Customer Satisfaction and Purchasing Behaviour in a Web-based Shopping Environment

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INTRODUCTION

This paper provides an empirical analysis of consumer behaviour in a computer mediated shopping environment. The focus is on the relationship between the shopping experience, i.e. the level of customer satisfaction, and the outcome of the shopping process, the amount of purchases made. This research is a part of the VRFlow research project, in which one of the key research areas is the effect of enhanced navigational features through hyperertext functionality on consumers’ purchasing behaviour.

Because the Internet attracts an increasing number of competing vendors, a prerequisite for success in online business is an understanding of consumer behaviour. Although consumer behaviour in e-commerce contexts is essentially the same as any other consumer behaviour, there are certain vendor controlled, technology related features that play a part in consumer decision making.

Turban et al. (2000) introduce a model developed by Matthew K. O. Lee, which provides a comprehensive framework for Web purchasing situations. The model suggests that in addition to selection and different properties of the goods themselves, there are various features related to the Web shop, such as speed of operation and the ease of use, that determine the navigational experience of the customer. Navigational experience is, in turn, one of the key determinants of overall shopping experience, or customer satisfaction. The key implication of Lee’s model is that increased customer satisfaction leads to an increase in the likelihood of a repeat purchase.

Existing empirical evidence supports the close relationship between shopping experience and attitude towards Web purchasing. For example, based on their survey Jarvenpaa and Todd (1997) concluded that, in order to increase shopping activity, Web vendors need to concentrate on different means of enhancing the Web shopping experience. Hoffmann and Novak (1997) found that the navigational experience, or more specifically the flow experience, has a positive effect on the likelihood of making purchases from an online store. The concept of flow was first defined by Mihaly Csikszentmihalyi (1977) and later elaborated on (1990). He defines it as ‘the holistic sensation that people feel when they act with total involvement’. He further specified the definition by stating that flow can only occur when the challenges and skills are in balance and above a certain threshold level. For more on the concept of flow see e.g. Hoffman and Novak (1997). White and Manning (1997) also found a positive relationship between the navigational features of a Web shop and the likelihood of a purchase.

Abstract

This paper investigates the relationship between shopping experience and consumers’ purchasing behaviour in a computer mediated shopping environment. To perform the experiment we signed up volunteers who performed actual purchases in a Web-based grocery shop. The participants used two alternative interface designs of the shop: conceptual maps and a conventional list-type presentation. Shopping experiences were recorded with online and offline surveys. The total sums of the purchases made were also recorded. The empirical analysis was based on a modified consumer optimization model. The results of the study show that the interface design does not have any direct effect on the purchases made. However, there seems to be a significant indirect effect. Our previous results show that the shopping experience can be significantly enhanced with a map-type interface, and the results of this study indicate a strong positive relationship between the shopping experience, i.e. the level of consumer satisfaction, and the amount of purchases made.

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potential purchase. Our previous study is also in line with the existing findings and the key implications of Lee’s model. Koivumäki et al. (2000) found that enhancing product presentation significantly increases customer satisfaction. Furthermore, there appeared to be a strong positive relationship between customer satisfaction and the likelihood of a repeat purchase.

The above findings can be intuitively explained by looking at online consumers from two different perspectives: first of all, they are consumers who buy and eventually consume goods. Second, they can also be viewed as ‘users’ of a shop who utilize the shop to gather information about the goods. The way this information is portrayed in the shop will effect the information retrieved by the consumer and the emotional experience related to the retrieval process. This experience will, in turn, determine consumers’ attitude towards the shop as a whole and the likelihood of future purchases from it.

Another area of e-commerce where both vendors and researchers are constantly searching for deeper understanding is consumers’ purchasing behaviour in the Web environment with respect to the payoff of alternative e-commerce retailing approaches. Although there is some empirical evidence that suggests that Web shop interface design has only marginal effects on the amount of purchases made, see e.g. Westland and Au (1997), we feel that this question needs closer inspection.

Again, the previously discussed dual role of consumers offers a good reasoning as to why Web shop design could have an effect on the amount of purchases, even among people who can be considered homogenous with respect to their preferences and other fundamental factors effecting purchasing decisions, such as their income. When using the web shop consumers can be viewed as consumers of information. The information they receive, for instance advertisements and product information, is determined by the navigation paths they choose. Differences in the information received may effect purchasing decisions, for example by increasing the amount of impulse buys.

