Customer Choice between Electronic and Traditional Markets: 
An Economic Analysis

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Abstract

Switching between electronic and traditional markets, consumers nowadays impact profoundly on market makers. To successful conduct business, firms have to carefully making channel decisions to meet the needs of customers. The purpose of this article is to offer normative models for analyzing consumer channel selection behaviors between traditional and electronic markets. Referred to transaction cost economics and consumer decision processes, the models assumed that customers would like to purchase on the market that brings them the highest utility values in terms of effort, waiting time, and cost savings. Equilibrium solutions at which customers are indifferent in choosing between electronic and traditional channels are also derived for both risk-neutral and risk-averse consumers.

1. Introduction

The emergence and proliferation of electronic markets are widely recognized. Markets makers endeavor to catch the eyes of Internet users and regard the tremendous web surfers as avenues toward market expansion. However, struggling to survive within strict market competition, only a few businesses claimed profitable. Reports showed that at least two third of web stores as well as web-based commercial communities earned insufficient income to support their business within years (Hodges, 1997; Scheier, 1997). Although some successful stories of electronic markets were well known, the huge percentage of failed experiences should be concerned much seriously.

Appropriate product decisions have significant impact on market success. Observations portrayed the figure that some products were more popular than others on electronic markets. These best-selling items included computer related products and informed purchased items (Sterne, 1995), digitalized products (Whinston et. al. 1997), and information-rich products (Schwartz, 1997). Although reasonable in many aspects, these experience-based findings could only be served as ad hoc guidelines with limited generalization capabilities. Since physically investigate the whole product sets are unfeasible, a simplified way to perform generic analysis for interpreting product fitness within channels is necessary.

The main purpose of this article is to address the above concerns by offering a set of analytical models to analyze why consumers purchase particular items from electronic or traditional market. We first formulate theoretical bases and a research framework to depict the transaction costs within consumer decision processes. Next, to model consumer channel selection behavior, several functional forms are introduced to compare traditional and electronic purchases respectively, and equilibriums of risk-neutral and risk-averse consumers for each market are also derived. Finally, pricing strategies and product fitness concerns for electronic market are discussed by analyzing the models.

2. Theoretical Base and Research Framework

People pursue their objectives through transactions in economic systems. A simple definition of transaction is the phenomenon of transferring products or services within technical independent units (Williamson, 1975). In order to accomplish a transaction, both the buyer and seller should involve in several activities such as acquiring, processing and disseminating information. Since market information processing is asymmetric and expensive at most time, transactions cannot be accomplished without significant cost.

Transaction cost economics (Williamson, 1975; 1981) provides a path toward analyzing potential outcomes of applying various transaction mechanisms. The theory depict that, among many alternatives, individuals will choose the most costless way to transact with others. Transaction cost economics have reasonably explained the outcomes of various market decisions, such as the adoption of vertical integration (Monteverde and Teece, 1982; Zaheer and Venkatraman, 1994), strategic alliance (Osborn and Baughn, 1990; Parkhe, 1993), outsourcing (Walker and Weber, 1984), and the acceptance of electronic markets (Liang and Huang, 1998).
Although surrogate variables such as assets specificity and uncertainty have widely introduced to measure transaction costs of different market structures, the ideal way to estimate such costs is to measure them item by item, if possible. By dividing consumer purchasing behavior into several phases and then aggregate costs within each phase, an acceptable estimation of the consumer transaction cost within purchases emerges. In marketing practice, consumer decision process are categorized into problem recognition, search, alternative evaluation, choice and outcome phases (Engel, et. al., 1978). Therefore, in the following paragraphs, we will further identify the transaction cost of consumer purchases in these stages.

In problem recognition phase, external stimulations and internal aspirations trigger consumers to alert some products or services. Since mental desires are inaugurated subconsciously or unconsciously with little effort, the transaction cost of this phase can be neglected. After needs are identified, consumers tend to collect large amounts of data several times for further decisions in search phase. Literatures have shown that it is painful for customers to perform such tasks in many circumstances (Thaler, 1985; Titus and Everett, 1995). Therefore, transaction cost in search phase can be measured by efforts of gathering and organizing product information in search space.

