CONSUMER SEGMENTATION ANALYSIS OF MULTICHANNEL AND MULTISTAGE CONSUMPTION: A LATENT CLASS MNL APPROACH

Quansheng Wang
Department of Marketing and Electronic Business
Nanjing University
Hankou Road 22, Nanjing, Jiangsu, P. R. China
wangqs@nju.edu.cn

Xue Yang[1]
Department of Marketing and Electronic Business
Nanjing University
Hankou Road 22, Nanjing, Jiangsu, P. R. China
yangxue@nju.edu.cn

Peijian Song
Department of Marketing and Electronic Business
Nanjing University
Hankou Road 22, Nanjing, Jiangsu, P. R. China
songpeijian@nju.edu.cn

Choon Ling Sia
Department of Information Systems
School of Business, City University of Hong Kong
Hong Kong, China
iscl@cityu.edu.hk

ABSTRACT

The prevalent multichannel shopping environment is driving many consumers to choose between online and offline channel at the information search and product purchase stages of a shopping experience. Consequently, multichannel retailers face the challenges of identifying different target consumer groups and maximizing the value of each channel by understanding and serving each group more effectively. Hence, this study attempts to identify consumer segments by examining consumers' perceived channel values at different shopping stages. The latent class MNL (LC-MNL) method, as a powerful tool that is able to detect consumer heterogeneity in the same consumption scenarios, is applied to conduct consumer segmentation analysis based on the consumer's perceived values, including channel benefits and costs, as well as different channels' characteristics. By using the survey data of 1325 consumers, results indicate two segments comprising innovative consumers and conventional consumers in terms of online vs. offline channel usage. Furthermore, the logit regressions for segments estimation illustrate that the two segments are significantly different in terms of channel attributes and consumers' intrinsic channel preferences. This study contributes to the extant electronic commerce and multichannel marketing literature by designing a rigorous consumer segmentation method which incorporates both interpretation and prediction capabilities and analyzing the underlying influential factors for different segments. The results can further provide useful guidance to marketing and sales practitioners in designing effective channel attributes to meet the needs of consumers belonging to different segments.

Keywords: Multichannel and multistage shopping; Consumer segmentation; Perceived channel value; Latent class MNL approach

[1] Corresponding author

1. Introduction

Extant research and practices strongly suggest that a large and increasing proportion of consumers are adapting to choosing between the online and offline channels for information search, educational, and/or product purchase purposes [Konuş et al., 2008; Liu et al., 2013; Rangaswamy and Bruggen 2005; Schröder and Zaharia 2008; Verhoef et al., 2007]. However, consumers are inherently heterogeneous and those with varying channel preferences or demographic characteristics may undertake channel switching for different purposes [Brunelle 2009]. Despite the prevalence of such emerging trend, many retailers possess few insights into how they can identify the potential consumer groups and consequently face enormous challenges in serving existing consumers or attracting new consumers [Myers et al. 2004; Neslin and Shankar 2009; Nobel et al., 2009; Weinberg et al., 2007]. It can thus be seen that, consumer segmentation analysis and segmentation schemes can provide systematic insights into the diverse channel choice behaviors of various consumer groups [Neslin and Shankar 2009], and at the same time enable multichannel retailers to maximize the value of each channel (such as through channel congruence) [Gabisch and Gwebu 2011], which would otherwise be much more difficult to achieve [Konuş et al. 2008].

Previous research in diversified disciplines, especially in the field of marketing, has illustrated mixed findings on consumer segmentation for different shopping channels [Bhatnagar and Ghose 2004a, 2004b; Fransi and Viadiu 2007; Ganesh et al. 2010; Keen et al. 2004; Knox 2005; Konuş et al. 2008; Kushwaha and Shankar 2006; Moe 2003; Papatla and Bhatnagar 2002; Rhom and Swaminathan 2004; Soopramanien and Robertson 2007; Thomas and Sullivan 2005]. However, existing findings on consumer channel choice in the multichannel environment are still fragmented and insufficiently comprehensive. For example, among several consumer segmentation studies, some have focused only on a single channel such as either the online [e.g., Bhatnagar and Ghose 2004] or offline channel [e.g., Bell and Lattin, 1998], respectively. Other studies investigating multiple channels did not incorporate the online shopping channel [e.g., Chen et al. 2008; Thomas and Sullivan, 2005]. In studies on multi-channel consumer segmentation, little attention has been devoted to the multistage shopping scenario, while most of them have focused on either the information search or product purchasing stages [e.g., Dholakia and Uusitalo 2005]. Two studies incorporating both multichannel and multistage consumer segmentation either lacked empirical support [Nunes and Cespedes 2003] or were perceived to have limitations regarding the selection of influential factors with which different consumer groups can be identified [Balasubramanian et al. 2005; Konuş et al. 2008; Thomas and Sullivan, 2005] .

Therefore, this study aims to address these research gaps and answer the following research questions: 1) What are the consumer segments in the multichannel and multistage shopping scenarios and, 2) What are the most useful segmentation criteria for the classification of consumers who prefer different channels for different shopping stages? 3) What are the differences in terms of the relationships between consumer perceived value factors and channel choice for different consumer segments? Compared to previous research, this study is based on a shopping scenario that mimics the actual shopping channel choice decision. First, since the behavior of online shoppers differs from that of offline shoppers [Ratchford et al. 2003; Shim et al. 2001; Wallace et al. 2004], and consumers' preferences on channels may be inconsistent across different decision stages (i.e., search vs. purchase) [Verhoef et al. 2007], this study integrates both multichannel and multistage conditions in the consumer classification process [Balasubramanian et al. 2005; Kumar and Venkatesan 2005; Schoenbachler and Gordon 2002; Venkatesan et al. 2007; Verhoef et al. 2007]. Second, we examine various dimensions of the determinants differentiating multichannel consumer segments based on the concept of consumer perceived values, including perceived channel benefits and costs, as well as some psychographic, demographic and product attribute factors [e.g., Konuş et al. 2008]. Furthermore, this study applies the latent class multinomial logit (LC-MNL) model to analyze the segmentation of multichannel consumers, which is distinguished from the traditional simple logit regression for segmentation analysis. One advantage of this model is that it enables the interpretation of individuals' different preferences on the channels for information search and product purchase by taking individual heterogeneity into account, as well as the prediction of the categorization of consumers into different segments based on their unique channel evaluation preferences. Through the LC-MNL analysis, we aim to provide a relevant, practical and managerial approach of segmenting the multichannel consumer market and proposing a design for marketing communication strategies that target different consumer segments.

To achieve the research objectives, this paper will proceed as follows. First, we review the previous research on multichannel consumer segmentation and identify the research gaps and in so doing, bridge these research gaps. Second, we present a conceptual framework with emphasis on critical factors that may enable the differentiation of multichannel consumers. Third, details of research methodology and sampling methods will be discussed. Fourth, empirical results from the LC-MNL analysis will be presented and elaborated with implications, limitations and future research directions.

2. Literature Review and Conceptual Model

2.1. Literature on Multichannel Consumer Segments

Prior empirical research has identified some possible categorizations of consumer segments in shopping channel choices. For example, consumers belonging to different product categories could be segmented into four shopping groups depending on utility measures and psychographics [Papatla and Bhatnagar 2002]. Three groups of web shoppers (i.e., in terms of segments of high/moderate/low product risk and security risk) were identified based on purchase behavior, perceived benefits, losses, risks and demographic profiling [Bhatnagar and Ghose 2004]. On their part, Rohm and Swaminathan [2004] labeled four online shopping types including convenience shoppers, variety seekers, balanced buyers, and store-oriented shoppers, according to shopping motivations of online convenience, physical store orientation, information use in planning and shopping, and variety seeking in the online shopping context. Online channel consumers were classified into three segments of young and older users, each with unique concerns about online shopping (e.g., reliability, convenience or expectations) and thus expressing varying levels of online satisfaction [Fransi and Viadiu 2007]. In addition, there has also been some initial research on multichannel consumer segments. Thomas and Sullivan [2005] identified two segments, i.e., the catalog segment and the bricks-and-mortar segment according to the impacts of product type, customer lifestyle and price sensitivity on the consumers' channel choice. Yet some other studies have identified certain fundamental differences among online buyers, online browsers and non-Internet shoppers [Moe 2003; Soopramanien and Robertson 2007]. Based on consumer attitudes, psychological, economic and socio-demographic covariates and product categories, multichannel shoppers in these studies were segmented into three types, including multichannel enthusiasts, uninvolved shoppers and store-focused consumers [Konuş et al. 2008]. The number of shopper types was found to vary with shopping motivations as well as online or offline shopping environments [Ganesh et al. 2010]. Furthermore, in these studies, most researchers found clearly defined and distinct consumer segments based on preferred channel(s) of shopping, which could be influenced by individual differences [e.g., Thomas and Sullivan 2005].