An alternative way to approach the relationship between the shopping experience and purchasing behaviour is to assume that differences in the shopping experience alter the preference structure of the consumer and make purchases in the Web shop that provides the better shopping experience more appealing. Koivumäki et al. (2000) considered several alternative theoretical approaches to modelling consumer choice behaviour with respect to making purchases from different shopping channels and concluded that an increase in positive shopping experience will lead to increased purchasing.

In this study we attempt to gain empirical evidence concerning the theoretical implications. The empirical experiment was conducted by applying two alternative interface designs in a Web-based grocery shop, which was designed as a department of a supermarket in Oulu, Finland. To perform the experiment we signed up volunteers who performed actual purchases in the Web shop.

The paper is organized as follows: in the second part we discuss consumer decision making in the Web environment. We present Lee’s customer satisfaction model and briefly discuss the relationship between emotional shopping experience, preferences and purchasing decisions. In the next part we describe the setting of the empirical experiment and the data. The key results are presented and then discussed. This is followed by some concluding remarks and suggestions for further research.

CONSUMER DECISION MAKING IN THE WEB ENVIRONMENT

In this section we discuss the implications of two alternative ways to formulate the relationships between navigational experience, the level of satisfaction regarding the whole shopping process and the purchasing decision – Lee’s model of customer satisfaction and the traditional consumer decision making framework.

Lee’s Model of Internet Customer Satisfaction

In our increasingly technology-oriented world it is quite safe to assume that consumer decision-making process can be influenced in every stage by different aspects of Web technology. Web-based marketing stimuli can be used in provoking needs. Sometimes the emergence of new technologies and technological applications themselves create new, previously unknown needs. The suitability of the Web in the information search and alternative evaluation stages has been widely recognized as being among the greatest benefits of the Web in comparison to traditional purchasing channels. In the purchasing stage there are issues such as trust, transaction safety, privacy and payment mechanisms that affect the consumer’s decision not only regarding what to purchase but also which marketing channel to use. After-purchase evaluation can be influenced by alternative ways of utilizing Web technology in customer service. For example FAQ lists, email communication and news groups can be used in increasing the level of interactivity and enhancing customer support.

These different aspects of purchasing in a computer mediated environment are included in Lee’s consumer satisfaction model, which is presented in Figure 1. His model suggests that repeat Web purchase is determined by consumer satisfaction, which in turn is the result of several properties related to the Web technology in general and to the individual Web shop. In Lee’s model the antecedents of customer satisfaction are logistics support, i.e. how the shipments of the purchased goods are handled, customer support, pricing and the different properties of the Web shop. These properties include privacy and security issues, the operational properties of the store such as speed of operation and system reliability, and ease of use. Also the
content, quality and the manner in which the goods are presented are assumed to be among the determinants of customer satisfaction.

The central implication of Lee’s model is the positive relationship between customer satisfaction and customer retention. Increasing customer satisfaction related to using a Web shop by, for example, enhancing the navigational properties of the shop, increases the likelihood of a repeat purchase. Koivumäki et al. (2000) used several alternative variables to describe the navigational experience and interface characteristics in a Web-based grocery shop. The results showed that there is a significant positive correlation between the shopping experience and enhanced navigational features. Furthermore, the usage of conceptual maps rather than a traditional list-type interface in product presentation lead to higher level of consumer satisfaction. Explicit features that increased the positive shopping experience were clarity of the Web pages, usefulness of the Web shop, interactivity, ease of navigation, the selection available, product presentation, the ease of use and the convenience of Web shopping. Their experiment also supported to the main assumption of Lee’s model. The results indicate a strong positive relationship between the shopping experience and intended future purchases.

SHOPPING EXPERIENCE AND PREFERENCES

Koivumäki et al. (2000) considered alternative approaches to modelling consumer choice behaviour with respect to making purchases in the traditional manner versus from an electronic shopping system. They assumed a simple two-good situation where the first good is a composite good that consists of all goods purchased electronically and the second good is the composite of all goods purchased in a traditional manner. This set-up can be generalized so that instead of having to make a decision between purchasing from a brick and mortar shop or from an electronic shop, the purchasing decision is made between two alternative Web shops or between using alternative interface designs of the same shop.

