

A latent class segmentation analysis of e-shoppers

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Abstract

We apply a latent class modeling approach to segment web shoppers, based on their purchase behavior across several product categories. We then profile the segments along the twin dimensions of demographics and benefits sought. We show that benefits sought can provide more diagnostic information than mere descriptive demographic profiling. Our study has some interesting findings that shed light on consumer perceptions and behavior with respect to online commerce. First, consumers are more concerned about web attributes that are associated with perceived losses than with web attributes that consumers associate with gains. Second, compared to other online purchase-related attributes, getting the lowest price does not appear to be a very important attribute for web shoppers. This finding may also indicate that prices on web pages are somewhat similar, and consumers are moving on to other criteria to continue their evaluation process. Third, demographics do not discriminate between web buyers even though that has been the traditional focus with the Internet. Fourth, there is a large segment of web surfers who dislike buying on the Web; the predominant reason for this appears to be their perception about the security of sensitive information. This segment feels that not only is it the most important of all attributes for online commerce, but also that the Web does a very poor job on this attribute/benefit.

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1. Introduction

The advent of the Internet is arguably one of the most important innovations related to the field of marketing. Its diffusion rate has been quite amazing. The number of Internet users over the age of 16 in the US and Canada went up from 58 million in September 1997 to 79 million in June 1998 to 92 million in April 1999 (CommerceNet Research Center, 1998, 1999). There has been a parallel increase in the number of sites, e.g., in March 1999, there were more than 51 million such sites—approximately a 60% increase from the 32 million hosts in March 1998 (Netsizer Reports, 1999). An understanding of the interface between marketers and consumers assumes greater importance in the face of this unprecedented growth.

To effectively target e-shoppers (we define them to be those individuals who make online purchases or make online price comparisons and then buy from online stores, using their toll-free telephone number), it is vital for companies to try and understand the nature of heterogeneity

in consumer preferences. The Web has made geographical boundaries weaker than ever before. This is one of the reasons why the e-firm is faced with dealing with customers who might be quite different from one another in many ways. Marketers have traditionally dealt with heterogeneity by segmenting the market. A similar approach has been considered to be relevant for Internet marketing. For example, Burke (1997) had raised the issue of heterogeneity of consumer markets in the context of Internet marketing. Similarly, Peterson et al. (1997) had also stated that an important unanswered research question relates to how retailers can segment online shoppers.

Even though there is little academic research, trade publications have paid attention to this important subject in the e-domain. Examples of trade articles directly addressing the segmentation topic are those by Miller (1996) and Berry (1999). Berry (1999) says that customer segmentation is crucial for the success of electronic commerce. Miller (1996) has concentrated on using demographics to depict the profile of Internet users. Many other industry surveys have focused on the demographic characteristics of web surfers and buyers. While demographic information is useful, that alone provides little *diagnostic* information about web users.

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Unlike the traditional demographic-based profiling studies, we believe that it is vital to understand the needs that consumers have with respect to being involved in commerce on the Web. *Diagnostic* rather than merely *descriptive* information about individuals should help firms make better decisions about their marketing strategies. For consumers within each segment, in addition to demographics, we want to know what are the important benefits that they seek from online stores, what are the risks that they perceive and most crucially how they perceive the online stores' performances on these important attributes. This would help an e-retailer to reallocate its limited resources, from sectors that are of low importance to the consumers to sectors of high importance. For example, if consumers believe that online stores do poorly on quality of information, but it is of high importance for them, then Internet stores can redesign their web sites and increase the quality of information. On the other hand, if consumers are more interested in obtaining lower prices, then resources allocated for web development can be reduced and the resultant saving applied towards achieving price reductions.

Specifically, our focus in this paper is on uncovering segments that describe the e-shopper and on investigating the nature of these segments to get some diagnostic information. We use a phased approach to reach this objective. First, we *identify* segments in the market on the basis of individuals' purchase behavior patterns. This identification is done using a latent class modeling approach. Second, we profile these segments on the basis of demographics. Next, we examine if there are meaningful differences in demographic characteristics between the different segments. Third, we profile these same *latent segments* on the basis of benefits sought. The comparative benefit segment profiles are then studied with the help of two-dimensional perceptual maps. We argue that profiling segments based on benefits sought provide more effective information than mere demographic profiling. The benefit perspective is captured by the dual dimensions of how consumers *perceive* the performance of the Web on benefit attributes, and how *important* these benefit attributes are to the e-shoppers.