Despite their significant contributions, most consumer segmentation studies related to multiple shopping channel choice are incomplete because they have failed to consider the multi-stage purchase scenarios (i.e., the information search and product purchase stages) and the critical influential factors (e.g., benefits, costs and product categories at each stage) determining the channel choice at each stage. The increasingly multichannel nature of consumer shopping behavior requires a better comprehension of their decision processes and new approaches to monitoring and measuring their experiences with each channel. Thus, this study identifies the segmentation scheme that incorporates consumers' channel choice in the context of multiple shopping channels (online and offline), multiple shopping stages (search and purchase stages) and multiple product categories. We further argue that consumers' channel choices for different shopping stages or different product categories may be related to the perceived value derived from searching or purchasing from a particular channel [Konuş et al. 2008]. The value is reflected in the benefits and costs of channels for the search and purchase stages [Konuş et al. 2008; Verhoef et al. 2007]. In other words, we aim at observing the characteristics of consumer segments in terms of various benefits and costs for each channel choice as well as the consumer demographic information. Konus et al.'s [2008] paper is an earlier example of such a research inquiry. However, we believe that our study contributes to the literature through a different perspective, i.e., consumers' perceived value (benefits and costs), in conjunction with the multichannel, multistage and multiple product categories as the basis of consumer segmentation. The settings of the segmentation criterion are different from studies such as Konus et al.'s [2008] paper because we only focus on the online and offline channels as a general contextual characteristic, due to the rarity of the catalog channel in some contexts such as in China. In addition, we also incorporated product category (search vs. experience product) into the analysis. The guiding research framework on perceived value (benefits and costs) also provided insights in explaining how the consumer segments are basically differentiated in terms of the weights put on various types of values by consumers in the different segments. To the best of our knowledge, this is one of the early attempts to provide insights on a comprehensive set of consumer channel segmentation measures (i.e., types of channels, shopping stages and product categories) based on which individual consumers' perceived value (benefits and costs) of different channels at different consumption stages may vary..

2.2. Conceptual Model on the Theoretical Lens of Consumer Perceived Values

The conceptual model of this study has as its basis the assumption that consumers make initial judgments on their perceived values of the online or offline channels for search and purchase purposes ahead of any channel choice decision [Konuş et al. 2008]. Consistent with well-accepted definitions, consumer perceived value is defined as the result of consumers' comparisons between perceived benefits and costs [Zeithaml 1988] which can be reflected by rational, emotional or social representations (e.g., utility evaluation vs. emotional experience vs. social reputation) [Holbrook 1999]. In other words, consumer perceived value is related to the subjective evaluations of the quality or preferences for particular products, services or other objects [Woodruff 1997; Shareef et al. 2008] and could be of either a rational or experiential orientation [Hirschman and Holbrook 1982]. According to the extant literature, to maximize the perceived channel value, consumers must first assess the benefits and costs associated with searching for or purchasing a product using a particular channel (i.e., perceived channel value) [Zeithaml 1988]. The formation of a perceived value also varies with its judgment context (e.g., product type, individual characteristics or consumption stages) [Mathwick et al. 2001]. For example, consumers may consider different product or service attributes and evaluate these attributes differently at various points of time throughout the entire consumption experience, including product selection, purchase and usage [Woodruff 1997]. Furthermore, the consumer perceived value has multidimensional measures, such as functional value, social value and emotional value [Sheth et al. 1991], which enrich the definition of the general concept of the consumer perceived value.

Thus, motivated by the importance of understanding the effects of perceived value and its various dimensions on consumer channel choice, this study is based on the theoretical lens of the perceived value concept to specify the most relevant and extensive perceived benefits and costs factors for the search and purchase stages, respectively [Babin and Attaway 2000; Baker et al. 2002; Balck et al. 2002; Dholakia and Uusitalo 2002; Gutierrez et al. 2010; Reardon and McCorkle 2002; Soopramanien and Robertson 2007; Thomas and Sullivan 2005; Tse and Yim 2001; Verhoef et al. 2007] as the determinants of channel value and in turn, the channel choice decision. This perspective differs from previous segmentation research that observed consumers' general psychographic or demographic profiles instead of the explicit utility measures [e.g., Wallace et al. 2004]. In fact, our study incorporates additional psychographic and demographic factors. The focal factors of perceived benefits and costs and the detailed conceptual model are shown in Figure 1.

The conceptual model illustrates several factors which are the basis for further analysis. We base this study on the assumption that consumers normally choose a particular channel for product information search or product purchase depending on their preferences for an offline or online channel [Verhoef et al. 2007], which is an indication of their perceived channel value. In other words, the channel value is the most important determinant of a consumer's channel choice. In particular, the channel value is further divided into two dimensions for both the search and purchase stages: channel benefits and costs, on which consumers base their channel choice decisions. In addition, product characteristics, consumer demographics and channel lock-in effects could also influence channel choice [e.g., Inman et al. 2004; Neslin et al. 2006; Verhoef et al. 2007]. Based on extant literature, we posit that each of these utility-related variables may relate to consumers' choices of the shopping channels at different phases. However, because of the key focus of identifying the potential consumer segmentations based on consumers' channel choice probabilities, we do not intend to propose any a priori hypotheses on the relationships between the various variables of consumer perceived values. In the literature, each variable of consumer perceived values was found to have either positive or negative relationship with a consumer's channel choice, but we believe the effects of these variables may vary for different consumer segments. Thus, we only argue that there are possible relationships between consumer perceived value variables and channel choice first and further collect survey data based on each variable for segmentation analysis. We shall elaborate on these variables in the following sections.

2.2.1. Channel Benefits in the Search and Purchase Stages

For both the information search and product purchase stages, the channel benefits generally include information quality, service quality, product offer, product quality, accessibility, enjoyment and social value derived from using a particular channel [e.g., Babin and Attaway 2000; Lovelock 2001; Soopramanien and Robertson 2007; Verhoef et al. 2007].

Specifically, information quality refers to consumers' perceptions of the overall level of the quality of the information accuracy, integrity, comprehensiveness and explicitness provided by the chosen channel to fulfill purchase activities [Aladwania and Palvia 2002; Montoya-Weiss et al. 2003]. For example, it is usually the aim of consumers to get richer, more comprehensive and more accurate information from certain sources to reduce the information asymmetry that usually exists in the product search process [Ahn et al. 2004]. Hence, information quality is critical in determining the choice of channel(s) for an information search.

Service quality refers to consumers' perceptions on the overall quality level of the services provided by sellers of a particular channel [Cronin et al. 2000; Verhoef et al. 2007]. Service quality is essential throughout the entire shopping process, which includes pre-purchase information search, product purchase and after-sales service [Jarvenpaa and Todd 1997]. The level of service quality is determined by the speed and appropriateness of sellers' responses to consumer demands. In this sense, in the information search stage, information service quality depends on how flexibly sellers can provide useful and necessary information to consumers rather than overloading them with excessive information [Chen et al. 2009]. In the product purchase stage, sales service quality and after-sales service quality are realized through interactions between sellers and consumers to resolve problems. Face-to-face interactions take place in an offline channel while emails, online real-time communication, and online communities, are among the options available for virtual interactions. Thus, the quality of sale-related services is an important factor that consumers may take into account when choosing between different channels.

