Research on the Evaluation Index System of Product Compatibility in Online Retailing

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Abstract- Few conceptual papers have offered systematic and comprehensive frameworks to assess and evaluate the compatibility of products with online retailing. Thus, this paper provides an evaluation index system for the compatibility of products with online retailing from the perspectives of products, consumers and channels based on the current literature and marketing framework. For the product dimension, this paper constructs the indexes from the perspective of searching trait, shopping experience trait, value, and logistics dependence traits based on the general process of online shopping; For the consumer dimension, this paper constructs the indexes of age, income, gender, education level and occupation from the perspective of target market orientation; For the channel dimension, this paper constructs the indexes of interactivity, convenience, return channels, payment channels, delivery channels, credit rating or popularity, which refers to the usability of channels.

Keywords: E-commerce; online retailing; Evaluation Index System

I. INTRODUCTION

As a new channel of product retailing and marketing, e-commerce has been changing the operation way of business, and has been accepted by more and more general consumers. The amount of trade conducted electronically has grown extraordinarily since the spread of the Internet.

Starting in 1999, a large number of EC-dedicated companies, especially e-tailing ones, began to fails (Useem 2000; Carton 2002; Perkins and Perkins 2001; and Kaplan 2002); Well-known B2C failures are eToys, Xpeditor, MarchFirst, Drkoop.com, Webvan.com, and Verticalnet(Efraim Turban, etc)[1]. As for China, a large of number of B2C companies such as dangdang.com and joyo.com struggled for the profit for a long time since 1999; The percentage of China online buyers has increased as a share of all internet users from 24.5% in 2004 to just 26% by the June of 2009, while the total number has nearly doubled with 87.88 million users since 2004[2], according to statistics of CNNIC. Total China revenues from online shopping are predicted to amount 250 billions by the end of 2009[3].

As for the survival and development of online retailing companies, one important issue is to select the type of products suitable for online retailing. However, due to the limit of economy, technology, infrastructure, consumption habits, product characteristics, and internet characteristics, etc, not all the products could be sold online via internet in the current stage. Estimates of online sales by product categories reveal that certain types of products such as books, CDs, clothes, 3C products, and virtual cards fare better than others. However, few conceptual papers have offered systematic and comprehensive frameworks to assess and evaluate the compatibility of products with online retailing.

Thus, this paper provides an evaluation index system for the compatibility of products with online retailing from the dimensions of product, consumer and channel based on the current literature and marketing framework.

II. LITERATURE REVIEW

Now, few conceptual papers have offered systematic and comprehensive frameworks to assess and evaluate the compatibility of products with online retailing. Most research perspective on the topic could be summarized as follows:

One of the perspectives is based on the congruence or fit between product and channel. As a retail channel, the strength and weakness of the internet have been extensively studied (Hoffman et al, 1996; Krantz, 1998; Mardesich, 1999) [2]. As a retailing channel, Internet can lower the transaction cost by eliminating time and space barriers and providing access to a great variety of products and providers. However, Internet has the limitations such as lack of trust, reducing the sensation of sensory shopping and socialization with friends. Current internet sales figures for different products may be a reflection of the channel’s benefits and limitations. Based on the research report of CNNIC, books, 3C products, clothes, toys, etc are some of the best-selling items on the internet in China. The success of these products can be attributed to a match or fit between their characteristics and those of the internet (Leo R. Vijayasathathy, 2002) [3].

Similar analysis is offered by Xiaohui Xu and Jian Chen (2000) of China, who suggests that standardization of products, consumers’ perception to online retailing and consumers’ attitude to online shopping are critical factors [4]. Efraim Turban (2006) thought goods with the following characteristics are expected to facilitate higher sales volumes: high brand recognition, a guarantee provided by highly reliable or well-known vendors, digitized format, relatively inexpensive items, and frequency purchased items, commodities with standard specifications, well-known packaged items [1]. Cost, differentiation, digitization and tangibility had been studied extensively in those studies (Peterson et al, 1997, Zhenhua Li, 2002, Leo R. Vijayasathathy, 2002, Efraim Turban et al, 2006).

The second perspective is based on the transaction cost analysis. Williamson’s transaction cost analysis is an efficiency-based theory, which argues that the type of
economic mechanisms—markets or hierarchies—formed for coordinating the exchange of goods and services between buyers and suppliers is contingent on the production and coordination costs associated with transactions ensuing between the involved costs. Extending this theory to channel choice, it can be postulated that consumers’ choice of a retail channel would be guided by the objective of reducing transaction costs (Liang and Huang, 1998) [3][5]. These costs that are dependent on asset specificity, uncertainty, frequency of transactions, and complexity of product description can vary by product. It is shown that experienced online consumers focus more attention on the uncertainty, while inexperienced online consumers focus more attention on both uncertainty and transaction costs [4].