With enough information, consumers will further consider alternatives in evaluation phase. The evaluation tasks are also effort consuming. It was suggested that the difficulty of choice is a good candidate to measure such effort (Shugan, 1980). Choice phase goes beyond product evaluation. Within choices, customers rank alternatives and select the best one. Since ranking activities are always finished in a few seconds, its transaction cost is minute. Finally, in the outcome phase, consumers typically enjoy delivery and maintenance services, and the major transaction cost in this phase is primarily waiting time (Ives and Learmonth, 1984).

Researches also showed that when customers performing purchasing behaviors, they also take price into account (e.g. Kelley, 1958; Cox, 1959; Downs, 1961; Ingene, 1984). If other things were equal, consumers would purchase the lowest-priced items to gain economic benefits. Therefore, if significant price difference exists in different markets, the potential price savings from purchasing cheap items should be included in counting transaction costs.

Synthesizing from the above discussions, a framework of customer choice between electronic and traditional markets is proposed as shown in Figure 1, which divides purchasing decisions into three layers. The first layer involves two factors to measure effort, namely, search space and product certainty. The second layer is to deal with transaction costs of consumer decision process within a particular market in terms of effort, waiting time and cost savings. Finally, the third layer represents the channel selection outcomes for customers. In short, a market selection decision is achieved by considering the possible utility gained from each channel, and the utility value of each channel is further derived from the synergy of effort, waiting time, and cost savings.

![Figure 1. The research framework of consumer channel selection](image)

3. The Analytical Models

Based on the framework, a set of analytical models are built to analyze consumer’s channel selection behavior. The models have the following implicit assumptions:

1. Consumers are homogeneous. Although both risk-neutral and risk-averse consumers will be discussed, however, we assume consumers behave just the same within each group.
2. Stores in the virtual channel take orders from the Internet but deliver though regular mail or distribution channels, whereas traditional stores rely on customers to visit them physically to place order and pick up merchandise.
3. No computer agent is adopted to facilitate purchasing in the traditional channel.
4. Utilities are additive. That is, the total utility is a sum of the utilities on individual attributes.
5. The buyer’s behavior is rational and independent of the seller’s manipulation. That is, the seller’s manipulation can only affect the value of the utility, but not the nature of the utility functions.

3.1 Effect of Search Space on Consumer Effort

In search phase, consumers put effort in information search to identify alternatives. Generally speaking, the amount of effort in search is positively correlated with alternatives in search space that a consumer needs to handle with (Beatty and Smith, 1987). However, in
different markets, the strength of such causal effect may differ.

**Traditional market.** With concerns of geographical convenience, consumers generally start search in adjacency. When the required information cannot be fully gathered nearby, consumers are obliged to perform search in areas that are not so familiar to them. Therefore, the marginal effort of search will rise when location familiarity decreases. We hypothesized that the effect of search space on consumer effort can be depicted by a convex function of quadratic form. Let $y_1^T$ be search effort of a consumer in traditional market, and $x_1$ stands for required search space of a product, the effect can be shown as:

$$y_1^T = a_1 x_1^2 + b_1 x_1 + c_1,$$

in which $a_1 > 0$, $b_1 > 0$, $c_1 > 0$

Notice that the convexity of the curve is determined by both $a_1$ and $b_1$. When $a_1$ or $b_1$ get larger, the convexity will increase.

**Electronic market.** When searching information with Internet engines, little effort is required in locating stores and products, and the geographic limitation is also reasonably relieved. Furthermore, since the interfaces among Internet stores are alike, it requires equal effort to search similar information at each site. Therefore, we hypothesize that the effect of search space on consumer effort can be represented by a straight line of positive obliquity as shown below:

$$y_1' = b_2 x_1 + c_2,$$

in which $b_2 > 0$, $c_2 > 0$

In other words, a consumer will put additional $b_2$ units of effort if she decides to search an additional unit of product information.