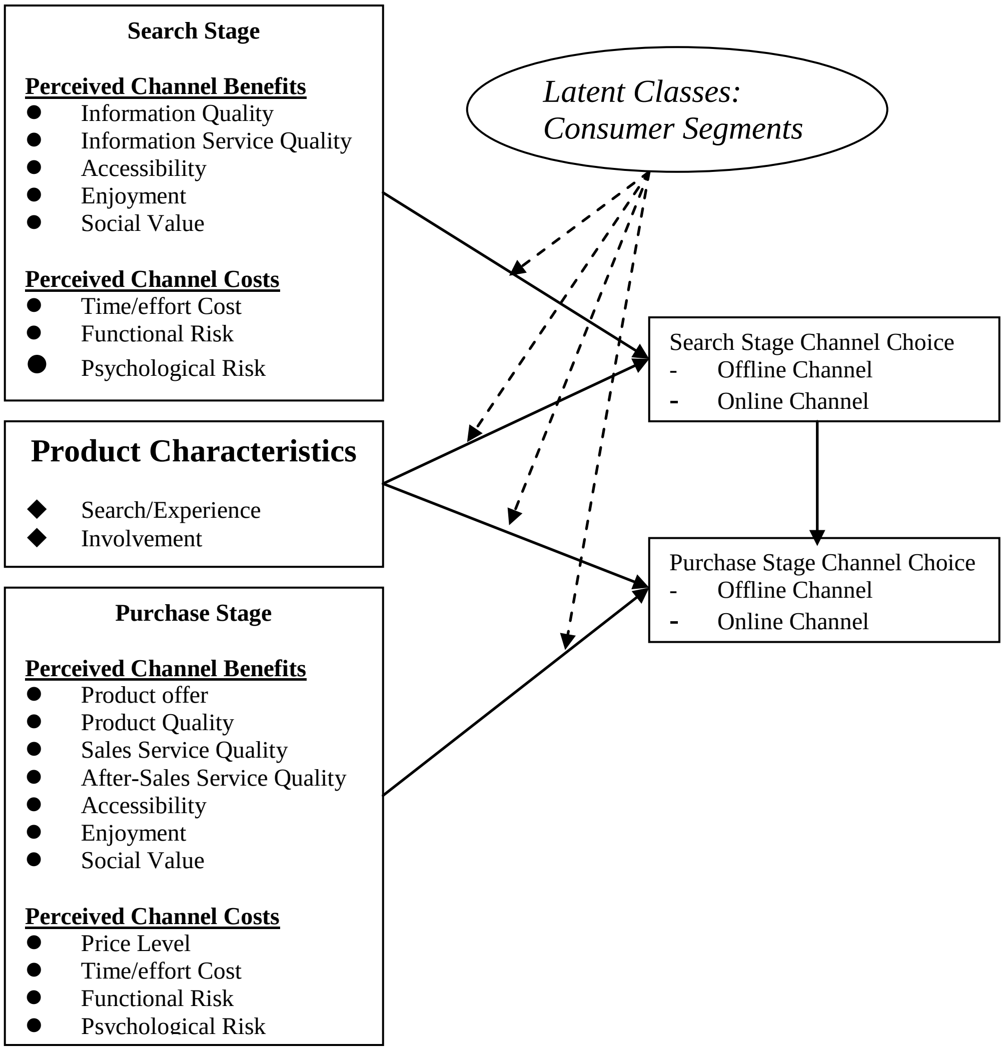

Figure 1. Conceptual Model

The product factor is critical in any purchase scenario. There are typically two dimensions relating to products. First, the product offer refers to the overall range of and the number of products that a particular channel makes available for consumers to choose from [Forsythe et al. 2006]. For example, online channels without physical space limits for their product displays are able to provide a much broader range of product categories and larger quantity of products for consumers to choose from than the brick-and-mortar stores and they also provide consumers with a sense of product richness [Brynjolfsson et al., 2003]. Amazon.com, touted as the world's largest bookstore, is a case in point. Second, product quality refers to consumers' perceptions of the overall quality level of the products presented by sellers of a particular channel in the purchase process [Sweeney et al. 1999]. Consumers are able to experience product quality through direct touch and services in an offline channel rather than through indirect description or personal understanding in an online channel [Childers et al. 2001; Mathwick et al. 2001; Zeithaml et al., 1996, 2002], thus differentiating the capability of different channels in supporting product quality evaluation.

Accessibility concerns the degree of convenience available for consumers when they visit or view a particular channel to obtain information at all times and anywhere [Black et al. 2002; Childers et al. 2001; Gehrt and Yan 2004]. Since an online channel has minimal constraints on the time and location to access [Kaufman-Scarborough and Lindquist 2002], it can enable information search and purchase activities of consumers at anytime and anywhere [Alba et al. 1997]. In some situations, consumers may also have free access to an offline channel, for instance when they are shopping at a store close to their residences or work places. Therefore, perceptions of the accessibility of each channel assist consumers in making channel choice decisions.

Consumers are inclined to be interested in the enjoyment that they experience during the information search and purchase processes, an experience which provides them with happiness, fun, entertainment, excitement, satisfaction or contentment [Childers et al. 2001; Mathwick et al. 2001; Sweeney and Soutar 2001]. From the environmental psychology perspective, it is posited that the traditional shopping environment (e.g., promotions, performance, placement of furniture, atmosphere of the shop, etc) can make the product search and comparison experience more entertaining [Babin and Attaway 2000; Holbrook, 1999], thereby, providing greater enjoyment for consumers in the searching stage. In contrast, as a consequence of the development of digital and network technologies, the online channel is able to offer more advanced and interactive options (e.g., online games, online lucky draws, multimedia product displays, dynamic multi-product comparisons, etc) for consumers so that the shopping process becomes more enjoyable [Cai and Xu, 2006; Kim et al. 2007; Marios 2002]. In other words, the enjoyment experienced by consumers would be expected to differ in the search and purchase stages, respectively.

Lastly, in the offline shopping process, consumers may derive social value through interpersonal communication and interactions according to their social status [Taher et al. 1996]. Social value reflects consumers' perceptions of being recognized, affirmed, admired, and having their self-confidence strengthened during the information search process and upon possession of information [Sweeney and Soutar 2001]. In recent years, the development of social functions in product information sharing and discussion has compensated for the limited social interaction in the online channel which may reduce the social value of online shopping for consumers.

2.2.2. Channel Costs in the Search and Purchase Stages

The perceived channel costs include the time/effort cost, functional risk, psychological risk and price level [Cunningham et al. 2005; Verhoef and Langerak 2001; Verhoef et al. 2007]. The time/effort cost is an important factor for consumers facing time constraints because they may perceive this cost as requiring more time and effort spent on searching for relevant product or service information [Baker et al. 2002; Dabholkar et al. 1996; Gupta et al. 2004; Ratchford et al. 2003; Verhoef et al. 2007]. For example, researchers have found that online buyers are mostly motivated by the convenience and the advantages resulting from time saving on an online channel [Chang and Farland 1999]. The advantages derived from the reduced time/effort cost of the online information search and purchase processes are seen as being relatively obvious to consumers [Peterson et al. 1997]. In contrast, shopping at traditional stores may incur other time/effort related expenses, such as visiting multiple locations or traffic jams, which raises the time/effort cost significantly.

The two most important risks in multichannel shopping that we examine include functional and psychological risks [Gutierrez et al. 2010]. Generally, compared to the offline channel, the online channel contains inherent risks due to its characteristics such as geographical distance or lack of direct contact, etc. Previous research has found that the perceived risks of online consumers are higher than those of their offline counterparts [Cunningham et al. 2005]. However, the effects of perceived risk may vary at different shopping stages [Gutierrez et al. 2010]. For example, perceived risk is lower for the information search and product comparison stage than the purchase stage when a consumer is using the online channel, and vice versa for the offline channel [Cunningham et al. 2005]. From this perspective, we differentiate functional risk from psychological risk; while the former refers to the risk that the information or product provided by the particular channel may not perform as expected [Forsythe et al. 2006; Sweeney et al. 1999; Verhoef et al. 2007], the latter indicates the tension and pressure that consumers experience during the search or the purchase stages [Forsythe et al. 2006;, Yang et al. 2006]. Nevertheless, we posit that consumers can search for information or products from numerous sources and purchase from different websites online with few restrictions, which can greatly reduce the perceived risk.