The third perspective is based on the consumers’ e-commerce adoption intention. When considering purchasing goods, as compared to services, consumers’ e-commerce adoption intention decisions are more strongly influenced by their perceptions of risk; In contrast, when considering purchasing services over the internet, consumers’ e-commerce adoption intentions are more strongly influenced by their perceptions of ease of use (Xiao Liu, Kwok Kee Wei, 2003) [6].

III. Construct The Evaluation Index System

A. Hypotheses

It is dynamical for the Product Compatibility in Online Retailing, which would be changing with technology, consumers’ behavior and external environments. Thus, the following hypotheses are required in this research.

H1: No great technology innovation on Internet
H2: No change on the consumers’ behavior
H3: a stable supply and demand on products

B. Product Dimension

The success of special online retailing products can be attributed to a match or complement between their characteristics and those of the internet, but not limited to these characteristics, as shown in table I. To find the entire characteristics matching with the internet, this paper constructs the product indexes from the perspective of online purchase process.

The online purchase processes can be divided to 4 stages: searching and comparing, negotiation, order and payment, delivery and post-service.

• Searching and comparing: search for relevant product information and compare prices or other attributes.
• Negotiation: negotiate terms, e.g., price, delivery time, etc.
• Order and purchase: place an order and pay for it.
• Delivery and post-service: delivery of goods and customer service.

<table>
<thead>
<tr>
<th>Characteristic of the internet</th>
<th>Product characteristic match with internet</th>
<th>Product characteristic complementary with internet</th>
</tr>
</thead>
<tbody>
<tr>
<td>digitalization</td>
<td>Digital products</td>
<td>Personal products</td>
</tr>
<tr>
<td>interactive</td>
<td>customized products</td>
<td>N/A</td>
</tr>
<tr>
<td>virtual</td>
<td>private goods</td>
<td>Standard products</td>
</tr>
<tr>
<td>Lack of trust</td>
<td>Low-price goods</td>
<td>Well-known products</td>
</tr>
<tr>
<td>global</td>
<td>Global goods</td>
<td>Geographical goods</td>
</tr>
<tr>
<td>convenient</td>
<td>N/A</td>
<td>High searching cost products</td>
</tr>
</tbody>
</table>

Based on the first stage, the index of searching trait of product is constructed. Based on the second stage, the index of shopping experiencing trait is constructed. Based on the third stage, the index of product value is constructed. Based on the fourth stage, the index of logistics dependence traits is constructed.

Searching trait of product means the searching cost of the product, which can be measured by the secondary indexes, i.e. differentiation, specificity, geographical.

Shopping experiencing trait, means perception or information required before buying the products, which can be measured by the secondary indexes, i.e. standardization, brand popularity, consume frequency and informatization level.

Product Value. For the cheap products, it is difficult to afford the cost of online sale, while for the expensive products there are too many risks to afford for consumers, thus, relatively inexpensive items would be more suitable retailing online. This index can be measured by the secondary indexes, i.e. price, profit margin.

Logistics dependence trait. For the products difficult to transport, more logistics fees would be needed, which may reduce consumer’s purchase desire. This index can be measured by the secondary indexes, i.e. tangibility, weight, putrescibility.

C. Consumer Dimension

According to the statistics of CNNIC, by June of 2009, 26% of the internet users i.e.87.88 million users in China has purchased online, with a high annual growth rate of 38.9%; the majority shopping online are students and white-collar workers aged between 18 and 30, with a monthly income between 1000 and 3000 RMB Yuan [2]. Thus, high-tech products, internet or computer related products, or products focusing on young people would fare better than other products. Besides, the overall shares of online shopping for female have surpassed the male, with a rapid growth; on the contrary, the male has a bigger share on the shopping of large sums of money [2], according to statistics of CNNIC.

This reveals the different attitudes and perceptions between different consumers such as the male and the female.

It is evident that products positioning on the above people would be more suitable for online retailing than other products; Clothes, cosmetics, books, CD, 3C products, virtual card, etc are most of the are some of the best-selling items on the internet in China by now, as shown in table II,
because the market orientation of these products matches with the internet users structure.

