Reduction in consumers’ purchasing cost by online shopping

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Abstract

The development of online shopping services is stimulated by both retailers and consumers. Compared to the brick-and-mortar type of stores, the online shopping retailers can save selling cost, such as rent and labor cost, and consumers who purchase items via online shopping site also can save time for shopping trips. In this study, we confirm how the online shopping affects retailer’s selling cost and consumer’s purchasing cost compared with the case of shopping at brick-and-mortar stores. Furthermore, we examine how delivery manners affects retailer’s and consumer’s cost, concluding that the online shopping retailers should clearly introduce the delivery charge independent from the price of the items.

Keywords: online shopping, brick-and-mortar, value of time, delivery time

1. Introduction

Recently, more and more consumers use online shopping services. According to the research of U.S. research firm eMarketer, Global B2C online shopping sales amounted to about $1.25 trillion. The online shopping becomes major option also in Japan to purchase various items. According to statistics released by Ministry of Economy, Trade and Industry, total Japanese online shopping sales in 2013 reached about 11.2 trillion yen ($112 billion).

The development of online shopping services is stimulated by both retailers and consumers. The retailer’s strategy on store location has been decided comparing consumers’ accessibility and store size with rent and labor cost. However, online retailers’ warehouses can be located at suburban areas where the land price is cheaper. In those areas, retailers can manage more stocks, which enable them to save rent and labor cost compared to brick-and-mortar. The online shopping services also benefit consumers because they can purchase items anytime and save their shopping time. The major reasons for Japanese consumers’ online shopping usage were suggested in Ministry of Internal Affairs and
Communications (2011) (Fig. 1). According to this research, many people recognize two time related factors (“It allows me to buy things regardless of stores’ business hours.”, “I don’t have to spend the time and money it takes to go to the store.”) as major reasons.

![Fig. 1. Reasons for Shopping via the Internet (Multiple choices allowed)](source: “Communications Usage Trend Survey in 2011”)

As shown in Fig. 1, delivery time of items is quite important factor in online shopping to satisfy consumers’ demands. Compared with shopping at brick-and-mortar stores, consumers cannot use items immediately after they purchase at online shopping site. In this regard, consumers might recognize delivery time as their cost. Thus, online shopping retailers have required parcel delivery operators to reduce delivery time. In this study, we mainly consider the travel and delivery time as consumer’s cost. This is because the travel time is regarded as time to be saved for spending more time from the perspective of the value of time.

Japanese major online shopping retailers offer “free of delivery charge” to consumers. Of course, it takes some cost for delivery actually. The cost is included in the price of items. For this reasons, many Japanese consumers are hardly aware of costs for delivery. Moreover, consumers cannot choose delivery options such as discount delivery charge when consumers purchase several items at a time. So, it is suggested that they could take rational behavior with lower social cost by providing delivery options that reflect the cost for delivery. One of the City Logistics’ goals is the overall optimization of transportation in a city. Thus, considering the impact of consumers’ purchasing behavior on transportation in a city is quite important for City Logistics, we believe.

In these days, studies of online shopping have been conducted. There are a lot of the studies that deal with the relation between online shopping and consumers’ behavior in terms of the impact of electronic devices and information on consumers’ perceived risk and behavior of searching items (Nakamura and Yano (2014), Aoki (2005) and Abernathy et al. (2000)). On the other hand, many primary literatures about logistics have focused on optimal network design. These studies evaluate cost efficiency given several demand conditions and constraints. In terms of online shopping logistics, they focus how the actual logistics structures change due to growth of online shopping market, and indicate that the parcel delivery operators should design their networks according to the demand or some constraints (such as delivery time) changes (Lim and Shiodc (2011) and Anderson et al. (2003)). The relation between online shopping and transportation is analysed in order to show the impact on the environment due to individual travel behavior in addition to those of logistics (Edwards et al. (2009)).

These studies attempt to clarify the impact of online shopping growth on consumer’s behavior and logistics networks. On the other hand, there are not so many studies that focus on the impact of consumer’s behavior on online
shopping logistics, especially parcel delivery. In addition, there are fewer researches to compare the consumer’s purchasing behavior (brick-and-mortar and online shopping) in Japan.