The relative price levels refer to consumers' perceptions of the overall price level of the products on a particular channel [Hoffman and Novak 1996; Montoya-Weiss et al. 2003; Sirohi et al. 1998]. On the one hand, the price level is more flexible for the online channel as there are no restrictions on physical space, thereby reducing the costs. On the other hand, consumers are able to benefit from lower prices through searching for and comparing prices of an extensive pool of products online, and consequently causing the prices of products sold online to be generally lower than those sold in offline channels [Brynjolfsson and Smith 2000].

2.2.3. Product Characteristics

In addition to the benefits and costs for different channels, research evidence suggests that consumers display varied channel choice preferences for different products being analyzed or under consideration for purchase (Levin et al. 2005]. Generally, products that are deemed more expensive, more complex or more risky for purchases are difficult to sell through an online channel because they may require intensive interaction with the seller or in-store contact, which is not always available online. In contrast, the online channel is better suited for standard products or those that are frequently purchased. Previous research has tended to classify these two groups of products into either the search type or the experience type [Alba et al. 1997]. For example, clothes are considered as experience products and offline stores are more suitable for purchasing them. In contrast, books belong to the search product category and previous research has shown that the online channel is an ideal location for book sales. Similarly, the level of product involvement is related to consumers' choice of search and purchase channels [Black et al. 2002]. Hence, specific product types (e.g., clothes vs. books) and more abstract categories (e.g., search vs. experience products or high vs. low involvement products) are integrated into the conceptual model as factors influencing consumer channel choices.

2.2.4. Consumer Demographics

Given the heterogeneity of consumer characteristics, consumer demographics (e.g., gender, age, income, education, past experience) may significantly influence channel choice decisions [Inman et al. 2004; Jihye and Leslie 2005]. This study attempts to segment consumers choosing between online and offline channels in the search and purchase stages according to their demographic information. The effects of channel value in the form of benefits and costs are subsequently incorporated.

2.2.5. Channel Lock-in Effects

Lastly, because of the lock-in effects that may occur between the shopping stages (i.e., search vs. purchase stages) [Verhoef et al. 2007], consumers' choice of an information search channel may also influence the subsequent choice of purchase channel. Therefore, we propose a link between consumers' choices of channels in the search and purchase stages and its influence on consumer segmentation.

3. Research Methodology

3.1. Designing of Survey Questionnaire

This study collected data on consumers' multichannel value perceptions and choices of one particular channel for the search stage and one for the purchase stage through a survey. In the survey, each participant was asked to choose one among 16 types of products without considering any brand for the product, including apparel, computers, television sets, jewelry, toys, books, MP3/MP4 players, headphones, cars, etc, that he/she would be most likely to purchase in the following month. The product categories chosen by respondents were basically consistent with the product configurations of commonly sold products in China [CNNIC 2009]. Each participant was also required to first choose between an offline channel and an online channel to search for information, followed with a choice of channel for purchasing a product. Participants also responded to questions on the various dimensions of their perceived benefits and costs regarding the selected channel for the information search stage and the purchase stage, respectively. The demographic statistics of the participants were also recorded. We developed the survey questions on the basis of existing verified items from previous research [2]. The channel value perceptions included measurements on the perceived values for both the search and purchase channels. We included as perceived value of the search channels, five types of channel benefits, namely information quality, information service quality, convenience, enjoyment and social value, and three types of channel costs, namely time/effort cost, functional risk and psychological risk. The perceived value of the purchase channel included seven types of channel benefits, which are product offers, product quality, convenience, sales service quality, quality of after-sales service, enjoyment and social value, and five types of channel costs, namely channel price, time/effort cost, functional risk and psychological risk. Items for these constructs were measured on a 6-point Likert scale (1 = strongly disagree, 6 = strongly agree, with no neutral point). Channel choices in the search and purchase stages were measured by a dummy variable, with 0 referring to choice of the offline channel and 1 referring to the choice of the online channel. The development of the measurements endured a rigorous process of pilot test by inviting university students to participate in the survey, and three rounds of exploratory factor analysis, confirmatory factor analysis and reliability and validity tests, based on three different data sets with the subject size of 461, 521 and 502, respectively. Through these tests, the reliability and validity of the measurement items was confirmed to meet standard criterion.

3.2. Data Collection

The data collection was conducted in Mainland China. We administered the survey questionnaire to residents in multiple major cities in different provinces through email, mail delivery or face-to-face interactions, followed by random telephone or email interviews to verify the validity and credibility of the responses. Each survey participant was offered US$5 as a reward for their efforts. Of a total of 2000 survey questionnaires, 1670 copies were returned, reflecting a response rate of 83.5%. After discarding invalid responses with incomplete answers, responses on unselected channels or products, we maintained 1325 data sets for further analysis. To refrain from non-response biases, we compared the basic statistics of the remained data sets with the discarded data sets and the results showed

[2] Due to space limit, the operationalization of the perceived value constructs in the search and purchase stages is available upon request to the corresponding author.

no difference in all of the dimensions that we measured through the questionnaire. Thus, non-response bias is not an issue of concern in this study. Moreover, because all the responses were collected through a single survey at one point of time, we apply Harman's Single-Factor Model to test for potential common method bias. It specifies that all of the items in the research model are to be entered into an exploratory factor analysis. The test argues that the presence of a substantial amount of common method bias will result in one factor emerging [Podsakoff 2003]. We loaded all of the items into two separate analyses for the information search and product purchase stages. In the principal component analysis with varimax rotation, the first factor accounted for 21.33% among the search stage survey items, while in the product purchase stage, the first factor accounted for 19.73% of the total variance. Since the items (in composite) did not account for a substantial amount of the variance, common method bias was rejected.

4. Data Analysis

4.1. Model and Analysis

We adopted the latent class multinomial logit (LC-MNL) method to classify consumers' multistage channel choices, which has been proposed to be valid and strong evidence for consumer segmentation in terms of shopping channel choice in the marketing literature [Konuş et al. 2008]. The latent class (LC) MNL is a well-established technique for representing consumer heterogeneity and segmenting the market [e.g., Andrews et al. 2002; Magidson and Vermunt 2003]. LC-MNL model allows covariates to predict class membership [Bandeen-Roche et al., 1997]. They allow the marginal distribution of class membership to be affected by covariates through a binary or polytomous logistic regression; the expression of the class membership using the individual characteristics is nested in the equation of the unconditional probability. The parameters for the individual characteristics will be estimated simultaneously with the class-specific part-worth values and the probabilities for class memberships [Zhu and Zhang 2009]. In this framework, the LC-MNL model allows the distributions of class membership to vary with covariates, but the meaning of the unseen class is still determined only by the items. As in classical logistic regression theory, the covariates are non-stochastic, assumed known and fixed.

