

# CUSTOMER TRANSACTION BEHAVIOR ON THE INTERNET: AN EMPIRICAL STUDY

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## **Introduction**

We know virtually nothing about how average people may use the Internet for on-line shopping. In the last few years computers have diffused more widely into households, and are being applied to wide range of tasks (Venkatesh 1996). At the same time, more and more people continue to purchase computers for home use. It is believed that the percentage of households with computers has increased from 15% in 1984 to about 43% in 1998 (Burrows et al. 1998). By 1996, a significant proportion of these home computers were being used for online connections to the Internet. Unfortunately, little systematic evidence exists as to who may use the Internet for on-line shopping, and who may not.

The growth of the Internet as a viable channel critically depends on the extent to which consumers make the transition to this electronic medium. We postulate that the following will be critical in determining the transition rate:

1. Differences between the Internet and traditional channel such as convenience, price and security.
2. Demographic characteristics of customers such as income, gender and age.
3. Experience with Internet as an information source.

## Method

The data analyzed here come from HomeNet, a field trial of residential Internet use, in which a sample of 110 households (229 individuals) were given Internet access in exchange for providing a variety of data source on their use of the Internet and their beliefs about it. When these analyses were conducted, all participants had access to the Internet for at least a year. Although this HomeNet sample is demographically more diverse than the population of Internet users in 1995, who were predominantly white, professional males (Andersen et al, 1995).

Custom-designed logging programs tracked the participants' actual use of the Internet. The usage data have been summed on a weekly basis to increase reliability. We derived the following usage metrics from the usage records: 1) *Sessions*, 2) *Internet hours*, 3) *Electronic mail use* (Personal messages sent and received) and 4) *World Wide Web use* (number of web sites visited).

At the beginning of their participation, each participant who was at least 10 years old completed a pretest—a long questionnaire assessing their computer skill, and attitudes; demographic characteristics including age, gender, education, income, race and family size; and personality measures of innovativeness, and sociability. We used a five-item scale to measure perceived computer skills (e.g., “I am very skilled at using computers.”; Cronbach’s Alpha = 0.86) and a twelve-item scale to measure the perceived value of computer of home computers across several domains (Cronbach’s Alpha = 0.83). We adopt a scale to measure the innovativeness construct. We included a measure of *sociability*, using Social Extroversion Scale (Cronbach’s Alpha = .74).

We measure three main constructs that capture the attitude of the respondents towards the Internet.

1. Convenience. We included six items to measure this construct. They are product variety, speed, degree of customization, information on order status, and time (24 hours flexibility.)
2. Cost. We included three items for this construct. They are discount, price expectation, and search cost.
3. Security. We used two items for this construct, namely, privacy and security.

The dependent variable of our model is the level of purchase on the Internet. Essentially, the measure is an ordered level of usage of Internet. At the lowest level, we have respondents who limit their purchase behavior only to conventional channels such as departmental stores, book stores, etc. At the intermediate level, we have respondents who buy using the traditional channels but exploit information on the Internet about products and services. We believe that these customers are more likely to become Internet shoppers when compared to the ones who shop in traditional outlets, and do not use any information on the net. At the highest level, we have respondents who have already started buying on the Internet.

We aim to exploit the inherent ordering information in the dependent variable. Thus we use an ordered probit model for our analysis. As noted earlier, our sample size ( $n=182$ ) is limited. Therefore, we do not want to estimate a large number of parameters. In order to be parsimonious, we represent the three constructs, convenience (6 items), cost (3 items) and security (2 items) by factor scores. Essentially, we do a principal component analysis for each construct and take the scores obtained from the first factor. In the case of convenience, the first

factor explains 45% of total variance, while the values for cost and security are 56% and 64% respectively.

We include the factor scores along with a set of explanatory variables in estimating the ordered probit model. These variables include the three factor scores, Internet use, and gender. We also include three control variables. They are generation (adult or child), income and innovativeness.

## **Results**

We find that importance of convenience is an important driver to purchase on the Internet. The parameter is highly significant and is in the expected direction. Note that we used the factor score for the construct. Flexibility, speed and selection were the items that loaded heavily on this factor. The finding supports the notion that the key benefit to be derived from the Internet purchase is convenience.

Importance of lower price expectation for online transactions on the Internet, according to our analysis, is not a significant factor. We do find that security concerns adversely affect the probability of on-line purchase. This effect, however, is only marginally significant. Two factors are likely to attenuate this issue over time. First, as customers become familiar with on-line transactions and engage in secure on-line purchases, security concerns may become less of an issue. Second, increasingly more secure software will become standard for secure on-line transactions, alleviating this concern.

Consistent with our expectation, we find that Internet usage has a positive impact on on-line purchase behavior. This effect underscores the impact of learning and familiarity with Internet before engaging in on-line transactions. We have also used the number of email messages (sent and received), as well as

number of world wide web sites visited as two separate measures of Internet use with similar results.

We find that there is a gender bias in terms of on-line purchases. A generation gap also emerges for on-line purchases and at least *prima facie*, in the unexpected direction. While children use the Internet more than adults, their on-line purchase behavior is lower than adults. Clearly, children have little or no access to credit and this easily explains the finding. Somewhat surprisingly, income is not a key determinant of on-line purchase behavior. One might have suspected that higher income households might value convenience (higher search cost) more than others. Finally, we find that respondents who self-report themselves as more innovative are more likely to engage in on-line purchase than others. The result is consistent with a large marketing literature on diffusion models (Rogers 1983).

### **Conclusion**

Our field study imposes a number of limitations and our findings have to be examined within the context of these limitations. To begin with, our sample size is modest. Given that we provided a free computer and on-line access, it is easy to see as to why a large sample size is not feasible from a resource point of view. Our study required close monitoring of households over an extended period of time. To secure co-operation of the households, we sought the help of schools in the area as well as local community groups.

In a controlled field experiment, we identify factors that influence on-line transactions. Convenience is a major driver while lower price expectations, at least during the time frame covered by the study, is not much of an issue. Security concerns impede the use of Internet for on-line purchase. Those who

use the Internet more are more likely to purchase on-line. A worrisome finding is that women not only use the web less but are less likely to purchase on this channel. Within the confines of our data, income, race, education or level of computer skill do not affect Internet purchase behavior significantly.

Our study is largely exploratory and provides some preliminary results of interest. Yet much of the literature on the Internet arena is anecdotal in nature and devoid of systematic empirical analysis. Our modest empirical study takes a first step in that direction. A number of findings are consistent with what one would expect. Perhaps the real interesting findings of our study are the issues that make compelling logical sense yet find weak or no empirical support.

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