In Section 2 of the paper, we look at the overall framework of our segmentation research, and draw from work in the literature to discuss how individuals might perceive the benefits and risks of the Web. In Section 3, we describe our methodology and the data. The results of our data analysis are detailed in Section 4. In Section 5, we first summarise our research and then discuss the managerial implications of our findings.

2. Problem conceptualization

In this section, we start by looking at some articles that have examined consumer demographics in the backdrop of Internet user profiling studies. The purpose is not to do an exhaustive literature review but rather to get an idea of the

current view in the field about the profile of web users. Secondly, we discuss our segmentation approach and the nature of variables that we will investigate in our empirical analysis, and articulate some of our expectations about how consumers might evaluate and also judge the importance of these Web-related attributes.

2.1. Age

Miller (1996) dispels the popularly held notion that cyberspace is the domain of young people. He reports that baby boomers in their 30s and 40s are nearly as likely as younger adults to use the Internet. Overall though, Miller finds that it is meaningful to use age as a variable to come up with meaningful segments for Internet users.

2.2. Gender

A study in August 1999 (Harris Interactive, 1999) found that the number of women who plan to shop online in the Christmas season of 1999 is substantially larger than the number of men. Another research (NPD Research, 1999) found that the female segment will soon outnumber male shoppers in every product category that the survey examined. Another marketing research study (Nielsen Media Research, 1998) had also drawn up market segments mainly on the basis of age and gender.

2.3. Income, education

In the travel literature, there have been some studies (e.g., Furr and Bonn, 1998; Schonland and Williams, 1996) that look at the characteristics of Internet users. These suggest that Internet users have higher incomes and hold higher educational degrees.

2.4. International studies

A study in Denmark (Dansk Statistik, 1999) found that over half the users are young—between 16 and 29 years of age. Similar studies in Russia (Comcon, 1999) have looked at age, gender, occupation and education as classifying variables. A study in France (Novatris, 1999) looked at gender as the primary distinguishing variable while British studies have built profiles based on income, gender, age and occupation (BBC Online, 1999; CommerceNet News and In The Press, 1999).

From the above, it is evident that the industry has tried to delineate web user groups on the basis of demographic variables.

2.5. Our segmentation approach

What is the best way to look at the market segmentation problem for online marketing? The answer, we believe, is to look at the problem from a benefit segmentation viewpoint.

Benefit segmentation provides diagnostics not available from demographic segmentation. This is very important when a marketer is trying to understand its audience and how it will behave. Researchers from the early days of work (Haley, 1963, 1983) in this field to more modern times (Rangan et al., 1992; Shoemaker, 1994) believe that benefit segmentation provides a valuable window into the mind of the consumer. We pursue the present research with the same perspective.

What does the Web offer consumers and what do consumers seek from the Web? Ghose and Dou (1998) have examined what the Web offers by doing a study of the impacts of web site design features on site quality. Convenience in shopping is one of the most obvious advantages. Similarly, the ease with which information can be accessed is also a strength of the online environment. Security of information (e.g., related to credit card transactions) is a primary worry for potential e-commerce consumers. Kotler (2000) also mentions that consumers have ethical concerns about Internet vendors. In sum, the electronic commerce environment is a mixed bag, characterized by both positive and negative dimensions.

In our research, we break down some of the above dimensions into more specific attributes that are relevant to consumers considering purchase on the Web. For example, we consider specific attributes related to customer service, vendor reliability, financial security, convenience/ease of use of the Web-based system of merchandising and price. It is commonly heard that easy access to information should lead to competitive prices on the Web. We would, therefore, expect consumers to perceive that price levels are generally on the lower side in online markets.

We would expect consumers to agree on the fact that convenience is a positive part of the experience of shopping online. The same logic applies to the availability of information about products. We would like to *hypothesize*, however, that the weaknesses of online marketing, such as security issues, would be extremely prominent in the minds of the potential customer. Prospect Theory (Kahneman and Tversky, 1979) clearly indicates that *losses* loom larger than *gains* in the minds of individuals. In the spirit of that principle, we argue that people would be much more worried about the potential pitfalls in the Internet shopping experience than enamored with its attractions. For example, we suggest that attributes related to credit card security or vendor reliability would be perceived by respondents to be extremely important.