Subsequently, the effects of the channel values of different shopping stages and the product characteristics of channel choices were investigated. The LC-MNL method assumes that when consumers encounter choice tasks, latent behavioral classes can be identified. The preferences of consumers in each latent class are assumed to be homogeneous, but the preferences and utility functions (i.e., perceived benefits and costs of channels) among latent classes are deemed as variables. Hence, the major advantage of LC-MNL is its capability to explain the preference distinctions among individual observations by applying the random utility theory as the theoretical underpinning. Given that there are n consumers and they can be segmented into C latent classes, with each of them choosing an option i among the J options with the maximum utility, then the probability of n^{th} consumer choosing the i^{th} option in the precondition of being categorized into the c^{th} class is:

$$P_{n,i|c} = \frac{\exp(\beta_{ci} X_{ni})}{\sum_{j=1}^{J} \exp(\beta_{cj} X_{nj})} \qquad c=1,\ldots\ldots C \qquad (1)$$

In Eq. (1), β_{ci} is the coefficient vector explaining the variable X_{ni} in the c^{th} latent class. We refer to Eq. (1) as the in-group utility model which is a logit model. In this study, on the one hand, we assume the channel choice in the information search and purchase stages depends on the value obtained from the channels selected by consumers, which excludes the influence of the choice of one channel on the other in order to focus purely on the effects of channel value. We define the shopping process as consisting of two stages of information search and product purchase. Consumers need to make decisions on the channel choice for each stage to maximize the utility of the chosen channel. In other words, utility maximization is the objective of the decision process and leads to observed choice in the sense that the consumer chooses the alternative for which utility is maximal [Baltas and Doyle 2001]. Individual preferences depend on characteristics of the alternatives and the tastes of the consumer. In the formula USP = US + UP, USP refers to the channel utility for the entire shopping process, including the channel utility of the information search stage (US) and the product purchase stage (UP). We assume consumers make channel choices separately, i.e., choosing one channel with maximal utility for each stage based on the benefits and costs brought to them by the channel [Manrai and Andrews 1998]. Therefore, the total utility of consumer shopping equals the sum of the search utility and purchase utility, which translates into USP=US+UP (i.e., USP as a linear combination of US and UP). Furthermore, according to Andrews and Srinivasan [1995], in the two-stage consumer decision modeling, because the same variables have different functions in both stages, the variables in the utility function for choice collections (first stage) and solution options (second stage) can be either the same for all, partially the same, or completely different. Hence, in this study, as consumers have different tasks and objectives in the information search and product purchase stages, the same variables can have different roles in different stages. In this sense, the probability that consumer *n* of class *c* chooses channel *i* in the search stage *s* and chooses channel *j* in the purchase stage *p* can be written as follows:

$$P_{n,si,pj|c} = \frac{\exp(\beta_{c,si} X_{n,si})}{\sum_{k=1}^{J} \exp(\beta_{c,sk} X_{n,sk})} \frac{\exp(\beta_{c,pj} X_{n,pj})}{\sum_{k=1}^{J} \exp(\beta_{c,pk} X_{n,pk})} \quad (2)$$

On the other hand, the consumer characteristics determine the class *t* in which consumer *n* should be categorized. Thus, the probability of the n^{th} consumer becoming a member of class *c* is:

$$P_{n,c} = \frac{\exp(\alpha_c Z_n)}{\sum_{t=1}^{S} \exp(\alpha_t Z_n)} \quad t=1,\ldots\ldots S \; c=1,\ldots\ldots S \quad (3)$$

Eq (3) is the membership probability model, which is a logit model. The factors determining consumer segmentation are the variables of consumer characteristics. Since the latent class determined by the membership probability model is not a behavioral relationship, but a statistical classification process, the error correlations between the inner group utility model and the membership probability model are negligible [Ratchford et al. 2003]. Hence, the total probability that consumer *n* chooses channel *i* in the search stage *s* and chooses channel *j* in the purchase stage *p* is:

$$P_{n,si,pj} = \frac{\exp(\beta_{c,si} X_{n,si})}{\sum_{k=1}^{J} \exp(\beta_{c,sk} X_{n,sk})} \frac{\exp(\beta_{c,pj} X_{n,pj})}{\sum_{k=1}^{J} \exp(\beta_{c,pk} X_{n,pk})} \frac{\exp(\alpha_c Z_n)}{\sum_{t=1}^{S} \exp(\alpha_t Z_n)} \quad (4)$$

In Eq (4), $\beta_{c,sk}$ is the coefficient vector of the explanatory variable $X_{n,sk}$ for the search stage in the c^{th} latent class. The explanatory variable $X_{n,sk}$ includes consumer *n*'s perceived benefits and costs of the search channel, product search experience characteristics and product involvement. $\beta_{c,pk}$ is the coefficient vector of the explanatory variable $X_{n,pk}$ for the purchase stage in the c^{th} latent class. The explanatory variable $X_{n,pk}$ includes consumer *n*'s perceived benefits and costs of the purchase channel, product search experience characteristics, product involvement and the choice of the search channel.

4.2. Testing of Measurement Model

We next assessed the measurement model. First, as the measures for the key factors are developed based on previous research for the first time, exploratory factor analysis was first performed to test the reliability and validity of the measures. After finalizing the set of measures, we applied MPLUS5 to conduct confirmatory factor analysis for the perceived value constructs. The results of the test of the measurement model show that the model has a satisfactory model fit (χ^2 = 5946.683 (df=2039), χ^2/df = 2.92, p-value = 0.0000, RMSEA = 0.038, CFI = 0.937, TLI = 0.930, SRMR = 0.034).

Second, the validity of reflective multiple-item constructs was assessed for reliability, convergent validity and discriminant validity. Reliability was assessed using item reliability and Cronbach's Alpha. Convergent validity was assessed using the composite reliability of constructs, and average variance extracted (AVE). The results indicate that the composite reliability values of all latent constructs are above the suggested level of 0.7 [Fornell and Larcker 1981). Factor loadings of items to latent constructs all exceed the significant level and are above 0.5. AVE values of all latent constructs are above 0.5 [Fornell and Larcker 1981; Hair et al. 1998]. Discriminant validity was satisfied, as the square root of the AVE for a construct is larger than its correlations with other constructs [Fornell and Larcker 1981]. Therefore, our constructs satisfied the requirements for validity and reliability[3].

4.3. Two Stages of Latent Class MNL (LC-MNL) Analysis

4.3.1. Latent Class Identification and Characteristics

This study applied Mplus 5.0 to conduct a latent class modeling estimate to identify the number of consumer groups. The LC-MNL model applies maximum likelihood estimation and is available in packages such as MPlus [Muthén and Muthén 1998]. In addition to applying the consumer demographics to predict consumer segments, we rely on LC-MNL nested approach as an important extension to the traditional latent class analysis [Bandeen-Roche et al. 1997] to introduce the perceived channel value and product types as covariates. In nested approach, the estimates of individual characteristics used to identify the segments are estimated with the segments' utility value

[3] Due to the space limit, we do not present the detailed measurement model test results in this manuscript but the results are available upon request.

and the probability of member segmentation, instead of the segmentation analysis first based on demographics and followed with logistic analysis for each segment. Therefore, the latent class analysis and logistic regression analysis are related in terms of applying the same estimation criteria (i.e., consumer valuation and demographics) to identify the consumer segments and the distinctions of consumer characteristics in the identified latent classes. In specific, this study applied the LC-MNL to build the three choice models: consumer segmentation, channel choice in the information search stage and channel choice in the product purchase stage (as illustrated in section 4.1), and jointly estimate the parameters of the three models.

First, Criteria like Akaike's Information Criterion (AIC) [Akaike 1987] and Bayesian Information Criterion (BIC) [Schwartz 1978] have been combined to guide the latent class identification in literature. In this study, participants were classified into 5 groups (named class groups 2, 3,4,5,6, as listed in Table 1). According to the classification fit indexes, the AIC is lowest when the number of classes is 5 while the BIC is lowest when the number of classes is 2. The BIC has been suggested as a good indicator for class enumeration over the rest because the BIC has been reported to perform consistently well while the AIC has been shown to overestimate the correct number of components [Provencher and Bishop 2004]. Thus, 2 as the class number is considered to be appropriate based on the lowest estimate of the BIC among others.

Table 1. Fit Estimate of Latent Class Model

Group No.	No. of Estimates	AIC	BIC
2	59	1948.975	**2255.136**
3	92	1845.239	2322.642
4	125	1837.889	2486.535
5	158	**1818.043**	2673.931
6	191	1899.048	2890.179

Second, membership probability model parameter estimation and intra-group utility model parameter estimation were evaluated. This study chose the second latent class groups as the reference group. Table 2 lists the parameter estimation results of the probability model. We found that consumer age and online purchase experience have a significant influence on a participant's group classification results. Older consumers in contrast with those with more online purchase experience are more likely to prefer the first channel in contrast with the second channel, respectively.