From the perspective of market orientation, this index can be measured by the secondary indexes, i.e. age, income, gender, education level, occupation (computer or internet dependencies).

### TABLE II. USER PROPORTION ON ONLINE-SHOPPING CATEGORIES IN THE FIRST HALF YEAR OF 2009 IN CHINA

<table>
<thead>
<tr>
<th>Items</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>apparel</td>
<td>62.5%</td>
</tr>
<tr>
<td>Cosmetics and jewelry</td>
<td>23.5%</td>
</tr>
<tr>
<td>Books and CDs</td>
<td>20.2%</td>
</tr>
<tr>
<td>communication products</td>
<td>13.2%</td>
</tr>
<tr>
<td>Virtual cards</td>
<td>9.0%</td>
</tr>
<tr>
<td>Food and health products</td>
<td>5.8%</td>
</tr>
<tr>
<td>Computer software and hardware</td>
<td>6.9%</td>
</tr>
<tr>
<td>Home appliance</td>
<td>4.8%</td>
</tr>
<tr>
<td>Toys, mother &amp; infants items</td>
<td>3.5%</td>
</tr>
<tr>
<td>Sports goods</td>
<td>2.4%</td>
</tr>
</tbody>
</table>


D. Channel Dimension

Now, most of the online-shopping products are purchased in the C2C websites and B2C websites such as taobao.com and dangdang.com. The market share for different websites has considerable variability. According to the statistics of CNNIC, by June of 2009, the market share of www.taobao.com is up to 76.5%, while the share of www.paipai.com is just 6.1%; For the B2C websites, the market share of www.dangdang.com, www.joyo.com and 360buy.com are 5.8%, 2.2% and 2.2%, while the market share of www.redbaby.com.cn, www.enzard.com and www.mecoxlane.com are less than 1%

For the well designed websites or well-known websites, the strength of online retailing would be strengthened, and the risk of online retailing would be reduced. The channel dimension has a great influence on the online-retailing. From the perspective of channels usability, the channel index can be measured by the secondary indexes, i.e. interactivity, convenience, return channels, payment channels, delivery channels, credit rating or popularity.

- Interactivity: refers to the interactive function of the website e.g., Instant message tools, Virtual community, etc.
- Convenience: refers to the content usability of the website e.g., FAQs, Helps, navigation function, search function, etc.
- Return channels: refers to the channel returning goods.
- Payment channels: refers to the payment way providing for users.
- Credit rating or popularity: refers to the credit level for C2C websites, or popularity for B2C websites.

### TABLE III. THE EVALUATION INDEX SYSTEM OF PRODUCT COMPATIBILITY IN ONLINE RETAILING

<table>
<thead>
<tr>
<th>Target</th>
<th>Index</th>
<th>Items</th>
<th>Secondary Indexes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Dimension</td>
<td>searching trait of product</td>
<td>specificity, geographical</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shopping experiencing trait</td>
<td>brand popularity, consume frequency</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Product Value</td>
<td>price, profit margin,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Logistics dependence traits</td>
<td>weight, putrescibility</td>
<td></td>
</tr>
<tr>
<td>Consumer Dimension</td>
<td>market orientation</td>
<td>education qualification, occupation (computer or internet dependencies)</td>
<td></td>
</tr>
<tr>
<td>Channel Dimension</td>
<td>Channel usability</td>
<td>interactivity, convenience, return channels, payment channels, delivery channels, CreditRating or popularity</td>
<td></td>
</tr>
</tbody>
</table>

IV. Conclusions

This evaluation index system consists of three dimensions, i.e. product, consumer and channel, as shown in table III.

For the product dimension, this paper constructs the indexes, from the perspective of searching trait of product, shopping experience trait of product, value of product, and logistics dependence traits of product based on the general process of online shopping; For the consumer dimension, this paper constructs the indexes from the perspective of target market orientation; For the channel dimension, this paper constructs the indexes from the perspective of channel usability; For the three aspects of the evaluation index system, we can make selective use in practice according to the evaluation objective. The three-dimension evaluation index system of this paper provides online retailers with a reference for the selection of product retailed online.

The whole evaluation index system consists of 23 sub-indexes. For the evaluation index system, we can figures out the weight of each index with the method of analytic hierarchy process and offer the weighted average method to the quantification of the evaluation index system. Further empirical study will required to verify the rationality of the indexes.
REFERENCES


Electronic Commerce Research and Applications [J], 2003, 2:229-239.