**Comparison between Traditional and Electronic Markets.** The niche of information search within traditional and electronic channels can be found by specifying equilibriums at which search effort is equivalent for both markets. The hurdle points can be derived by solving $y_1^T = y_1'$. Let $\delta = (b_1 - b_2)^2 - 4a_1(c_1 - c_2)$, we have two pairs of solutions, namely:

$$x_1 = \frac{-(b_1 - b_2) \pm \sqrt{\delta}}{2a_1}$$

and

$$y_1 = \frac{-b_2 (b_1 - b_2) \pm b_1 \sqrt{\delta} + 2a_1 c_1}{2a_1}.$$

Both $x_1$ and $y_1$ should be non-negative. In case of $\delta < 0$, the non-negative solutions of $x_1$ and $y_1$ cannot be derived, which means that the search effort in traditional market will always be high, and all consumers prefer to search in electronic market. If $\delta \geq 0$, the sign of $x_1$ and $y_1$ are determined by both $b_1-b_2$ and $c_1-c_2$. Several possibilities occurred in this circumstance. Consumer behavior in search within each condition is shown in Table 1.

<table>
<thead>
<tr>
<th>Search Conditions</th>
<th>Consumer Search Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>$b_1-b_2 &gt; 0$ and</td>
<td>All consumers prefer electronic</td>
</tr>
<tr>
<td>$c_1-c_2 &gt; 0$</td>
<td>market.</td>
</tr>
<tr>
<td>$b_1-b_2 &gt; 0$ and</td>
<td>Consumers prefer traditional market</td>
</tr>
<tr>
<td>$c_1-c_2 \leq 0$</td>
<td>when the search space is small, and</td>
</tr>
<tr>
<td>or</td>
<td>move to electronic market when the</td>
</tr>
<tr>
<td>$b_1-b_2 \leq 0$</td>
<td>search space becomes larger than the</td>
</tr>
<tr>
<td>$c_1-c_2 \leq 0$</td>
<td>hurdle point.</td>
</tr>
<tr>
<td>$b_1-b_2 \leq 0$</td>
<td>Consumers prefer traditional market</td>
</tr>
<tr>
<td>$c_1-c_2 &gt; 0$</td>
<td>when the search space is very small or</td>
</tr>
<tr>
<td></td>
<td>very large, and move to electronic</td>
</tr>
<tr>
<td></td>
<td>market when the search space fall into</td>
</tr>
<tr>
<td></td>
<td>the range of lower and upper bound</td>
</tr>
<tr>
<td></td>
<td>hurdle points.</td>
</tr>
</tbody>
</table>

### 3.2 Effect of Product Certainty on Consumer Effort

Product certainty is considered important for most consumers within a purchase. With little doubt, product uncertainty has positive effect on evaluation effort. When purchasing a product with unknown attributes, consumers always have to put considerable effort in evaluation to avoid receiving unsatisfactory product. We hypothesize that the relationship between product certainty and evaluation effort must fulfill the following two criteria. First, the more uncertain the product is, the more effort will be involved in evaluation. Second, the marginal benefit of product certainty will decrease.

Hyperbolic function forms may fit the above considerations. For analytical purpose, we use a simple hyperbolic format. Suppose $x_2$ represents the degree of product certainty, $y_2^T$ and $y_2'$ stand for consumer evaluation effort in traditional and electronic market respectively, the effect of product certainty and on evaluation effort can be shown below:

$$y_2^T = d_1 + e_1 / x_2,$$

where $y_2^T \geq 0$, $x_2 \geq 0$, $d_1 \geq 0$, $e_1 > 0$

and

$$y_2' = d_2 + e_2 / x_2,$$

where $y_2' \geq 0$, $x_2 \geq 0$, $d_2 \geq 0$, $e_2 > 0$

Therefore, parameters $d_1$ and $e_1$ determine the curve shape of evaluation effort in traditional market, while $d_2$ and $e_2$ influence the curve shape in electronic settings. The niche of evaluation within each channel can also be specified by specifying the equilibrium of both curves.