Table 2. Parameter Estimation of Membership Probability Model

Variable	Unstandardized Coefficient B	SE	T-Value	P-Value	ODDS RATIO
Age	**-0.381****	0.14	-2.714	0.007	0.683
Gender	0.034	0.34	0.101	0.920	1.035
Education	0.252	0.201	1.25	0.211	1.287
Family Income (monthly average)	0.061	0.216	0.281	0.779	1.063
Internet Experience	0.262	0.179	1.467	0.142	1.300
Online Purchase Experience	**1.456*****	0.264	5.51	0.000	4.289
Intercept	-4.666	1.801	-2.591	0.01	0.009

Note: *p<0.05, **p<0.01, ***p<0.001, two-tailed test

The distribution of the consumer characteristics of the two groups is shown in Table 3. In the sample on Group 1, the percentages of consumers who chose to use the online channel for information search vs. product purchases are 84.67% vs. 66.28%, respectively, which are higher than the percentages of all the samples (59.25% vs. 36.53%, respectively). This implies that most of the Group 1 consumers chose the online channel for information search and product purchase while a smaller percentage of consumers in this group were also likely to choose the offline channel. Moreover, the demographic details show that 84.8% of Group 1 consumers are between the ages of 18 and 30. It can also be observed that 71.5% of Group 1 consumers purchased online at least once in the past six months, which is a much higher percentage than that of the complete sample (37.67%). Therefore, we classify Group 1 as the "**innovative consumer**" group.

Table 3. Distribution of Consumer Characteristics of Latent Classes

Consumer	Item	Total Sample	Group 1 (N=685)	Group 2 (N=640)

Characteristics		(N=1325)					
		Sample Size	Percent age%	Sample Size	Percent age%	Sample Size	Percen tage%
Channel Choices	Online Search	785	59.25	**580**	**84.67**	205	32.03
	Offline Search	540	40.75	105	15.33	**435**	**67.97**
	Online Purchase	484	36.53	**454**	**66.28**	30	4.69
	Offline Purchase	328	63.47	231	32.72	**610**	**95.31**
Search+Purchase Patterns	Offline+Offline	482	36.38	58	8.50	**424**	**66.30**
	Online+Offline	359	27.09	173	25.30	186	29.10
	Online+Online	426	32.15	**407**	**59.40**	19	3.00
	Offline+Online	58	4.38	47	6.90	11	1.70
Gender	Male	712	53.74	370	54.01	325	54.90
	Female	613	46.26	315	45.99	267	45.10
Age	<18	46	3.47	14	2.00	32	5.00
	18-24	725	54.72	406	59.30	319	49.80
	25-30	265	20.00	175	25.50	90	14.10
	31-35	112	8.45	46	6.70	66	10.30
	36-40	60	4.53	21	3.10	39	6.10
	41-50	93	7.02	19	2.80	74	11.60
	>50	24	1.81	4	0.60	20	3.10
Education	Middle School	42	3.17	4	0.60	38	5.90
	High School	209	15.77	66	9.60	143	22.30
	Junior College	209	15.77	90	13.10	119	18.60
	Bachelors	746	56.30	443	64.70	303	47.30
	Masters	105	7.92	70	10.20	35	5.50
	PhD	14	1.06	12	1.80	2	0.30
Online Purchase Experiences	None	545	41.13	33	4.80	512	80.00
	Once every few years	159	12.00	63	9.20	96	15.00
	Once per year	123	9.28	99	14.50	24	3.80
	Once half a year	141	10.64	135	19.70	6	0.90
	Once every 3 months	152	11.47	150	21.90	2	0.30
	Once every month	87	6.57	87	12.70		
	More than once every month	94	7.09	94	13.70		
	Once or more often every week	24	1.90	24	3.50		
Internet Use Experience	Less than 1 year	115	8.67	12	1.80	103	16.10
	1-3 years	330	24.91	119	17.40	211	33.00
	3-5 years	354	26.72	188	27.40	166	25.90
	More than 5 years	526	39.70	366	53.40	160	25.00

In the sample on Group 2, the percentages of consumers who chose to use the offline channel for both the information search and product purchase are 67.97% and 95.31%, respectively, both of which are higher than the corresponding percentages of the complete sample (40.75% and 63.47%, respectively). In addition, consumers who chose the offline channel for both information search and product purchase accounted for 66.3% of the sample for Group 2. We thus posit that Group 2 is represented by consumers who are most likely to use the offline channel for the search and purchase processes. Furthermore, it can be seen that the number of consumers who are above 30 years of age is obviously greater than that of Group 1, while 80% of the consumers of Group 2 were seen to have had no previous online purchase experience. Therefore, we classify Group 2 as the "**conventional consumer**" group.

4.3.2. Segmental Estimation of Channel Choice Factors

Further, we apply logit regression analysis to analyze the different effects of channel choice factors on the channel choices of consumers who belong to the two different segments. Table 4 displays the parameter estimations of factors related to consumers' selected channels in the information search and product purchase stages. Through the logit regression for the two groups in both stages, we found that respondents in the two groups have inherently different evaluations of the various factors which may determine their choice of a particular channel. The overall logit regression results of all the samples are listed for comparison with the segmented sample results.

Specifically, for the innovative consumer group, first, information quality, information service quality, accessibility and time/effort cost are significantly related to the choice of an information search channel. Among these, the accessibility and time/effort cost are especially critical (coefficients are 0.68, $p<0.001$; and -0.414, $p<0.001$ respectively). In other words, innovative consumers choose the online channel for information search because they perceive that there would be more convenient access to the online channel thus resulting in savings on the time/effort cost in the online search. However, perceived better information quality and information service quality of the offline channel may also motivate them into choosing the offline channel for information search (coefficients are -0.198, $p<0.05$; and -0.239, $p<0.01$ respectively).

Second, product involvement, search channel choice, product quality, accessibility, sales service quality, after-sales service quality, price level and functional risk are significantly related to the purchase channel choice of the innovative consumer group. Among these factors, price level and accessibility are the most crucial issues relating to the use of the online channel (coefficients are -0.747, $p<0.001$; and 0.557, $p<0.001$ respectively). However, this group of consumers will tend to choose the offline channel for its higher product quality and product involvement (coefficients are -0.444, $p<0.001$; and -0.249, $p<0.001$ respectively). In addition, the channel lock-in effect is significant for the innovative consumer group, which indicates that their search channel choices will be transferred to the purchase channel choices. Higher perceived functional risk is positively related to their choice of the online channel (coefficient 0.311, $p<0.001$) which implies that innovative consumers would tend to take higher functional risk for better future benefits by purchasing at the online channel. After-sales service quality has limited influence on channel choice (coefficient 0.186, $p<0.1$), but innovative consumers will tend to choose the online purchase channel if they perceive better after-sales service quality of the channel.

Regarding the conventional consumer group, although consumers of this group are perceived to have inherent preferences for the offline channel, some of the channel characteristics however can influence their channel choice decisions. First, in the information search stage, information quality, information service quality, enjoyment, accessibility, social value, time/effort cost and functional cost are significantly related to their choice of information search channel. Among them, accessibility and information service quality play important roles (coefficient 0.659, $p<0.001$; and -0.652, $p<0.001$ respectively). Specifically, greater accessibility is positively related while information service quality is negatively related to the choice of the online channel. Furthermore, distinct from the innovative consumer group, information quality has a significant positive relationship with the choice of the online channel for the conventional consumer group (coefficient 0.32, $p<0.05$). Similarly, different from the innovative consumer group, product type, enjoyment, social value and functional risk are perceived to have significant relationships with the channel choice of the conventional consumer group. Specifically, experiential product type and higher enjoyment are related to the choice of the online channel, but lower functional risk and higher social value will lead conventional consumers into choosing the offline channel for information search (coefficient 0.381, $p<0.001$; and -0.278, $p<0.001$ respectively).