The goal of this study is to confirm how the online shopping affects retailer’s selling cost and consumer’s purchasing cost compared with shopping at brick-and-mortar stores. In addition, we examine how the delivery time affects consumer’s purchasing cost. First, we organize current Japanese distribution and purchase type and suggest the model to compare the retailer’s and consumer’s cost of brick-and-mortar and online shopping. Second, we examine how delivery manners affects retailer’s and consumer’s cost in order to judge whether the online shopping retailers should clearly introduce the delivery charge independent from the price of the items.

2. Research Framework

2.1. Distribution Types of Brick-and-mortar and Online Shopping

The items from manufacturers to wholesalers and to retailers are often transported in large lot. In case of online shopping, items are delivered to each consumer in small lot. So, freight transportation of brick-and-mortar stores is more efficient than that of online shopping. On the other hand, consumers visit stores using their own cars, public transportations, or on their feet to purchase them. Thus, total traffic volume may decrease when more consumers purchase via online shopping site.

Modern retailers’ distribution types and consumers’ purchase behavior have been changed variously by the development of online shopping services. Recently, some online supermarket integrates the distribution of both brick-and-mortar store and online shopping site by receiving orders via Internet from consumers, picking up the items from store inventories and delivering them to the consumers. Moreover, some retailers have both physical stores and online shopping sites (click-and-mortar type). On the other hand, consumers can also choose convenient pickup point (in the case of Japan, it is generally convenience store). In addition, some consumers go to stores only for making preliminary inspection (showrooming) and then they purchase same but cheaper item at the online shopping site.

In order to make the story simple, we distinguish two distribution types (brick-and-mortar store and online shopping) in this study (Fig.2).

![Fig. 2. Distribution types of the brick-and-mortar store and online shopping](Source: Nemoto (2014))
2.2. Assumptions

Each retailer has different distribution system. For example, some retailers have their own warehouse and others do not, or some adopt online supermarket and others do not. On the side of consumers, there are not much statistical data of consumers’ behavior to estimate all various situations in Japan. To simplify comparison between brick-and-mortar and online shopping, we set following assumptions.

- The distribution system between the manufacturer and each retailer’s warehouse of both type are same. We compare the distribution system after each retailer’s warehouse.
- Retailers conduct warehouse operations by themselves. Transportations after warehouse are all outsourced to logistics service providers.
- The cost for ordering and inventory management of two types is same amount in this estimation.
- Consumers purchase same one cloth (same kind, quality and price) in both cases. We assume the price of the item is $50. This is based on Internet questionnaire survey about the average purchase amount of cloth per shopping via Internet in Nakamura and Yano (2014) which indicates that the largest percentage (37.1%, n=700) of the respondents answered “$50 ~ $100” and the second largest percentage (26.1%, n=700) of the respondents answered “$25~ $50” (at a rate of 100 yen per dollar). Omni-channel retailing, new retailers’ form having physical and online store such as UNIQLO, gradually offers the same price at physical store and online shopping site in the case of same item. This is because they prevent consumers’ confusion resulting from the price gap. In addition, they also prevent both stores taking sales each other.
- Consumers’ trip modes are restricted to cars and they go shopping only by themselves. The average speed of the car is 30km per hour, the car’s average fuel consumption is 10km per liter and the fuel price is $1.6.
- No showrooming is considered.
- The charge for delivery is free. Some Japanese online retailers include cost of delivery in the price of items to compete with other retailers.
- The item purchased at the online shopping site is delivered to consumer’s home (no other pick-up point) and is delivered on the next day (based on standard service level of Japanese parcel delivery operators).
- In the case of brick-and-mortar type, we consider time cost and fuel cost for consumer’s trip.
- In the case of online shopping type, we consider consumer’s time cost for waiting arrival of the item.
- Shopping time is regarded as “leisure”. So it is not regarded as cost in this estimation.