Solving $y_2^T = y_2'$, we achieve:

$$x_2 = \frac{e_2 - e_1}{d_1 - d_2},$$

and

$$y_2 = \frac{d_1 e_2 - d_2 e_1}{e_2 - e_1}.$$

**Comparison between Traditional and Electronic Markets.** Both $x_2$ and $y_2$ are meaningful only when their
values are positive. Since the sign of \( x_2 \) and \( y_2 \) are determined by parameters \( d_1, e_1, d_2 \) and \( e_2 \), we therefore divide all possible conditions into four conditions. Each condition and its consumer behavior in evaluation are shown in Table 2.

### Table 2. Evaluation conditions and consumer behavior

<table>
<thead>
<tr>
<th>Evaluation Conditions</th>
<th>Consumer Behavior in Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>( d_1-d_2 \geq 0 ) and ( e_1 \geq e_2 \geq 0 )</td>
<td>All consumers prefer electronic market.</td>
</tr>
<tr>
<td>( d_1-d_2 \leq 0 ) and ( e_1 \leq e_2 \leq 0 )</td>
<td>All consumers prefer traditional market.</td>
</tr>
<tr>
<td>( d_1-d_2 \leq 0 ) and ( e_1 \geq e_2 &gt; 0 )</td>
<td>Consumers prefer traditional market when the product certainty is high, and move to electronic market when the product certainty becomes lower than the hurdle point.</td>
</tr>
<tr>
<td>( d_1-d_2 &gt; 0 ) and ( e_1 \leq e_2 \leq 0 )</td>
<td>Consumers prefer electronic market when the product certainty is high, and move to traditional market when the product certainty becomes lower than the hurdle point.</td>
</tr>
</tbody>
</table>

#### 3.3 The Effect of Effort, Waiting Time, and Cost Savings on Channel Selection

The following paragraphs further discuss how consumers choose marketing channels when considering the whole effects of effort, waiting time, and cost savings. Since the measuring units of these items are quite different, the concept of utility and risk attitude are applied to derive channel selection decisions of different consumers on both markets.

**The effect of effort on channel selection for risk-neutral consumers.** The relationship between effort and utility gained for risk-neutral consumers can be represented by a straight line of negative obliquity. Assume that risk-neutral consumers would gain nothing if their effort is equal or above \( m_1 \), and the maximum utility will be \( n_1 \) if no effort is put in a purchase. Let \( U_{1,T,N}^{T,N} \) represents utility of effort when they purchasing in traditional market, and \( y_1^T \) and \( y_2^T \) stand for effort put in search and evaluation at traditional settings, the effect of effort on utility gained can be shown as:

\[
U_{1,T,N}^{T,N} = -\frac{n_1}{m_1} (y_1^T + y_2^T) + n_1
\]

In the same way, let \( U_{1,L,N}^{T,N} \) be utility of effort for risk-neutral consumers when purchasing in electronic market, and \( y_1^L \) and \( y_2^L \) stand for effort put in search and evaluation at electronic settings, the effect in this case is:

\[
U_{1,L,N}^{T,N} = -\frac{n_1}{m_1} (y_1^L + y_2^L) + n_1
\]

Therefore, let \( U_{1,D,N}^{T,N} \) be the difference of utility gained on effort for risk-neutral consumers between purchasing in traditional and electronic markets, we have:

\[
U_{1,D,N}^{T,N} = \frac{n_1}{m_1} [(a_1 x_1^2 + b_1 x_1 + c_1 + d_1 + e_1) - (x_2)]
\]

\( U_{1,D,N}^{T,N} \) is one of the signals that judging channel selection decisions for risk-neutral consumers. Overall, they prefer traditional market when \( U_{1,D,N}^{T,N} \) is positive, and may turn to electronic market when its value becomes negative.