Second, product involvement, search channel choice, product offer, product quality, time/effort cost, price level and psychological risk are factors significantly associated with the choice of the purchase channel for the conventional consumer group. Product offer and price level are main determinants of the channel choice for this group (coefficient 1.001, $p<0.001$; and -0.665, $p<0.001$ respectively), implying that a larger number of product offers and cheaper prices are the main reasons for the choice of online purchase channel. Furthermore, similar to the innovative consumer group, product involvement and product quality are perceived as reflecting a negative relationship with the channel choice (coefficient -0.484, $p<0.1$; and -0.355, $p<0.001$ respectively), which implies that conventional consumers tend to choose the offline channel to purchase high involvement or high quality products. The conventional consumer group was also found to manifest significant channel lock-in effects. Lastly, psychological risk has a significant impact on the channel choice (coefficient 0.37, $p<0.05$), indicating that a higher perceived psychological risk may be associated with conventional consumers' choices of the online channel to purchase products. It is probably because conventional consumers usually associate the great risk that attend the high return from online purchasing and hence are willing to take the risk in order to realize the greater benefit of online purchasing over offline purchasing.

To summarize, the two segments of innovative consumers vs. conventional consumers result in significant differences in the effects of channel choice factors (i.e., perceived benefits and costs) on the channel choices of consumers in both product search and product purchase stages. As shown in Table 4, by comparing the coefficients of the relationships between various factors and channel choice, we find that for all the 24 factors, 11 of them is significantly related to channel choice for only one segment, but only 7/5 of them is significantly related to channel choice/have no effect for both segments, while 1 of them is significantly related to channel choice for both segments but has opposite effects. It thus shows valid and consistent distinctions between the two segments of consumers in terms of the impacts of the different driving factors for channel choice.

5. Discussion

This study examines the consumer segments in a multichannel environment involving a two-stage shopping process (i.e., information search and product purchase) by applying the LC-MNL model, and by examining factors influencing consumers' channel choice. From the results of the LC-MNL data analysis, we perceived two consumer segments, i.e., the innovative consumer group and the conventional consumer group. The two groups manifest significant differences in channel choice tendencies in the two shopping stages.

First, in terms of the consumer demographics and online behavior characteristics and their relationship with channel choice, this study found that most of the innovative consumers tend to choose the online channel for information search and product purchase. The innovative consumer group mainly comprises younger consumers between the ages of 18 and 30 with considerable online shopping experience. In contrast, the conventional consumer group consists of consumers who are older, and possess limited online shopping experience. They prefer to use the offline channel for information search and product purchase. These findings are consistent with previous research [Chang et al. 2005; Shim et al. 2001]. Though some studies indicate that gender, income, education and Internet use experience can influence channel choice [Ansari et al. 2005; Strebel et al. 2004], we did not find these factors effective for classifying consumers in the channel choice context.

Second, two perspectives of product characteristics, product involvement (i.e., high vs. low involvement) and product type (search vs. experience product), were examined. The results demonstrate a significant relationship between product involvement and the purchase channel choice for both consumer groups, more specifically, the choice of the offline channel for high-involvement product purchase. This finding is consistent with a previous research verifying that the online channel is more suitable for selling low-cost products [Phau and Poon 2000]. However, no significant relationship was found between product involvement and channel choice for the information searching stage.

The product type of search/experience goods only had a significant relationship with the information search channel choice of the conventional consumer group. The offline channel was found to be more effective for searching information about experience products [Cheema and Papatla 2009], but this proved to be significant only in the case of the conventional consumer group. In addition, no significant result was found to support the argument that it is more suitable for search products to be sold at the online channel, whereas experience products sell better at the offline channel [e.g., Chiang and Dholakia 2003]. Possibly, this is because sellers are increasingly using multimedia technologies to showcase products and to enhance communication in online channels, thus reducing the differences between online and offline channels in enabling information search or product purchase for either search or experience product types.

Third, results show significant channel lock-in effects for both the online and conventional consumer groups. Innovative consumers were perceived as preferring the use of the online channel for both information search and product purchase. In contrast, conventional consumers tended to use the offline channel for both information search and product purchase. This finding is different from previous research indicating that the lock-in effect only exists in offline channels and catalogue channels, but not in the online channels [Verhoef et al. 2007]. In fact, this study finds that the lock-in effect exists in both offline channels and online channels at different stages of the shopping process.

Table 4. Analysis of Channel Choice Effects on Consumer Segments

		CLASS1(N=685) innovative consumer			**CLASS2(N=640) conventional consumer**			**Comparison of Results**	**Complete Sample(N=1325)**		
	IV	Standardized Coefficient	P-value	Odds Ratio	Standardized Coefficient	P-value	Odds Ratio		Standardized Coefficient	P-value	Odds Ratio
Search Stage	Intercerpt		0.562	2.425		0.000	0.001				
	Exp	-0.02	0.81	0.931	0.563*	0.059	1.719	Partially supported	0.042	0.159	1.261
	InvPro	0.061	0.471	1.157	0.108	0.300	1.208	NS	0.331	0.307	1.110
	SIQ	-0.198*	0.051	0.913	0.32***	0.001	1.145	Opposite	0.051	0.125	1.035
	SSQ	-0.239**	0.008	0.851	-0.652***	0.000	0.691	Consistent	-0.261***	0.000	0.783
	SEN	-0.062	0.490	0.974	0.194*	0.026	1.079	Partially supported	0.044	0.188	1.028
	SAC	0.68***	0.000	1.590	0.659***	0.000	1.525	Consistent	0.376***	0.000	1.452
	SSV	0.028	0.737	1.010	-0.278***	0.001	0.907	Partially supported	-0.074*	0.016	0.960
	STE	-0.414***	0.000	0.780	-0.218**	0.003	0.882	Consistent	-0.168***	0.000	0.860
	SFR	0.133	0.110	1.100	0.381***	0.000	1.301	Partially supported	0.132***	0.000	1.152
	SPR	0.076	0.389	1.068	-0.126	0.133	0.897	NS	-0.017	0.569	0.978
Purchase Stage	Intercerpt		0.950	0.912		0.007	0.000				
	Exp	-0.058	0.466	0.810	-0.032	0.879	0.891	NS	-0.036	0.200	0.763
	InvPro	-0.249***	0.001	0.550	-0.484+	0.062	0.348	Consistent	-0.134***	0.000	0.542
	SCHANNEL	0.275***	0.000	4.035	0.498*	0.023	6.910	Consistent	0.254***	0.000	6.821
	PPO	0.07	0.405	1.051	1.001***	0.001	1.978	Partially supported	0.065*	0.040	1.097
	PPQ	-0.444***	0.000	0.769	-0.355+	0.097	0.815	Consistent	-0.183***	0.000	0.804
	PAC	0.557***	0.000	1.465	0.303	0.270	1.219	Partially supported	0.196***	0.000	1.302
	PSQ	-0.174+	0.075	0.866	0.057	0.820	1.043	Partially supported	-0.048	0.172	0.927
	PAS	0.186*	0.044	1.090	0.021	0.928	1.009	Partially supported	0.069*	0.046	1.065
	PEN	0.175	0.052	1.068	0.46	0.121	1.172	NS	0.077*	0.027	1.057
	PSV	-0.064	0.41	0.976	-0.093	0.687	0.968	NS	-0.014	0.641	0.990
	PTE	-0.061	0.496	0.965	-0.484*	0.034	0.741	Partially supported	-0.059*	0.053	0.931
	PPL	-0.747***	0.000	0.540	-0.665**	0.004	0.524	Consistent	-0.31***	0.000	0.581
	PFR	0.311***	0.000	1.242	0.302	0.111	1.234	Partially supported	0.129***	0.000	1.201
	PPR	0.073	0.349	1.065	0.37*	0.033	1.379	Partially supported	0.042	0.131	1.077
	LL	-914.875									

Note: Exp - experience product, InvPro - product involvement, SCHANNEL - search channel;
Information search stage: SIQ - information quality, SSQ – information service quality, SEN - enjoyment, SAC - accessibility, SSV - social value, STE - time/effort cost, SFR - functional risk, SPR - psychological risk;
Product purchase stage: PPO - product offer, PPQ - product quality, PAC - accessibility, PSQ - service quality, PAS - after-sales service, PEN - enjoyment, PSV - social value, PTE - time/effort cost, PPL - price level, PFR - functional risk, PPR - psychological risk
+p<0.1, *p<0.05, **p<0.01, ***p<0.001, two-tailed test