Fig. 3. Each activity of retailer, consumer and parcel delivery operators to estimate cost
Fig. 3 is a simplified version of Fig. 2 based on above assumptions. In this estimation, our target is the area inside broken line. Numerals ((i) ~ (xii)) in Fig. 3 are the classification of cost.

3. Results of the Cost Estimation

3.1. Retailer’s Selling Cost Comparison

First, we define retailer’s selling cost of both types as shown below. Selling cost of brick-and-mortar type is consisted of (i) cost for operating warehouse $C_W^B$, (ii) cost for transportation between warehouse and store $C_L^B$ and (iii) cost for operating store $C_S^B$ (equation (1)). Selling cost of online shopping type is consisted of (iv) cost for operating warehouse $C_W^D$ and (v) ~ (ix) cost for delivery from retailers’ warehouse to consumer (equation (2)).

\[
\text{Selling Cost (Brick and mortar Type)} = C_W^B + C_L^B + C_S^B \\
\text{Selling Cost (Online Shopping Type)} = C_W^D + C_D^D
\]  

(i) Cost for Operating Warehouse (Brick-and-mortar Type)

We assume that warehouse operation is conducted by retailer itself and transportation between warehouse and store is outsourced to logistics service provider. Therefore, all retailer’s logistics cost is considered as cost for operating warehouse in this case. This cost is calculated based on item unit price $50, retailer’s ratio of logistics cost to sales (4.66%) and in-house logistics cost to logistics cost (23.32%) (JILS (2013)).

\[
C_W^B = 50 \times 4.66\% \times 23.32\% = 0.54 \text{ (per item)}
\]

(ii) Cost for Transportation between Warehouse and Store

The cost for transportation between warehouse and store is retailer’s outsourcing logistics cost. So it is estimated based on item unit price $50, the ratio of logistics cost to sales (4.66%) and the ratio of outsourcing logistics cost to logistics cost (76.68%) (JILS (2013)).

\[
C_L^B = 50 \times 4.66\% \times 76.68\% = 1.79 \text{ (per item)}
\]

(iii) Cost for Operating Store

We assume that cost for operating store is consisted of rent of the store and labor cost. To calculate rent per item, we use the ratio of rent to sales (11.83%, we take the average in the past 6 years because the fluctuation range of the ratio of each year is high) (JCSC (2013)). Labor cost per item is calculated based on the ratio of labor cost to sales (14.26%), according to the preliminary figures for 2014 (from April to June 2014) of “Business Analyses & Statistics by TKC”.

\[
C_S^B = 50 \times 11.83\% + 50 \times 14.26\% = 13.04 \text{ (per item)}
\]

(iv) Cost for Operating Warehouse (Online Shopping Type)

Online shopping retailer’s warehouse operations are also conducted by retailer itself and the item delivery are outsourced to logistics service providers (parcel delivery operators), same as in the case of the brick-and-mortar type. The cost for operating warehouse per item is calculated based on Japanese online shopping retailers’ average ratio of logistics cost to sales (12.09%) and in-house logistics cost to logistics cost (27.56%) (JILS (2013)).
\( C^W_D = \$50 \times 12.09\% \times 27.56\% = \$1.67 \text{ (per item)} \)  \hspace{1cm} (6)

(v)–(ix) Cost for Delivery from Retailer’s Warehouse to Consumer

In the case of B2C, unit price per delivery depends on each contract between retailers and parcel delivery operators, which is different from that of C2C. According to “Supplementary Materials for Settlement of Accounts for Year Ended March 31, 2014” of Yamato HD, the leading company of parcel delivery operators in Japan, TA-Q-BIN, which is the parcel delivery service provided by major parcel delivery operator Yamato Transport, unit price is 574 yen ($5.74). This price includes both C2C and B2C price, and the price of B2C alone is not released. Unit price of B2C is generally cheaper than that of C2C as it can be taken lower cost to collect a lot of parcels at one pickup point. Morita (2014) estimates this unit price approximately 350 yen ($3.5) based on his interview investigation to major online shopping retailers and independent logistics service providers for online shopping retailers. In this estimation, we adopt this estimated value.