To calculate the effect of the time saved on the consumer’s choice between the two channels of shopping, we assume that consumption is restricted by the standard budget constraint and a time constraint. Combining the two, we get a single constraint, the full budget constraint, which includes the monetary cost and the time cost of consumption. We considered several alternatives of modelling preferences and the shopping experience: the constant elasticity of substitution (CES) and Cobb–Douglas utility
functions, household production theory, the equivalence scales and repackaging models. The core implications of all different approaches were quite similar, so for the sake of clarity we only present the framework of one alternative. Assuming Cobb-Douglas preferences the consumer optimization problem becomes as follows:

$$\text{max } u(q_1, q_2, \theta_1, \theta_2) = q_1^\theta_1 q_2^\theta_2$$

subject to:

$$p_1 q_1 + p_2 q_2 = Y_f$$

(1)

The related demand functions are:

$$q_1 = \frac{\theta_1}{(\theta_1 + \theta_2)} Y_f,$$

(2)

$$q_2 = \frac{\theta_2}{(\theta_1 + \theta_2)} Y_f$$

(3)

where \(q_1\) and \(q_2\) are the two composite goods purchased using alternative Web shop designs, \(p_1\) and \(p_2\) are the full prices of goods 1 and 2, \(Y_f\) is the full income, \(\theta_1\) and \(\theta_2\) the shopping experiences related to purchasing channels, respectively. The formulations suggest that, when faced with two alternative channels of conducting purchases, in this case alternative Web shop designs, and assuming no learning costs, an increase in the positive shopping experience of one alternative shopping channel will lead to an immediate shift in purchases in favour of the alternative in question.

**FRAMEWORK OF THE EMPIRICAL STUDY**

The empirical experiment was conducted in a Web-based grocery shop, which was designed as a department of a supermarket in Oulu, Finland. The supermarket provided the deliveries of the Web shop. The Web shop was launched in 1998. In the beginning it was available for the employees of the Oulu Technopolis, a technology park in Oulu, and in November 1998 it was opened to the general public. The Web shop offers 98% of the items sold in the supermarket. The supermarket has operated since 1972.

Two alternative interfaces were set up for the Web shop. One interface was designed as a conventional e-shop, in which the items were presented in a list-type format in different item groups. The grouping was based on the grouping used by the wholesaler. In the other interface the items were presented using conceptual maps based on same item grouping. Maps were designed so that by clicking, for example, ‘dairy products’ in the ‘item groups’ map, a detailed map of the goods in the ‘dairy products’ category appeared. A more detailed presentation of the experiment design can be found in Koivumäki et al. (2000).

By altering the interface design and surveying both map and list users, we were able to study whether the theoretical implication of the positive relationship between the level of customer satisfaction and the amount of purchases made could be detected in the empirical data.

To perform the experiment we signed up volunteers who performed actual purchases in the Web shop. The total sums of the purchases were recorded when the orders were placed. Payments were made using electronic payment mechanisms provided by leading Finnish banks. Each participant was handed out a discount coupon worth approximately US $20 when the ordered goods were delivered. It must be pointed out that the purchases had to be paid for before the coupon was given, so that it could not be used in paying for the purchases. The total number of participants was 54. Participants were randomly assigned to the two groups. Half of the participants used the traditional list type interface and half the map type.

The participant group was quite similar to the current aggregate Web shopper profile found in surveys by different online research companies such as Ernst and Young and e-marketer. During the past few years the share of women has been increasing. In our participant group there was practically no difference between the genders; the share of women in the group was over 47%. Most of the participants belonged to the age group 25 to 34 years, and more than 80% of the participants were between 25 and 49 years of age. Like the majority of current Web shoppers, the participants were also well educated. More than 70% had at least a bachelor’s degree. Although almost everyone in the group used the Internet at least 2 to 6 times a week, and almost 70% of them daily, almost 40% of them regarded their personal Web using skills as average at best.

