group found the books more attractive than the control group.

The results for shopping satisfaction were similar to those for shopping experience. The mean for the control group was 4.18; while the treatment group’s mean were 4.69. The different is statistic significant. Again, this result supports the corresponding hypothesis 2.

The difference of shopping intention between treatment group and control group were significant. The mean for the control group was 3.02; while the treatment group’s mean were 3.65. The different is statistic significant. Again, this result supports the corresponding hypothesis 3.

Subjects in the treatment group also had more items chosen than those in the control group. The mean in the treatment group was 3.12, and a slightly lower 2.53 in the control group. But the different is not statistic significant.

C. The Result of SEM
Important goodness-of-fit indices of SEM model are shown as below:

From the model indicators, the theory structure in this study is a good goodness-of-fit model. It is acceptable in statistics. Model goodness-of-fit results are very similar except GFI and AGFI (both of them are less than 0.7), and this is acceptable. RFI and NFI are less than 0.9, but more than 0.8, so the model goodness-of-fit results are relatively good. Other indicators are more than 0.9, so the model goodness-of-fit results are very good. Bentler&Chou (1987) pointed out that it was difficult to achieve the assumed goodness-of-fit for the model with many variables.

There are 5 variables and 27 testing items in this model, so it is acceptable that some goodness-of-fit indicators cannot reach up to 0.9, and actually other goodness-of-fit indicators show that the goodness-of-fit results are very good.

Therefore, H1, H2, H3, H5, H6, H7 are accepted and H4,H8 are rejected.
Online shopping intention and the number of items they choose. The research discovered that comments and recommendation system do seem to influence online consumer behavior, particularly in their online shopping experience, their satisfaction with the online shoppers, shopping intention and the number of items they choose.

The goal of this research, from the beginning, has been to contribute some additional knowledge about the use of comments and recommendation systems in online e-commerce to our general body of knowledge about both intelligent systems and e-commerce. Having now completed this research study, it offers several contributions to the literature.

Perhaps most significant is the development of an explanatory model which seems to provide an accurate picture of the relationships between the factors which impact the use of comments and recommendation systems in the online shopping process. In addition to the development of the model, the research also suggests that collaborative filtering based comments and recommendation systems do have a positive influence on the customer’s level of satisfaction with their online shopping experience. This is not surprising given the heavy use of r comments and recommendation systems by some well know online businesses. However, we can now provide some quantitative data about what the actual impact may be that was not previously available in the public domain.

This research also illustrates and explains the impact that the use of comments and recommendation systems has on the online shopping process. Through this research, we have shown that the use of comments and recommendation systems has an impact on the online shopping experience. The increase of shopping experience would increase online shopping experience. As a result of this increased positive attitudes make stronger intention to buy and more items to buy.

III. LIMITATION AND FUTURE STUDY

This research has a few limitations. The primary limitation of the study is the use of undergraduate students as subjects for the study. Although the use of students as research subjects is a common practice in the literature, it does not necessarily provide a complete picture of online shopping behavior.

In addition to the use of undergraduate students as subjects, the fact that the experiment used in the study does not require the subject to spend any money to actually purchase a product is also a limiting factor. Shopping behaviors are likely to be somewhat different when an actual purchase is being made. A subject saying that they would be willing to purchase a particular product in a given situation and their willingness to actually spend their hard earned money may be different.

This study examined the impact of comments and recommendation systems on buyer behavior. Future research studies based on the our theoretical model could compare the impact of different types of comments and recommendation systems on the buying process to see

IV. CONCLUSION

In this research, a theoretical model of comments and recommendation system was developed to explain the concepts and factors involved in the online shopping process and what their relationships to one another are. The research discovered that comments and recommendation system do influence online consumer behavior, particularly in their online shopping experience, their satisfaction with the online shoppers, shopping intention and the number of items they choose.

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which type of comments and recommendation systems seems to be the most effective. In addition to testing different types of comments and recommendation systems, future research with the theoretical model developed for this study might also examine how changes in product characteristics affect the impact that comments and recommendation systems have. In this study, we examined comments and recommendation systems impact in book. How might that change when the product is made up entirely of more expensive items such as personal computers, televisions, or even cars? Or, perhaps examining comments and recommendation systems use where the product mix is somewhat more diverse, such as shopping online for clothing? Additionally, shoppers would need to choose between multiple sub categories including shirts, pants, dresses, shoes, jackets, and various accessories. There are a potentially wide range of different product types and categories with their unique characteristics which may affect the implementation and use of comments and recommendation systems.

Although online shopping is not likely to ever completely replace our real world shopping excursions, it continues to hold great promise for the future. Its convenience and ability to provide vast amounts of information on product features and availability can be used by consumers to get the most from the money they have to spend.

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