\( C^O_D = \$3.5 \text{ (per item)} \)  \hspace{1cm} (7)

<table>
<thead>
<tr>
<th>Shopping types</th>
<th>Brick-and-mortar Store Type</th>
<th>Online Shopping Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) cost for operating warehouse</td>
<td>$0.54</td>
<td>(iv) cost for operating warehouse</td>
</tr>
<tr>
<td>(ii) cost for transportation between warehouse and store</td>
<td>$1.79</td>
<td>$1.67</td>
</tr>
<tr>
<td>(iii) cost for operating store</td>
<td>$13.04</td>
<td>(v)–(ix) cost for delivery from retailer’s warehouse to consumer</td>
</tr>
<tr>
<td>Total Cost</td>
<td>$15.37</td>
<td>$5.17</td>
</tr>
</tbody>
</table>

Table 1 shows the amount cost per item calculated in equation (1) ~ (7). Logistics costs (cost for operating warehouse and transportation or delivery cost) of online shopping type are higher than those of brick-and-mortar store type. This result is not different from general image of online shopping type’s feature. On the other hand, in the case of brick-and-mortar store type, it takes a lot of money to operate physical store. In this estimation, total cost per item of brick-and-mortar store type amounts approximately three times higher than that of online shopping type.

It is generally spoken that the cost for system maintenance of online shopping retailers tends to be higher than brick-and-mortar retailers. In this estimation, we assume that the system is mainly for sales and inventory management and each cost for system maintenance is same. However, for online shopping retailers, their web sites are sales floor. Therefore, they should devise the design of their website and rent the server that can with stand the large amount of consumers accessing.

In our estimation, retailer’s selling cost of online shopping is lower than that of brick-and-mortar. But, it is important to recognize following points for understanding why many retailers actually have their physical stores.

First, it is generally spoken that the cost for ordering of online shopping retailers tends to be higher than brick-and-mortar retailers. In this estimation, we assume that cost is same amount. However, for online shopping retailers, their web sites are sales floor. Therefore, they should rent the server that can withstand the large amount of consumers accessing and take more money to manage and protect consumer information than brick-and-mortar retailers.

Second, to satisfy consumer’s demand for checking or trying item, some retailers have both physical store and online shopping site, as shown in Fig.2.

3.2. Consumer’s Purchasing Cost Comparison

We define the consumer’s purchasing cost of brick-and-mortar type as the total amount of (x)fuel cost \( C^F_B \) and (xi)trip time cost \( C^T_B \) and that of online shopping type as (xii)waiting item time cost \( C^T_O \). The cost of item itself is excluded from the estimation because we assume the exact same item is being bought in both types. Moreover, we do not consider the shopping time (including the search time in online shopping type) as cost but benefit. As several
researches point out (e.g. Saito et al. (2003), Kato (2013) etc.), the shopping is generally recognized as “primary demand”, while shopping trip is recognized as “derived demand”. Thus, the time of shopping can be considered as leisure by consumers.

\[
\text{Purchase Cost (Brick and mortar Type)} = C_{FB} + C_{BT} \quad (8)
\]

\[
\text{Purchase Cost (Online Shopping Type)} = C_{OB} \quad (9)
\]

(x) Fuel Cost

We assume that the consumer goes to the store by his/her own car with no fellow passenger and buys one item. Ministry of Internal Affairs and Communications (2011) shows the average trip time of cars per 1 trip on holiday as 29.9 minutes (approximately 0.50 hours). Based on this datum and assumptions about cars (car’s average speed 30km per hour and car’s average fuel consumption 10km per liter) and fuel price $1.6 per liter, the fuel cost per item is calculated below.

\[
C_{FB} = $1.6 \times 30 \div 10 \times 0.50 = $2.39 \text{ (per item)} \quad (10)
\]