Fourth, in considering the effects of channel characteristics on channel choice, we found accessibility was the most important factor leading consumers of the two groups to choose the online channel for information search [Kleijnen et al. 2007; Schröder and Zaharia 2008; Verhoef et al. 2007].Specifically innovative consumers placed more emphasis on reducing the time/effort cost in the information search, while conventional consumers devoted more attention to information service quality, thus leading to different channel preferences of both consumer groups. Information quality had a distinct influence on the channel choice of the two consumer groups. Higher perceived information quality was seen to lead innovative consumers to choose the offline channel, while preferring the online channel for information search. This result was largely dependent on the perception differences of online information for the two groups. Innovative consumers are experienced in discerning the potential problems of online information but conventional consumers are more prone to unreservedly trust online information. Enjoyment, social value and functional risk factors only had a significant influence on conventional consumers' channel choice for information search as these consumers intended to choose the offline channel for its higher social value and lower functional risk. The offline channel provides more opportunities for personal interactions which heighten its social value [Taher et al. 1996]. On its part, the online channel is also perceived to be of high functional risk because of conventional consumers' lack of online purchase experience. However, this study found that higher perceived enjoyment led conventional consumers to choose the online channel. Although the online channel provides less direct product contact, promotions, and human interaction than the offline channel, the development of an online shopping environment that includes more diversified esthetic factors and online communication tools provides enhanced enjoyment experiences for its visitors [Hennig-Thurau et al. 2004]. It partially explains why conventional consumers are willing to use the online channel for information search.

Fifth, various channel characteristics are seen to exert their influence on the purchase channel choice of the two groups of consumers. Price level has a crucial impact on both consumer groups, hence prompting them to choose a channel based on its price advantages [Brynjolfsson and Smith 2000]. However, product involvement and product quality have a negative influence on channel choice. Perceived high product involvement and quality are found to lead both groups of consumers to choose the offline channel, which is consistent with previous findings that the online channel basically has products that are of a lower price and quality than the offline channel [Childers et al. 2001; Mathwick et al. 2001; Phau and Poon 2000]. It was also perceived that product supply, sales service quality and time/effort cost have a distinct influence on the two consumer groups. Product supply merely influences conventional consumers because only these consumers have a better perception of product supply on the online channel than on the offline channel [Brynjolfsson et al. 2003]. In contrast, an extensive product supply has little attraction for innovative consumers who are experienced online purchasers. After-sales service quality was seen to have a significant impact on innovative consumers as they were generally found to have a better understanding of online after-sales service quality (e.g., through various service guarantee measures) [Zhou and Wang 2010]. The time/effort cost was found to influence innovative consumers, that is, they tended to choose the online channel to purchase products because it entailed less time/effort [Verhoef et al. 2007]. Risk was found to have different relationships with channel choice as well. Conventional consumers were found to emphasize more on psychological risk but innovative consumers pay more attention to functional risk when choosing the online channel. Their choice depended largely on their previous experiences and perceptions of the online purchase.

6. Managerial Implications

Generally, the research findings of the study enhance companies' understanding of consumer behavior in the multi-channel shopping environment. Based on the several critical factors that influence channel choice selected from extant literature and rigorous latent class LC-MNL data analysis, this study provides important theoretical insights to assist companies in creating better channel designs, as well as help them to enhance their optimization, operational and management activities. Specifically, this study scrutinizes consumers' behavior in the multi-channel shopping environment by applying the latent class LC-MNL method. We discovered the existence of two types of consumers with distinct characteristics and analyzed their channel choice behavior according to demographics, product characteristics and shopping stages. The research findings could provide guidance to multi-channel sellers to identify relevant consumer segments and conduct better marketing campaigns.

First, we suggest that sellers focus on innovative consumers who are young and benefit from extensive online experiences. This group of innovative consumers has high expectations regarding the convenience, time/effort cost reduction and low product price of the online channel. Therefore, sellers are advised to try simplifying the shopping process and optimizing delivery services to meet the requirements of the very efficient innovative consumers.

Second, online sellers need to understand that extensive online information is less attractive to innovative consumers than conventional consumers. It is deemed wise for online sellers to improve on the information display, organization and search functions to enhance consumers' search for useful information quickly and effectively. In the information service stage, sellers would benefit by providing convenient features such as instant messaging and online communication to attract consumers. In contrast, since conventional consumers are highly sensitive to online information quality, online sellers are advised to devote special attention to the provision of information on experience products by enhancing the authenticity of the information and reducing consumers' functional risk perceptions of online information through leveraging on consumer reviews. For offline sellers, the provision of choices of more effective and convenient information delivery methods (e.g., a 24-hour hotline) is critical, in addition to the provision of information service quality. Presenting information in an entertaining manner is also deemed to be helpful.

Third, sellers need to understand that high involvement products are more suitable for the offline channel. Hence, more of relatively lower involvement products can be offered in the initial stages of online sales to attract a larger number of consumers. It is beneficial to target conventional consumers by providing ample product choices as these consumers find the offer of extensive products more attractive.

Fourth, the advantage of after-sales service quality in the offline channel was found to have little impact on innovative consumers. Mechanisms such as third-party warranties, service guarantees and seller rankings were seen to effectively enhance online consumers' trust toward sellers [Wang et al. 2009], while trust has become particularly an important factor for sellers in the offline channel.

Fifth, the channel lock-in effect implies that sellers should assist consumers in understanding and using the online channel to enhance its stickiness. Online sellers are advised to provide extensive and detailed product information, as well as to build up the consumer-seller communication channels and eventually turn information users into product purchasers.

7. Limitations and Directions for Future Research

This study is not without its limitations, which will provide directions for future research. First, we collected data solely through a survey at only one point in time. However, the survey questions were designed to ask respondents to make channel choices based on a scenario similar to the real situations, aimed at better reflecting the actual choices that respondents would make in a real market situation and thus minimizing the problem of common method bias. Second, the categorization of product characteristics according to the search/experience categorization and high/low involvement of the products was based on a sample of 50 students. The 16 types of products were classified by cluster analysis into different categories. However, this method might overgeneralize the characteristics of the product clusters, which could result in a bias against the data analysis. Other methods of product categorization can be applied to verify this limitation. Third, as we aim to capture the most basic and general characteristics of both online and offline channels in terms of facilitating information search and product purchase, we did not specifically consider the latest utilization of emerging technologies such as mobile applications and social media in online shopping which may further differentiate consumers' perceived channel value of the two channels. Nevertheless, we believe the general conceptualization and operationalization of the key factors are able to reflect these real shopping experiences.

Based on the limitations just mentioned, future research could first be directed at understanding the actual behavior of consumers in choosing any channels for real purchases through field studies or longitudinal experiments, and also across different cultures [e.g. Shin and Choo, 2012]. Second, more aspects of product characteristics can be considered to enrich our understanding of their impacts on consumers' shopping channel choices. Third, future research can investigate how offline and online companies can better assist and manage consumers' activities in the multi-channel shopping environment. Third, we encourage further explorations to take the recent development of online channel facilitations such as mobile shopping or social shopping into account and further enrich the dimensions of perceived channel value. The inclusion of more channel choices such as mobile hand phone and tablet channels may help identify more diversified consumer segments because of the increasing multichannel shopping activities facilitated or motivated by more digital shopping channels.

8. Conclusion

The multi-channel environment for both information search and product purchase has become increasingly popular in the contemporary consumer market. Motivated by the interest in how consumers choose between an offline channel and the emergent online channel, this study has applied the latent class LC-MNL method to categorize different types of consumers according to consumer demographics, product characteristics (i.e., search vs. experience product and high vs. low involvement), and channel characteristics in both the information search stage and the product purchase stage. Results reveal two main consumer groups, the innovative consumer group and the conventional consumer group, derived from different sources in terms of demographic information and preferences for product and channel characteristics. Practical suggestions are provided to inform sellers on how to manage different types of consumers in a multi-channel shopping scenario.

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