**The effect of effort on channel selection for risk-averse consumers.** For risk-averse customers, their utility dropped in a fast pace when additional effort of a purchase is required. We hypothesize this negative relationship between effort and utility gained fits an exponential form. Assume that risk-averse consumers would gain maximum utility \( n_1 \) if no effort is required, and \( r_1 \) represents the degree of risk averse in effort. Let \( U_{1,T,A}^{T,A} \) donates the utility of effort for risk-averse consumers purchasing in traditional settings, the effect in this case can be shown as:

\[
U_{1,T,A}^{T,A} = n_1 e^{-r_1 y_1^T} = n_1 e^{-r_1 (a_1 x_1^2 + b_1 x_1 + c_1 + d_1 + e_1) / x_2}
\]

Let \( U_{1,L,A}^{T,A} \) be utility of effort for risk-averse consumers when purchasing on electronic market, and \( U_{1,D,A}^{T,A} \) be the difference of \( U_{1,T,A}^{T,A} \) and \( U_{1,L,A}^{T,A} \), we have:

\[
U_{1,T,A}^{T,A} = n_1 e^{-r_1 (b_2 x_1 + c_2 + d_2 + e_2) / x_2}
\]

\[
U_{1,D,A}^{T,A} = n_1 [e^{-r_1 (b_2 x_1 + c_2 + d_2 + e_2) / x_2} - e^{-r_1 (b_1 x_1 + c_1 + d_1 + e_1) / x_2}]
\]

Likewise, \( U_{1,D,A}^{T,A} \) is a signal of judging channel selection decisions for risk-averse consumers. They prefer traditional market when \( U_{1,D,A}^{T,A} \) is positive, and turn to electronic market its value becomes negative.

**The effect of waiting time and cost savings on channel selection for risk-neutral consumers.** Theoretically, the marginal effect of waiting time and cost savings for risk-neutral consumers would always be
the same. For risk-averse consumers, however, the marginal effects would always be decreased.

Let \( w^T \) and \( w^I \) donate waiting time in traditional and electronic channels, \( p^T \) and \( p^I \) represent product price in traditional and electronic settings respectively. Suppose risk-neutral consumers would gain nothing when their waiting time reaches \( m_2 \) level, and the maximum utility gained will be \( n_2 \) if no waiting time in purchase is required. Let \( U^{T,N}_2 \) be utility of time for risk-neutral consumers in traditional market, and \( U^{I,N}_2 \) represents the time utility holds in electronic purchase, the effect of waiting time on utility gained for both channels can be shown as:

\[
U^{T,N}_2 = -\frac{n_2}{m_2} w^T + n_2
\]
\[
U^{I,N}_2 = -\frac{n_2}{m_2} w^I + n_2
\]

Therefore, the difference of time utility for risk-neutral consumers in traditional and electronic settings (donated as \( U^{D,N}_2 \)) is:

\[
U^{D,N}_2 = U^{T,N}_2 - U^{I,N}_2 = \frac{(w^T - w^I)n_2}{m_2}
\]

Likewise, the effect of cost savings on utility can also be determined. Suppose consumers would gain nothing when product price reaches \( m_3 \), and the maximum utility gained will be \( n_3 \) if price is down to zero. Let \( U^{T,N}_3 \) and \( U^{I,N}_3 \) be utility of cost savings for traditional and electronic purchases respectively, the effect of product price on utility gained from both channels is:

\[
U^{T,N}_3 = -\frac{n_3}{m_3} p^T + n_3
\]
\[
U^{I,N}_3 = -\frac{n_3}{m_3} p^I + n_3
\]

Let \( U^{D,N}_3 \) be the difference of cost-saving utility for risk-neutral consumers in both channels, we have:

\[
U^{D,N}_3 = U^{T,N}_3 - U^{I,N}_3 = \frac{(p^T - p^I)n_3}{m_3}
\]

Both \( U^{D,N}_2 \) and \( U^{D,N}_3 \) are also valuable signals to judging channel selection decisions for risk-neutral consumers. They tend to prefer traditional market when \( U^{D,N}_2 \) or \( U^{D,N}_3 \) is positive, and may turn to electronic market when the values becomes negative.