(xi) Trip Time Cost

In the field of transportation economics, the trip has been considered as “derived demand” to fulfill the “primary demand” such as activities at the destinations. Therefore, it is generally considered that the trip time as cost except for the case that person enjoys his/her trip as leisure. Trip time cost for shopping changes due to the trip mode, person’s income and the situation. In this estimation, we adopt the driver’s value of time (non-business) 28.87 yen per minute ($0.29 per minute) calculated in Ministry of Land, Infrastructure, Transport and Tourism (2006). We utilize the datum of the average trip time 29.9 minutes (Ministry of Internal Affairs and Communications (2011)).

\[
C_{BT} = $0.29 \times 29.9 = $8.63 \text{ (per item)} \quad (11)
\]

(xii) Waiting Time Cost

In the case of online shopping, it takes times to receive the item after consumers order it at the online shopping site. We consider this waiting time as cost for consumers who purchase items at online shopping sites. Although the value of trip time by a person is generally considered simply as an opportunity cost, it is difficult to estimate value of waiting time. It is because of the difference between how they can use that time. A person can do something else when waiting for their purchased item to arrive, which means they are not wasting their time when waiting.

Hsiao (2009) estimated the value of waiting time as $0.53 per day based on the personal interview with questionnaire in 2002 at bookstore. However, it is quite difficult to simply adopt this value of time in our estimation because the respondents in that interview might go to the bookstore by various modes and it might be difference of the basic value of time between Japanese and Taiwanese. For example, Hsiao (2009) estimated the value of trip time as $5.29 per hour. On the other hand, the value of trip time we adopt in this study is $17.32 per hour (this gap may be due to the influence of difference in assuming person’s trip mode).

So we assume the value of waiting time is $5 per day referring the express delivery service charge of major online shopping site Amazon. In Japan, items are delivered within two days to most area with exception of isolated islands. Thus, we set the delivery time as 36 hours assuming that consumer purchase at around midnight and receive the item day after tomorrow morning.

\[
C_{OB} = $5 \div 24 \times 36 = $7.50 \text{ (per item)} \quad (12)
\]
Table 2. Consumer’s Purchasing Cost Comparison by Two Types

<table>
<thead>
<tr>
<th>Shopping types</th>
<th>Brick-and-mortar Store Type</th>
<th>Online Shopping Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>(x) fuel cost</td>
<td>$ 2.39</td>
<td>(xii) waiting arrival of the item time cost</td>
</tr>
<tr>
<td>(xi) trip time cost</td>
<td>$ 8.63</td>
<td></td>
</tr>
<tr>
<td>Total Cost</td>
<td>$ 11.02</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 shows the total cost per item calculated in equation (8) ~ (12).

The total cost of brick-and-mortar type is 1.5 times higher than that of online shopping type. In this estimation, we assume that the consumers purchase one item. If the consumers purchase several items at one trip for shopping, consumer’s purchasing cost per item can be reduced. In addition, we have to note that the barriers for purchasing at online shopping site that is difficult to converse monetary cost are not considered in our estimation.

The total cost of online shopping type can be reduced by shortening delivery time. For example, if the standard delivery time was shortened to six hours, the waiting time cost is reduced to $1.25. In this estimation, we assume the value of waiting time as $5, though the value of waiting time is influenced by the price of items or the speed of obsolescence same as the consumer’s features. Shortening the delivery time has a significant effect on waiting time cost especially when a consumer purchases fashionable clothes because of the speed of obsolescence.

As shown in Table 2, consumer’s purchasing cost of online shopping type is lower than those of brick-and-mortar store type. In spite of this superiority in the aspect of purchasing cost, as shown in some researches in Japan (Ministry of Internal Affairs and Communications (2011, 2012) and Aoki (2005)), many Japanese consumers purchase clothes at physical store. We think this difference is caused by three factors.

First, we did not take the inconvenience of consumers in account (e.g. they cannot try on and their distrust of online shopping). To understand more deeply why consumers purchase at the physical stores or online shopping sites, we have to analyze consumer behavior besides cost analysis.

Second, we did not take the benefit of shopping in account. The purpose of consumers is not only to get items but also to enjoy talking to salesclerks or window-shopping. If we can take these benefits in account, consumer’s purchasing cost of brick-and-mortar should be offset by them.