Data regarding the alternative interfaces and shopping experiences were gathered in two stages. In the purchasing situation we recorded the total value of purchases of each participant. They were also presented with a short online questionnaire consisting of three questions that measured their shopping experience. A second questionnaire related to the features of the Web shop interface and to Web shop properties in general was sent to the participants by email. The latter questionnaire also included one question about the shopping experience and a question about the likelihood of a repeat purchase.

In the question regarding the Web shop interface properties participants were asked to describe on a scale from 1 to 7 their feelings about the interface in relation to the following variables: funny, unique, useful, explicit (the clarity of the interface), enticing, interesting, informative, positive, interactive and easy to navigate. If a variable matched the participant’s feeling about the interface completely it was given a value of 7. A score of 1 indicated that a variable did not match his or her feeling at all.

Feelings towards Web shop properties were measured similarly. The variables that were presented to the participants were selection, quality of perishables, prices, payment mechanism, services, product presentation, delivery,
functionality, shopping hours, ease of use, convenience, security and privacy. The questions measuring the shopping experience (both online and offline questions) were also rated on a scale from 1 to 7.

Due to the fact that the participants were reluctant to provide information about their income level, we had to measure it indirectly. We constructed an income variable based on a question about the respondents’ occupations. Occupation was measured using several categories: these were transformed into ‘income categories’ based on the monthly occupational average salaries in Finland as reported by Statistics Finland.

RESULTS

As previously mentioned, Koivumäki et al. (2000) studied the effects of the two alternative interface designs on the level of customer satisfaction and also the relationship between different features related to navigation and the Web shop. One of the most interesting findings was that participants who used the map-type interface in making purchases had a significantly more positive shopping experience than those using the list-type interface. Other survey variables presented in the previous section that had a significant positive effect on the shopping experience were clarity of the interface, usefulness of the Web shop, interactivity, the ease of navigation, the selection available, product presentation, ease of use and the convenience of Web shopping. We also found a statistically significant relationship between the level of customer satisfaction and the likelihood of a repeat purchase.

In this paper the analysis focuses on the relationship between the shopping experience, that is, the level of customer satisfaction, and the outcome of the shopping process, the total monetary amount of purchases made.

Estimations were made using a standard OLS estimation method. The regression equation used in the estimation is based on the demand equations derived above. In order to be able to use the OLS method we had to transform the demand equations into a linear form by a logarithmic transformation. The log-linear regression equation can be written as follows:

\[ \ln \text{PURCHASES}_i = \alpha_1 \ln \text{INCOME}_i + \alpha_2 \ln \text{CUSTSAT}_i + \beta_1 \text{D25} + \beta_2 \ln \text{INTERFACE} + \epsilon_i, \quad \epsilon_i \sim N(0, \sigma^2), \quad i = 1, 2 \ldots, 54 \]  

where \text{PURCHASES}_i is the value of purchases made by participant \( i \) expressed in US $, \text{INCOME} \_i \), the average monthly disposable income of participant \( i \)’s occupational group and \text{CUSTSAT}_i, the level of satisfaction related to the whole shopping process. The level of satisfaction is measured as the average value of the four survey questions (three online and one offline) measuring the shopping experience. D25 is a dummy variable that is used to capture the effect of the ‘free riders’ who only took advantage of the discount coupon and purchased for less than US $25. The threshold value was arbitrarily determined. However, we considered several other values ranging from US $22–30, but the results were not significantly affected. The variable \text{INTERFACE} is a dummy variable that accounts for the direct effects of the alternative interface designs on the amount of purchases. The variable is given a value zero for a list-type interface and a value one for a map-type. The error terms \( \epsilon_i \) are assumed to be normally distributed with a zero mean.

The results of the estimation are shown in Table 1. The \( t \)-values of the parameter estimates are shown in parenthesis below the estimates. Both income and customer satisfaction have a strong statistically significant positive relationship to the value of the purchases made. Interestingly, in the full model where the direct effects of both customer satisfaction and the interface variable are included, the interface design does not appear to have any direct effects on the monetary value of purchases. This result is similar to the findings of Westland and Au (1997). These results, together with our previous findings, indicate that although interface design does not directly alter consumers’ purchasing behaviour, it does have a significant indirect effect via the shopping experience.