In our research, the focus then will be to investigate the nature of benefit segments that exist in Internet marketing. With respect to such characteristics, we will examine how consumers perceive the Web to be performing on these attributes and how important do they think these attributes are in an online shopping context. While we expect distinct benefit segments to exist, we also believe that there will be some commonalities in segment perceptions. For instance, we do expect that consumers in general will perceive

expected loss-creating attributes (e.g., security) to be more important than expected gain-creating attributes (e.g., convenience-type features such as ease of contacting vendor, etc.). However, we do expect substantial heterogeneity in the importance perceptions of different attributes across consumers.

3. Analysis

3.1. Modeling approach

Let consumer i derive utility U_j^i from making an online purchase in category j . This utility can be deconstructed into a deterministic component β_j^i and a stochastic component ϵ_j^i . While the deterministic component captures the consumer i 's intrinsic preference for the benefits of online purchase in category j , the stochastic component allows for random factors, like promotional price cut, attractive web site, etc., which may influence consumer's purchase decision at an Internet store. We assume the stochastic components to be independently and identically distributed as extreme value of Type II. This allows us to specify the probability of consumer i making a purchase in category j , in terms of logit function as:

$$\text{Prob}(\text{Buy})_j^i = \frac{\exp(\beta_j^i)}{1 + \exp(\beta_j^i)}. \quad (1)$$

We observe the consumer's purchase decision across several product categories and this presents a modeling problem somewhat different from the traditional conditional multinomial logit framework. In standard brand choice literature, consumers choose one brand from a set of K brands. This is called 'pick 1/ K ' type of data and is effectively modeled by conditional multinomial logit. In our case, the consumer can choose to buy from any number of product categories. This is called 'pick any/ K ' type of data and one cannot use the standard multinomial logit. The likelihood of observed choice behavior across j categories, for consumer i , therefore becomes:

$$\Lambda^i = \prod_j \left(\frac{\exp(\beta_j^i)}{1 + \exp(\beta_j^i)} \right)^{\omega_j} \left(\frac{1}{1 + \exp(\beta_j^i)} \right)^{1-\omega_j} \quad (2)$$

where, $\omega_j = 1$ if the consumer i buys from product category j and 0 otherwise.

The sample likelihood can be obtained as:

$$\Lambda = \prod_i \Lambda^i. \quad (3)$$

3.1.1. Segmentation

The heterogeneity in the sample is captured by assuming that there are k latent segments in the markets (Gupta and Chintagunta, 1994). All members of a segment display the same intrinsic preference for making a purchase in a given category. Let the intrinsic preference of all members of

segment k , for making an online purchase in category j , be β_j^k . We do not know, a priori, to which segment a particular consumer belongs. Let the probability of a given consumer, belonging to segment k , be given by π^k . Then the unconditional probability of consumer i making a purchase in category j will be given by:

$$\text{Prob}(\text{Buy})_j^i = \sum_k \frac{\exp(\beta_j^k)}{1 + \exp(\beta_j^k)} \pi^k. \quad (4)$$

We allow the segment probability to have a logit distribution (Gupta and Chintagunta, 1994). Therefore:

$$\pi^k = \frac{\exp(\lambda^k)}{1 + \sum_{k=1}^{K-1} \exp(\lambda^k)}$$

where K is the total number of segments. The sample likelihood in Eq. (3) accordingly changes to:

$$\Lambda(\bar{\beta}, \bar{\lambda}) = \prod_i \prod_j \sum_k \left(\frac{\exp(\beta_j^k)}{1 + \exp(\beta_j^k)} \right)^{\omega_j} \times \left(\frac{1}{1 + \exp(\beta_j^k)} \right)^{1-\omega_j} \left(\frac{\exp(\lambda^k)}{1 + \sum_{k=1}^{K-1} \exp(\lambda^k)} \right). \quad (5)$$

Maximizing the likelihood allows us to measure segment-specific preference for the different categories. The parameters of this model are estimated to be conditional on a prespecified number of latent segments. We initiate the estimation process by first calibrating a single-segment model and then a two-segment model, a three-segment model and so forth, until the additional parameters required for an additional segment do not lead to any significant improvement in model fit. The model has the most optimum fit to the data when the Bayesian information criterion (BIC) is minimized. The BIC is given by $\text{BIC} = -2\Lambda + k\ln(N)$, where Λ is the log likelihood, k is the number of parameters and N is the sample size. For additional support, we also estimate the Constrained Akaike Information Criterion (CAIC). CAIC is calculated as $-2\Lambda + k(\ln(N) + 1)$. CAIC penalizes overparameterization more strongly than the BIC.