The effect of waiting time and cost savings on channel selection for risk-averse consumers. In this case, we assume exponential functional forms can donate these effects. Suppose risk-averse consumers would gain \( n_2 \) units of utility if no waiting time is required, and \( r_2 \) stands for the degree of risk aversion toward waiting time. Let \( U^{T,A}_2 \) be utility of time savings for risk-averse consumer in traditional market, and \( U^{I,A}_2 \) be the same utility holds on electronic purchases, the effects can be shown as:

\[
U^{T,A}_2 = n_2 e^{-r_2 w^T}
\]
\[
U^{I,A}_2 = n_2 e^{-r_2 w^I}
\]

And the difference of time utility for risk-averse consumers between traditional and Internet purchase (namely, \( U^{D,A}_2 \)) is:

\[
U^{D,A}_2 = U^{T,A}_2 - U^{I,A}_2 = n_2(e^{-r_2 w^T} - e^{-r_2 w^I})
\]

On cost-saving effects, we suppose a consumer would gain \( n_3 \) units of utility if the product price equals zero, and \( r_3 \) represents the degree of risk aversion toward product price. Let \( U^{T,A}_3 \) and \( U^{I,A}_3 \) represent utility of cost savings hold on traditional and electronic purchases respectively, the effects can be shown as:

\[
U^{T,A}_3 = n_3 e^{-r_3 p^T}
\]
\[
U^{I,A}_3 = n_3 e^{-r_3 p^I}
\]

Finally, let \( U^{D,A}_3 \) be the difference on utility of cost savings for risk-averse consumers within traditional and electronic purchases, we have:

\[
U^{D,A}_3 = U^{T,A}_3 - U^{I,A}_3 = n_3(e^{-r_3 p^T} - e^{-r_3 p^I})
\]

\( U^{D,A}_2 \) and \( U^{D,A}_3 \) may reflect channel selection intentions for risk-averse consumers. They tend to prefer traditional market when \( U^{D,A}_2 \) or \( U^{D,A}_3 \) is positive, and may allured by electronic channel when the values becomes negative.

Table 3 summarized the above outcomes. It contains the utility gained in terms of effort, waiting time, and cost savings on both traditional and electronic channels for risk-neutral and risk-averse consumers. The utility differences between both markets are also presented.

The additive utility gained from a purchase. From Table 3, the additive utility of a traditional purchase for risk-neutral consumers (donated as \( U^{T,N}_{1+2+3} \)) is:

\[
U^{T,N}_{1+2+3} = \frac{n_1}{m_1} (a_1x_1^2 + b_1x_1 + c_1 + d_1 + \frac{e_1}{x_2})
\]
\[
-\frac{n_2}{m_2} w^T - \frac{n_3}{m_3} p^T + n_1 + n_2 + n_3
\]

When purchasing electronically, the additive utility of risk-neutral consumers (donated as \( U^{I,N}_{1+2+3} \)) would be:
\[
U_{1+2+3}^{I,N} = -\frac{n_1}{m_1} (b_2 x_1 + c_2 + d_2 + e_2) x_2
\]
\[
-\frac{n_2}{m_2} w' - \frac{n_3}{m_3} p' + n_1 + n_2 + n_3
\]

In the same manner, the additive utility of a traditional purchase for risk-averse consumer (donated as \(U_{1+2+3}^{T,A}\)) is:

\[
U_{1+2+3}^{T,A} = n_1 e^{-\eta(a_1 x_1^2 + b_1 x_1 + c_1 x_2 + d_1 x_2 + e_1 x_2)} + n_2 e^{-\eta w'} + n_3 e^{-\eta p'}
\]