DISCUSSION AND FURTHER RESEARCH

This paper concentrates on the effects of Website design on customers’ shopping experience and the relationship between the shopping experience and purchasing behaviour. Our research has been motivated by previous studies, in which the results appear to be somewhat contradictory. Some studies, such as Ahola et al. (2000), Jarvenpaa and Todd (1997) and White and Manning (1997), have suggested that there is a close relationship between the navigational features of a Web shop, the

<table>
<thead>
<tr>
<th>Table 1. The Monetary Sum of Purchases and Level of Customer Satisfaction</th>
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<tr>
<td><strong>Full model</strong></td>
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<tr>
<td><strong>INCOME</strong></td>
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<tr>
<td>(4.12)</td>
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<tr>
<td><strong>CUSTSAT</strong></td>
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<td>(2.50)</td>
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<tr>
<td><strong>D25</strong></td>
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<td>(–9.92)</td>
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<tr>
<td><strong>INTERFACE</strong></td>
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<tr>
<td>(0.18)</td>
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<tr>
<td><strong>R²</strong></td>
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<td><strong>JB°</strong></td>
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* Statistically significant at 5% level
** Statistically significant at 1% level
° Jarque–Bera test for residual normality
shopping experience and consumers’ attitudes towards Web shopping. The customer satisfaction model developed by Lee, proposes that repeat purchase is determined by customer satisfaction. However, the findings of the study by Westland and Au (1997) were somewhat different from the above. Their results implied that alternative Web shop interface designs do not affect consumers’ purchasing behaviour.

In the experiment we signed up volunteers who performed actual purchases in a Web-based grocery shop, which was designed as a department of a supermarket in Oulu, Finland. The participants of the study used two alternative interface designs of the shop, namely conceptual maps and a conventional list-type presentation. The shopping experiences were recorded with online and offline surveys. The total sums of the purchases made were also recorded.

The results of this study, together with our earlier results in Koivumäki et al. (2000), shed some light to the contradictory evidence discussed above. The main findings of our earlier study can be summarized as follows:

- In a Web-based grocery shop a conceptual map type interface leads to higher level of customer satisfaction than a traditional list type interface.
- The following interface-related variables have a positive effect on customer satisfaction: clarity of the interface, usefulness of the Web shop, interactivity, ease of navigation, product presentation and ease of use.
- There is a statistically significant positive relationship between the level of customer satisfaction and the likelihood of a repeat purchase.

In this paper we estimated a regression model in which consumers’ actual purchases were explained with their income, their shopping experience and the type of interface used in the shopping situation. The regression equation was based on the demand equations derived from consumer optimization theory. The results showed that: both income and customer satisfaction have a strong, statistically significant, positive relationship to the value of the purchases made; and that the interface design did not seem to have any significant direct effects on purchases.

Based on this result and the results from our previous study, we can conclude that the interface design does not directly alter consumers’ purchasing behaviour, but that it does have a significant indirect effect through the shopping experience.

These results have important implications for online vendors and Internet storefront designers. Inclusion of enhanced hypertext features, such as conceptual maps, in the Web shops increases the positive navigational experience of the customers. Based on our previous research navigational experience is one of the main components of the overall shopping experience, and hence one of the main contributors to success in online business-to-consumer commerce.

Because of the importance of the navigational experience, Website designers have to analyse customer online behaviour carefully. As noted in Hoffman and Novak (1997) consumer navigational behaviour can be divided into two broad categories: experimental behaviour, which they characterize as having unstructured and frequently changing goal hierarchy, and goal-oriented behaviour, which is based on static clearly defined goal hierarchy. The design that leads to a positive navigational experience in a situation where consumers are browsing in an experimental or exploratory mode is very likely to be notably different from that suitable for goal-oriented navigational behaviour. Complicated and flashy designs that include, for example, animations and virtual reality features may work well in Web shops that sell, for example, video games, but may not be at all suitable for online grocery shops where the navigational behaviour is very goal oriented. Westland and Au (1997) found no statistically significant difference in sales revenues between alternative interface designs, including virtual reality storefronts in general.

The ‘right design’ is situation-specific, and features such as the target market and the nature of the offering are among the key features that have to be taken into consideration in interface design. Our research shows that increased customer satisfaction not only leads to an increased amount of purchases made, but also to higher customer retention. Hence, the money spent on analysing customer behaviour both online and offline is very likely to pay off in increased future revenue.

References