3.1.2. Demographic profile

After the parameter estimates were obtained, consumer i 's probability of belonging to segment k was determined from:

$$\text{Prob}_k^i = \frac{\hat{\Lambda}^i \hat{\pi}^k}{\sum_k \hat{\Lambda}^i \hat{\pi}^k}$$

where $\hat{\Lambda}^i$ is the estimated likelihood for consumer i and $\hat{\pi}^k$ is the estimated probability of belonging to segment k . For

each consumer, the probability of belonging to each segment was calculated and was used to assign them to the segment for which the probability was the highest. This was followed by measuring the mean demographic characteristics of the different segments.

3.1.3. Perceptual maps

The respondents were asked to evaluate the Web-based stores on several attributes on a Likert-type scale. They had to also indicate on a similar Likert-type scale how important these attributes were for them. In the measurement literature, there has been some debate about whether a Likert scale is purely of the interval type or whether it more closely resembles an ordinal-type scale. While some scholars treat Likert scale as interval data (McIver and Carmines, 1981), others consider it to be ordinal in nature (O'Brien, 1979a,b; Bornstedt and Borgatta, 1981). We decided to be conservative and treat the Likert scale data to be ordinal in nature. We then used Thurstone Case V scaling (Green and Tull, 1978, p. 179) to convert these data into an interval scale. For each segment and for both evaluation and importance scores, we used Thurstone Case V analysis (Thurstone, 1959) to transform the data. For performing Thurstone Case V analysis, we used the Paulssoft software developed by Advanced Software Technology. The resultant evaluation ratings were plotted along the abscissa and the importance ratings along the ordinate to prepare the perceptual maps.

3.2. Data

The data were collected through an online survey. The survey was advertised on Yahoo, Netscape and WebTV. Responses were boosted by offering three cash prizes of US\$250 each. The respondents were presented with a list of product categories and, for each category, they had to indicate whether they buy in that category from online stores or not. We took care to include a variety of categories such that the set was fairly representative of the market. We gave detailed emphasis to computer hardware, software and electronics, as they are the leading product categories being sold on the Web (www.forrester.com). According to a report cited at Nua.ie website, computer products and consumer electronics retailers will continue to reap the most benefits from online retailing, with revenue in these sectors expected to grow to US\$59.7 billion by 2004 from US\$7.5 billion in 1999. We decided to include both hardware and software as they differ in terms of their price and short- and long-term implications. Software seems suitable for selling over the Internet for a couple of reasons. First, it is one of the few products that can be delivered over the Web. Second, it is also one of the few categories that can be evaluated prior to online purchase. We also wanted to include services and therefore included legal and investment choices, as they appear to be the fastest-growing sector in the online service

Table 1
Model fit based on BIC and CAIC

Segments	Likelihood	Number of parameters	Number of respondents	BIC	CAIC
2	– 4164.52	21	1330	8480.096	8480.111
3	– 3994.16	32	1330	8218.486	8218.511
4	– 3959.36	43	1330	8228.013	8228.045

sector. Food and beverages have been a well-researched category in traditional marketing research (e.g., scanner data-based studies), so we wanted to examine it in an online context. We also wanted to examine a category that is not a high-technology item and is commonly purchased online and thus chose music tapes.

In addition, respondents were asked to evaluate online stores in general on 11 attributes. They also had to indicate how important these attributes were for them. These two kinds of attribute ratings give an idea of the benefits that respondents perceive vis a vis online shopping. These benefit-related questions are reproduced in Appendix A. The responses were measured on a Likert-type scale. The scale for web evaluation had five rating scale categories and was anchored by *Strongly Disagree* and *Strongly Agree*. Similarly, the scale for importance ratings was anchored by *Very Important* and *Not Important At All*. In addition, they had to provide demographic details, which were used to prepare the demographic profile.

Online surveys offer some advantages and also some disadvantages. While printing costs, mailing costs, etc., place an upper limit on the number of print surveys that can be administered, the zero marginal costs on the Internet make it theoretically possible to administer the surveys to the entire Internet population. In fact, one can easily conduct surveys across national frontiers. Moreover, the Internet allows for very quick feedback. If the surveys are properly designed, it is possible to program data collection such that consumers directly feed their responses into an online database. This can avoid costly and time-intensive manual entry of survey responses into a database.