### Table 3. Utility gained on different shoppings

<table>
<thead>
<tr>
<th>Risk attitude</th>
<th>Utility on traditional market</th>
<th>Utility on electronic market</th>
<th>Utility differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effort</td>
<td>Risk Neutral</td>
<td>(-\frac{n_1}{m_1} (b_2 x_1 + c_2 + d_2 + e_2) x_2)</td>
<td>(-\frac{n_1}{m_1} (b_2 x_1 + c_2 + d_2))</td>
</tr>
<tr>
<td></td>
<td>Risk Averse</td>
<td>(n_1 e^{-\eta(a_1 x_1^2 + b_1 x_1 + c_1 x_2 + d_1 x_2 + e_1 x_2/x_2)})</td>
<td>(n_1 e^{-\eta(b_2 x_1 + c_2 + d_2 + e_2/x_2)})</td>
</tr>
<tr>
<td>Waiting time</td>
<td>Risk Neutral</td>
<td>(-\frac{n_2}{m_2} w' + n_2)</td>
<td>(-\frac{n_2}{m_2} w' + n_2)</td>
</tr>
<tr>
<td></td>
<td>Risk Averse</td>
<td>(n_2 e^{-\eta w'})</td>
<td>(n_2 e^{-\eta w'})</td>
</tr>
<tr>
<td>Cost savings</td>
<td>Risk Neutral</td>
<td>(-\frac{n_3}{m_3} p' + n_3)</td>
<td>(-\frac{n_3}{m_3} p' + n_3)</td>
</tr>
<tr>
<td></td>
<td>Risk Averse</td>
<td>(n_3 e^{-\eta p'})</td>
<td>(n_3 e^{-\eta p'})</td>
</tr>
</tbody>
</table>

Performing the same purchase on Internet, the additive utility gained by risk-averse consumers (donated as \(U_{1+2+3}^{I,A}\)) would be:

\[
U_{1+2+3}^{I,A} = n_1 e^{-\eta(b_2 x_1 + c_2 + d_2 + e_2/x_2)} + n_2 e^{-\eta w'} + n_3 e^{-\eta p'}
\]

### 4. Pricing Strategies and Product Fitness in Electronic Market

It is reasonable to infer that, if the price of a specific product on electronic market is attractive enough to bring consumers more utility values than traditional channels do within cost-effective considerations, the product must has significant niche to present in electronic market.

For risk-neutral consumers, the criteria for them to gain equal or more utility values from electronic rather than traditional purchases can be represented as:

\[
U_{1+2+3}^{I,N} \geq U_{1+2+3}^{T,N} - U_{1+2+3}^{I,A}
\]

It can be rewritten as follows:

\[
-\frac{n_2}{m_2} (w' - w^T) + n_3 \geq \frac{n_3}{m_3} p' + n_3
\]

\[
-\frac{n_1}{m_1} [a_1 x_1^2 + (b_1 - b_2) x_1 + (c_1 - c_2 + d_1 - d_2 + e_1 - e_2/x_2)]
\]

Let \(E^D = a_2 x_1^2 + (b_1 - b_2) x_1 + (c_1 - c_2 + d_1 - d_2 + e_1 - e_2/x_2)\), we have:

\[
p' \leq p^T + \frac{m_3}{n_3} \left[\frac{m_1}{n_1} (E^D) + \frac{n_2}{m_2} (w^T - w')\right]
\]

When electronic market sets its product price fulfill with the criteria in (29), risk-neutral consumers would like to purchase on Internet. It is worth notice that the attractive product prices on electronic channels may not always be lower than those of traditional counterparts. For example, when both \(E^D > 0\) and \(w^T > w'\), even the product price is a higher than traditional ones, risk-neutral consumers would like to purchase items electronically if the additive utility gained in electronic purchase is still higher than that acquired from traditional channels.
For risk-averse consumers, the criteria for them to gain equal or more utility values from electronic purchases can be depicted as:

\[ U_{3}^{L,A} \geq U_{1+2+3}^{T,A} - U_{1}^{L,A} - U_{2}^{L,A} \]

