Overall Satisfaction Prediction

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INTRODUCTION

Strides in information technology and improvements in networking technology have set the pace for rapid growth in new applications of electronic commerce in a variety of settings. Business to business (B2B), business to customer (B2C), customer to business (C2B), and customer to customer (C2C) have become prevalent business channels and have reshaped the ways that business transactions are conducted in the marketplace. According to Internet Data Corporation (IDC), the number of Internet users worldwide will exeed 1 billion Internet users by 2007 (IDC, 2004). Given recent trends and forecasting, it is clear that no business enterprise can afford to ignore the tremendous potential of these emerging technologies in terms of the rate of creating, processing, and distributing the volume of business.

The proliferation of the Web potential for business, together with its profuse customer information, have offered an alternative sales channel for a growing number of firms and have prompted extensive research on the effect of negative critical incidents on customer satisfaction with Internet shopping. The increase in business-to-customer (B2C) channels has made several firms look for new strategies to understand online shopping behavior in order to attract, retain and satisfy customers' needs (Ranganathan & Ganapathy, 2002). In fact, many researchers have considered that customer satisfaction leading to higher levels of customer retention would depend on the success of critical factors, such as quality design (Huizingh, 2000; Liu & Arnett, 2000; Stefani & Xenos, 2001), security concerns (Belanger, Hiller, & Smith, 2002; La & Kandampully, 2002), and other factors for electronic commerce (Loiacono, Watson, & Goodhue, 2002; Yang, Cai, Zhou, & Zhou, 2005). However, Waterhouse and Morgan (1994) reported an interesting finding that just one factor of dissatisfaction and defection would be enough to cause customers to become disenchanted with Internet shopping. Thus, the call for the managers to find and discriminate the dissatisfaction or defection in the velocity and dynamic nature of the Internet environment becomes loud.

According to Fang, Shih, and Liu (2004), the slow response affected overall satisfaction indirectly by quality attributes satisfaction (QASAT) seems to be more important to customers who have less purchase frequency or purchase amount than high one. Furthermore, online bookstores with incomplete content and have untrustworthy transaction would affect overall satisfaction indirectly to customers with high loyalty by QASAT. The main purpose of this study was threefold. First, it designed a set of quality attributes satisfaction, in term of the negative critical incidents concept, to measure individual satisfaction, an online shopping bookstore served as empirical cases. Second, from predictive model standpoint, a method, call multiple discriminant analysis (MDS), was used to analyze customers' satisfaction based on QASAT and estimated data. Finally, it adopted holdout samples to confirm the ability of generalization with a predictive model.

BACKGROUND

In the past decade, perhaps, the most dramatic evolution, a new agenda, in business is the dawn of the Internet. A hallmark of the new economy is the ability of company to increasingly recognize that in the postindustrial era, a company success is determined mainly by economic value from its new application of electronic commerce in a variety of settings.

Based on the book chapter in e-commerce and m-commerce technologies (Fang et al., 2004), research on web quality attributes for measuring Internet shopping falls into four broad categories: quality e-store, information content, security concerns, and consumers' experience. These four categories were specified to construct a set of critical incidents for encounter satisfaction. The four factors consisted of 34 items from previous literature described as follows:

1. **Quality E-Store (10 items):** Fast Web-page download, store size, promotions, ease of use and so on (Huizingh, 2000; Liu & Arnett, 2000).

2. **Information Content (8 items):** Availability of information to compare across alternatives, completeness of information provided about a firm, product, and service, and so on (Huizingh, 2000; La & Kandampully, 2002; Ranganathan & Ganapathy, 2002).

3. **Security Concerns (5 items):** Availability of secure modes for transmitting information, provisions made for alternatives, overall concern about security of transactions over the Internet, gathering of personal information, and so on (Belanger et al., 2002; La & Kandampully, 2002; Ranganathan & Ganapathy, 2002).

4. **Consumer Experience (11 items):** Increased customization, convenience in purchasing, responsiveness in product delivery, and so on (Elliot & Fowell, 2000; Iwaarden, van der Wiele, Ball, & Millen, 2004).

There are a number of custom satisfaction measurements currently in place. However, the assessment from negative critical incidents is spare. For the content validity purpose, these items were initially assessed using a Delphi method (Green, 2000). Furthermore, three e-commerce scholars were asked to evaluate the items and make changes to eliminate repetitive items. After two evaluation rounds, there remained 22 critical incidents of Web quality attributes for further study.

Two questions were used to measure overall satisfaction. One question is, "What is the degree of satisfaction for online bookstores?" The other question is, "Will you recommend using online bookstores to a friend?"

To detect customer's satisfaction in online shopping, a model was proposed and applied to the empirical case—online bookstores (shown in Figure 1). This model used dimension of quality attributes satisfaction to discriminate and forecast overall satisfaction by multiple discriminant analysis.

METHODOLOGY OF THE MANUSCRIPT

Research Procedure

First, to produce more precise and interpretable factors for the dimension of quality attributes satisfaction, the principal component analysis (PCA) was used to examine related items. Moreover, to provide meaningful interpretation of the relative importance among the various factors, a multivariate analysis-discriminant analysis was chosen as the appropriate statistical technique. This technique derives a profile based on a linear combination of variables that will best discriminate between the a priori defined groups. In this study, a degree of overall satisfaction was divided into two groups, based on the cutting

Figure 1. Proposed model
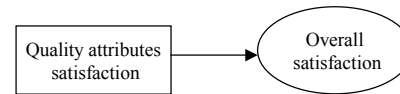
score (a score of more than 4 indicates customer who has higher overall satisfaction; a score of less than 3 represents customer has lower overall satisfaction).

Finally, for the cross validity purpose, a holdout sample was used for validation of the discriminant function. In this study, 70% of the cases were assigned to the analysis sample for purposes of training the discriminant function first; then, it was validated by assessing its performance on the remaining cases in the holdout sample.

Measurement

A questionnaire was designed to measure satisfaction of service quality, overall satisfaction, demographic variables, and experience of online purchasing. The questionnaire was based on the previous studies (Fang et al., 2004). A measurement of quality attributes satisfaction and overall satisfaction, such as "What is the degree of satisfaction for online bookstores?" included a 5-point Likert scale from 5 (*strongly agree*) to 1 (*strongly disagree*). A measurement of the second question of overall satisfaction, "Will you recommend using online bookstores to a friend?" included a 5-point Likert scale from 5 (*strongly willing*) to 1 (*strongly unwilling*). In addition, two demographic variables (gender and income) and three variables with experience of online purchasing (number of online bookstore visits per month, frequency of purchasing per month, average amount of money spent in online bookstores per month) are all measured by a nominal scale from respondents to obtain more information for explaining the analytical results.

Data Collection

According to Fang et al. (2004), 15 critical incidents were for measuring the constructs of QASAT. An online survey was performed for collecting the data. Participation in this study was completely voluntary, but respondents of at least one online purchase were considered qualified for analysis. In this online survey, our system would check incomplete data and ask the respondents to fill out the questionnaire on time.

This paper used 210 respondents to predict their overall satisfaction based on quality attributes. Table 1 presents the characteristics of respondents. The sample included 88 (42%) males and 122 (58%) females, all of whom had made purchases online, with 75% having had

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