It is worth noting that the Internet has not penetrated completely in the US population. If one is studying general consumer behavior, it may introduce a systematic bias in the sample representativeness as most of the consumers with Internet access are more educated and well-off than the average citizen. Our sample, however, suffers relatively less from this bias as our interest is in studying the ‘online’ consumer and not the ‘generic’ consumer. If we had collected the data through print surveys, we would have to make expensive prescreening phone calls to restrict survey mailings to only those who shop online. However, our survey suffers from the problems of self-selection and self-reporting that are associated with the convenience sampling-type approach used. Even though the survey was administered to everybody on the Web, survey respondents self-selected themselves as panel members. Answers to survey questions about Internet usage are self-reported. Self-selection and self-reporting are two limitations of this survey. Self-reported data in any kind of survey are subject to the fallibility of people’s memories, idiosyncratic scale use and even deliberate alteration through social desirability biases.

4. Results

The sample had 1330 respondents. The average age of the sample was 39.3 years with a standard deviation of 12.9 years. Around 83% had received some college education with nearly one third of the sample being college graduates. Nearly 5% of the sample had doctoral degrees. One third of the respondents were women. The modal income was between US\$40,000 and US\$49,000, with about one tenth of the respondents in each of the following groups: US\$50,000–74,999, US\$75,000–99,000 and over US\$100,000 per year. Nearly half of the respondents were divorced, single or widowers. Over two thirds of the population had more than a year of Internet experience. There was sufficient diversity in the population. The sample

Table 2
Segments’ preference for online shopping

Parameter	Segment 1	Segment 2	Segment 3
Computer hardware <US\$50	– 0.0242 (0.1719)	– 3.7578 ** (0.2968)	1.6081 * (0.7195)
Computer hardware >US\$50	0.3179 * (0.1598)	– 3.3764 ** (0.2502)	1.8334 (1.4080)
Computer software <US\$50	1.6403 ** (0.2303)	– 2.5001 ** (0.1658)	1.3737 ** (0.4438)
Computer software >US\$50	1.1150 ** (0.2723)	– 3.5060 ** (0.2984)	1.2131 (0.8291)
Home electronics <US\$50	– 4.4744 (5.8749)	– 4.0215 ** (0.4909)	1.0328 ** (0.3602)
Home electronics >US\$50	– 6.8785 (7.0813)	– 3.8768 ** (0.5002)	0.9445 (0.9832)
Legal services	– 4.3162 ** (0.6405)	– 4.5510 ** (0.3562)	– 2.2384 ** (0.4030)
Food/condiments/beverages	– 2.8943 ** (0.2815)	– 3.4998 ** (0.2136)	– 1.7902 ** (0.3105)
Investment choices	– 1.6453 ** (0.2356)	– 2.6164 ** (0.1613)	– 0.5962 ** (0.2176)
Music CDs/tapes/albums	– 1.9381 ** (0.3019)	– 2.9285 ** (0.1665)	– 0.4876 * (0.2159)
λ	0.9995 * (0.4931)	2.0101 ** (0.3745)	1

The numbers in parentheses are the standard errors.

* Significant at the .05 level.

** Significant at the .001 level.

Table 3
Demographic profile of the segments

Variable	Segment 1 ($n^a = 309$)	Segment 2 ($n^a = 909$)	Segment 3 ($n^a = 112$)
Age (mean)	38.94 ($\sigma = 11.71$)	39.75 ($\sigma = 13.38$)	36.29 ($\sigma = 11.32$)
Education			
Grammar	0.3	1.4	Nil
High school or equivalent	3.9	12.3	7.1
Vocational/technical school (2 years)	3.6	6.7	3.6
Some college	26.5	34.4	33.0
College graduate (4 years)	33.3	26.6	28.6
Master's degree (MS)	23.0	13.1	21.4
Doctoral degree (PhD)	8.7	3.9	5.4
Others	0.6	1.5	0.9
Gender			
Male	78.3	61.5	80.4
Female	21.7	38.5	19.6
Income			
Rather not say	2.3	6.6	5.4
Under US\$10,000	4.5	7.2	2.7
US\$10,000–19,999	8.1	13.4	3.6
US\$20,000–29,999	10.4	15.4	13.4
US\$30,000–39,999	9.7	12.9	7.1
US\$40,000–49,999	22.3	18.2	25.0
US\$50,000–74,999	16.8	7.9	15.2
US\$75,000–99,999	15.2	7.0	17.0
Over US\$100,000	10.7	11.4	10.7
Married			
Divorced, separated, single, widowed	41.4	47.2	45.5
Married, living with another	46.6	42.7	42.9
Rather not say	12.0	10.1	11.6
Number of years on the Internet			
Less than 6 months	2.3	20.8	6.3
6–12 months	5.8	22.0	4.5
1–3 years	36.2	32.5	29.5
4–6 years	31.7	17.5	42.0
7 years or more	23.9	7.3	17.9

The numbers indicate percentages unless otherwise indicated.