And it can be rewritten as follows:

\[ n_{3}e^{-r_{p}p^{'}} \geq n_{1}e^{-\gamma_{1}(a_{1}x_{1}^{2}+b_{1}x_{1}+c_{1}+d_{1}+e_{1}/x_{2})} + n_{2}e^{-r_{p}r_{p}w^{'}} + n_{3}e^{-r_{p}r_{p}w^{'}} - n_{1}e^{-\gamma_{2}(b_{2}x_{1}+c_{2}+d_{2}+e_{2}/x_{2})} - n_{2}e^{-r_{p}w^{'}} \]

Let \( U' = n_{1}e^{-\gamma_{1}(a_{1}x_{1}^{2}+b_{1}x_{1}+c_{1}+d_{1}+e_{1}/x_{2})} + n_{2}e^{-r_{p}w^{'}} + n_{3}e^{-r_{p}w^{'}} - n_{1}e^{-\gamma_{2}(b_{2}x_{1}+c_{2}+d_{2}+e_{2}/x_{2})} - n_{2}e^{-r_{p}w^{'}} \), we achieve:

\[ p' \leq \frac{1}{r_{3}} \ln(n_{3}/U) \]

Risk-averse consumers would like to purchase on Internet when the prices are set in accordance with the \( P^{'}, \) constraint. Therefore, if product price in electronic market can be set to \((1/r_{2})\ln(n_{3}/U)\) or lower within cost- effective considerations, risk-neutral consumers would like to purchase these items electronically.

5. Conclusions and Implications

The task of identifying suitable products for electronic market is under concern by researchers and practitioners. This study examined channel selection behaviors by considering transaction costs in terms of effort, waiting time, and cost savings for both risk-neutral and risk-averse consumers. In specific, our models predicted channel selection behaviors by applying the following step-by-step analysis. We first identify the effect of search space on effort within purchases, and then discuss the effect of product certainty on evaluation effort. After taking waiting time and cost savings into account, the additive utility of purchase in traditional and electronic channels for both risk-neutral and risk-averse consumers emerges. Finally, consumers would like to purchase in the market that brings them the greatest utility values.

Electronic market is still in its infancy, and the behaviors of Internet shoppers are still under investigation. This study explores the channel selection behaviors of various consumers when both traditional and electronic channels are available. Findings of this study are valuable for consumers, providers, and researchers as well.

For consumers, the framework may serve as a guideline to purchase on the market that is most benefit to them. Purchasing in accordance with the models, consumers can get rid of the loss of effort, waiting time, and costs due to making wrong channel decisions. If parameters are estimated reasonably, the models would derive ex ante purchasing hints to consumers.

For providers, the analytical procedures help their managers to understand consumer channel selection by addressing break-even analysis between traditional and electronic markets. With the knowledge of consumer behaviors, electronic channel managers are capable of forming strategies for product planning, pricing, delivery, and other related activities.

For researchers, this study offers valuable insights in analyzing the niche market of traditional and electronic channels in economic ways. The results may serve as a starting point to uncover the mass process of consumer channel selection behavior, and may also enrich theoretical bases for further conceptual reasoning and empirical judgments.

However, readers should be cautious in several limitations that may influence causal interpretations of this study. First, in a real purchase, consumer channel selection decisions are influenced not only by transaction costs, but also by internal and external motivations such as hedonics (Hirschman and Holbrook, 1982) and opinion leaders (Etgar, 1978) as well. Second, our interpretations may also be distorted due to the simplification of consumer behavior. Third, risk attitudes toward effort, waiting time, and cost savings may also be narrowly defined. In practice, consumers may treat these items with various risk attitudes, and the attitudes may change over time. Further investigations should address these issues by alleviating assumptions or test models empirically to achieve outcomes with external validity.

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References