^a Number of consumers in the segment.

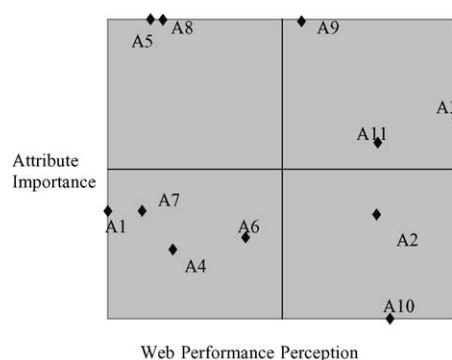
had a higher representation from more educated, upper-income segments of the population. The survey was admin-

istered online, and hence, a precondition for responding to the survey was access to the Internet. Therefore, it is not surprising that sample statistics match those of the overall Internet user profile (Clemente, 1998). According to a survey conducted by ABC News, those intending to buy online are likely to earn over US\$75,000 and have a college education (www.nua.ie).

The results of the BIC and CAIC analyses are presented in Table 1. Both the BIC and CAIC values are minimum for the three-segment solution. This indicates that the sample has three distinct segments.

The preferences of the three segments for the different product categories are presented in Table 2. A positive sign indicates that the segment has positive preference for buying from that product category on the Internet and the bigger the value, the stronger the preference that the segment has for online purchase. For example, Segment 1 buys both high-priced and low-priced computer software at Internet stores, but is more likely to buy low-priced software as compared to high-priced software. In all, we had seven product categories. Three of the categories, i.e., computer hardware, software and home electronics, were further split along the price dimension to see if there is any segment that buys only low price products. Some of the categories were physical goods, whereas some others (e.g., Investment Choices, Legal Services) were services. We had a category, i.e., Food/ Condiments/Beverages, where touch/feel was important. The choice of product categories exhibited enough variety. In general, individuals had a stronger preference for buying technical-type physical goods than for services or for touch/feel-type products. The first segment buys mainly computer hardware and software at online stores. The second segment shows strong dislike for buying anything from an online store. The last segment buys mainly standardized products costing under US\$50 at the online store. This segment does not buy high-price products.

After identifying the three segments, we evaluated their demographic profiles. Variables used for this profiling were age, education, gender, income, marital status and Internet experience of the respondents. It is evident from Table 3 that there is little noticeable difference in the demographic profiles of Segments 1 and 3. The only demographic variable



List of Attributes

- A1: Quality of Information about Purchase Choices
- A2: Easy Handling of Returns or Refunds
- A3: Ease of Placing Orders
- A4: Ease of Canceling Orders
- A5: Internet Vendor's Reliability
- A6: Easy Payment Procedures
- A7: Customer Service and After Sales Support
- A8: Security of Sensitive Information
- A9: Getting Orders/Services in a Timely Manner
- A10: Lowest Price
- A11: Ease of Contacting the Vendor

Fig. 1. Perceptual map for Segment 1.

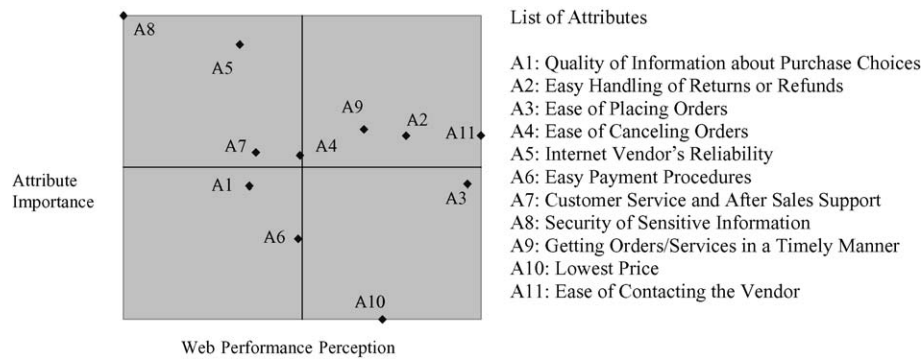


Fig. 2. Perceptual map for Segment 2.

where there is substantial difference between Segments 1 and 3, on one hand, and Segment 2, on the other, is the number of years on the Internet. It is not surprising that the second segment, which abhors the idea of buying anything on the Internet, has the least experience. Segment 1 members have the most experience and that perhaps explain why they are willing to buy computer products on the Internet. These consumers have the highest interest in computers and, through experience, they know exactly what they want in computers. They do not need to conduct prepurchase search or seek salesperson advice. So they have no trouble in buying a standardized product like computer products on the Internet.

Figs. 1–3 depict the perceptual maps for the identified segments. The horizontal axis indicates consumers' perceptions of how well the Web is providing these *benefits*. The vertical axis indicates their perceptions of the importance of these web marketing attributes. The south-west corner has those attributes that the consumers think are neither important, nor does the Web perform well. In the south-east corner are the attributes where the consumers think the Web performs well, but the attributes are not very important to the consumers. Therefore, the e-retailers are wasting resources by investing in these attributes. In the north-east corner, we have attributes where the Web performs well and which are important to the consumers. The Internet stores should continue to invest their resources in these attributes. The north-west corner is the most critical in the map. These

represent attributes that are very important to consumers, but where they believe the Web to be functioning at a very low level. The online retailers need to divert resources into improving their stores on these attributes.

5. Discussions and managerial implications

In this section, we summarize our research. We also indicate some of the key managerial implications of our empirical results.

5.1. Summary

Online buying is a topic of major interest in today's world. There is little existing knowledge about the nature of market segments of online consumers who may buy from multiple product categories. In this research, we use a modeling approach to uncover latent segments based on online consumer buying patterns. Next we profile the characteristics of the members of these segments using demographic and benefit variables, respectively. We obtained interesting managerial implications when profiling using benefit variables. We examine how the members of the different segments perceive the performance of online stores on benefit attributes and also how important these benefit attributes are to the members.

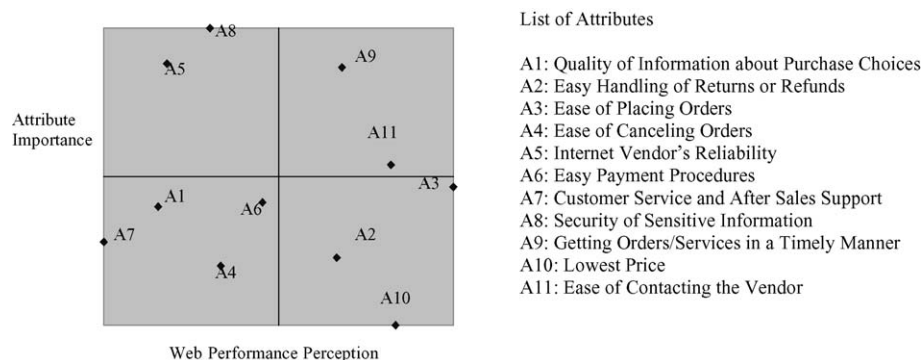


Fig. 3. Perceptual map for Segment 3.

We have used a *latent class modeling* approach based on online purchase behavior to uncover the existence of market segments. We came up with three segments that we subsequently profiled demographically and looked at their perspectives of benefits from the Web. This allowed us to identify insights of significant managerial interest. We discuss these next.

Pricing is clearly a crucial element of the marketing mix in the context of Web commerce. If we look at the positioning of attribute A10 (price), it is evident that all three clusters of individuals think that Internet stores have good prices. Interestingly, however, all the three clusters think that getting the lowest price is of little importance to them. There could be more than one explanation for such a finding. One explanation could be that getting the lowest price is *comparatively* of lower importance to electronic commerce customers. This would suggest that stores could easily increase their prices. Another explanation might be that the prices on the Web pages are fairly homogeneous. Once the acceptable price is found, the attribute of price could cease to be an important one, and the next criterion could come into play.

The most important attribute for all segments is A8 (Security of Sensitive Information) followed by A5 (Internet Vendor Reliability). This is consistent with our expectations in Section 2 where we had said that since perceived losses loom larger than perceived gains, attributes like A8 and A5 would be more important. We see that most of the other attributes are convenience/ease-type attributes with a sense of gain associated with them.

In sum, our study has some interesting findings that shed light on consumer perceptions and behavior with respect to online commerce. First, consumers are more concerned about web attributes that are associated with possible losses (e.g., security of information and vendor reliability) than with those associated with perceived gains (e.g., different convenience-type attributes). Second, getting the lowest price is comparatively a low-importance attribute for web shoppers. This finding may also indicate that prices on web pages are somewhat similar, and consumers are moving on to other criteria to continue their evaluation process. Third, demographics do not discriminate between web buyers even though that has been the traditional focus with the Internet. Fourth, there is a large segment of web surfers who dislike buying on the Web; the predominant reason for this appears to be their perception about the security of sensitive information. This segment feels that not only is it the most important of all attributes for online commerce, but also that the Web does a very poor job on this attribute/benefit.

5.2. Managerial implications

All segments not only agree that security of sensitive information (A8) is very important to them, they also feel that the Web performs poorly on this. Our empirical findings indicate that all Web-based stores should first ensure that the security of their sites is of high quality. Next they should

devote resources to changing consumers' perceptions by informing them that this quality level exists. This can be done in at least a couple of ways. The firm could provide a button on their site, which when clicked would explain to those concerned the steps that the company has taken to ensure security of sensitive information. In addition, advertising messages on TV and other media should make consumers aware of the high-security level of the firm's web site. At this point in time, we see that a large number of web sites have started advertising in the mainstream media such as TV, periodicals, etc. Most of them highlight their different benefits, but almost none of them speaks about the steps that the site has taken to guarantee the security of information. This needs to be changed.

Similarly, our respondents indicate that Internet vendor reliability is very important, but the Web-based retailers do a poor job on this aspect. Evidently, brand name manufacturers would have a decided advantage over small name players. This dispels the notion that the Web provides a level playing field to all. Perhaps small name players can counter this weakness by aligning themselves with portals/stores like Yahoo and Amazon so that the brand name "rubs off" on to them. At the very least, a small manufacturer who is thinking of opening a retail web site should get listed in a reputed portal like Yahoo, America Online, etc.

Most of the attributes related to consumer "ease" after sales (A2, A4 and A7) are viewed to be of higher importance by Segment 2 but are viewed as less important by Segments 1 and 3. Thus, Segment 2 seems to lay relatively more premium on convenience after sale. It is interesting to see that Segment 2 evaluates the Web better than the other two segments on almost all attributes except security of information. Therefore, if Internet retailers can somehow change the perceptions of Segment 2 on just this one attribute, they will have a much better chance of selling to them. They will no longer be averse to shopping online, thus opening up a potentially fertile market segment for e-retailers. This is an example of the real utility of this kind of diagnostic analysis.

What is the impact of demographics? This is an interesting issue since our review in Section 2 shows that especially trade articles and surveys are focusing a lot on the demographic characteristics of Internet users. In our analysis, we have found that there is little difference in the demographics of the segments (Table 3). It is well known that many e-firms that require registration ask surfers to fill in their demographic information. Our research would suggest that it is more important to find out how a surfer views the Web as a shopping medium. Therefore, at the time of registration, surfers should be asked to indicate the benefits that they seek. It is also worth noting that in this age of Internet privacy concerns, consumers may often be reluctant to provide personal demographic information (e.g., about age, income, etc.). In contrast, there appears to be no a priori reason to believe that individuals would be unwilling to provide benefit information. In fact, it is logical that individuals would be keen to let web firms know the type of benefits they seek from

the online retailer (Schwartz, 1997). In sum, benefit information is more useful for web firms and potential consumers are more likely to provide the firms with such information.

Future studies can extend our research in several directions. For example, a more comprehensive study may look at a probabilistic sample of consumers. However, the difficulty in obtaining a unified unbiased sampling frame would be a deterrent to appropriately using a probabilistic sampling approach. Future research should also include additional product categories such as books to further understand the perceptions of online consumers.

The Internet allows e-firms to precisely target audiences with their marketing messages (Rotfield, 1999). This is facilitated by the use of technologies like “cookies” and other similar things that allow firms to trace surfers’ search behavior. We believe that web marketers should certainly use such technological innovations and also collect demographic data, but most importantly, they must first find out what benefits the customer seeks and what risks he/she fears. An industry article by Busch (1999) also reflects this point by stating that it is important to “go beyond the bits and bytes of e-commerce and listen to the actual voice of customers.” In the beginning of this paper, we mentioned the amazing growth of the Internet. We believe that when firms use the diagnostic information available from benefit segmentation, it will reduce their potential for suffering opportunity losses. In turn, this will lead to additional growth in electronic commerce.

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Appendix A

The respondents were asked to evaluate the Web merchants on the following attributes and then to state how important these attributes were to them personally when shopping, or considering shopping, on the Web.

Quality of information about purchase choices
Easy handling of returns or refunds
Ease of placing orders
Ease of canceling orders
Internet vendor’s reliability
Easy payment procedures
Customer service and after-sales support
Security of sensitive information
Getting orders/services in a timely manner
Lowest price
Ease of contacting the vendor

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