Third, we hypothesize assumptions such as the number of clothes that consumer purchase and the unit value of waiting time. These assumptions should also affect consumer’s purchasing cost. For example, that of brick-and-mortar might be lower when consumers purchase several items at one shopping.

All these three factors have important role to affect consumer’s behavior. However, we have not enough data to monetize the consumer’s inconvenience and benefit for shopping. Although those future issues remain, we can confirm the online shopping type’s superiority in the aspect of retailer’s selling cost. In the next section, we consider the variation of three assumptions mentioned above.

4. Sensitivity Analysis and Implication

4.1. When Consumers Purchase Several Items at a Time

When consumers purchase at physical store (brick-and-mortar), their purchasing cost per item gets lower. Because the number of purchasing items do not affect fuel cost or their trip time. On the other hand, even if consumers purchase several items at a time and order to deliver those items together via online shopping site, it does not change in our estimation. It is affected by delivery time. Thus the number of items does not affect any consumers’ purchasing behavior in the case of online shopping.

This is because consumers cannot pay delivery charge responding to actual delivery cost of their orders due to “free of delivery charge”. Even if online shopping retailers hold up it, the cost for delivery arises actually. The delivery charge is included in the price of items. Therefore, when consumers purchase two items and order to deliver them together, they pay twice delivery charge (Fig.4). Moreover, when they purchase several items and order to deliver together, it is likely that “free of delivery charge” makes consumers pay higher delivery charge because actual cost for delivery is affected by the number of delivery times rather than the number of items delivered at a time.
Price including delivery charge might not prompt consumers to order delivering all items together. If online shopping retailers introduce the delivery charge discount when consumers purchase several items and select combined delivery, consumers can choose rational behavior by recognizing the relation between delivery charge and services (Fig.5).

4.2. The Unit Value of Waiting Time

The parcel delivery services and online shopping services have been developed affecting each other. In Japan, early online shopping development depended on the parcel delivery services that had been already developed at that time. Recently, some kinds of parcel delivery services were started affected from online shopping services, such as the designation of convenience stores as a pick-up point for their parcels and the designation of delivery time window.

Fig.7 shows how the consumer’s purchasing cost responds to the change in the delivery time in case of online shopping. In this estimation, we assume the waiting time cost as $5 and the consumer purchases only one item. In this case, the consumer’s purchasing cost of online shopping type is lower than that of brick-and-mortar store type, when the waiting time is shorter than approximately 53 hours.

We set the waiting time cost as $5 based on the express delivery charge of Amazon. As mentioned above, however, the willingness to pay for shortening delivery time depends on consumer’s preference and their situations. For consumers who have higher waiting time cost, shortening delivery time can make significant influences (e.g. same day delivery). On the other hand, for consumers who have lower waiting time cost, the benefit of shortening delivery
time could be small. Therefore, they may utilize online shopping services if the standard delivery time was longer than current level.

Currently, major Japanese parcel delivery operators can deliver to most of the domestic areas within two or three days without extra charge for express services. It may be possible that current standard delivery time is excessive service for consumers who have low waiting time cost. If parcel delivery operators set the lower charge for slower delivery than the current operations, the demands of consumers who have lower willingness to pay for getting the items quickly can be satisfied.

However, it might take more cost to keep parcels in parcel delivery operators’ warehouse as current their delivery network are designed assuming within two or three days delivery. Today, some parcel delivery operators start the inventory control or ordering and accepting services for small and medium-sized online shopping retailers. If major parcel delivery operators can grasp consumers’ order information and manage inventory of online shopping retailers, it might be possible to reduce their cost and introduce “discount delivery charge for slower delivery” by delivering items that consumers purchase at several online shopping site. However, we also consider the problem of personal information protection.

5. Conclusion

In this study, we estimated the retailer’s selling cost and consumer’s purchasing cost in the case of two types (brick-and-mortar store type and online shopping type). And then, we confirmed that online shopping type achieve the lower cost in both retailer’s and consumer’s side. We consider this cost gap may be one of the causes that online shopping has spread. When consumers designate combined delivery or pick up point (such as convenience store in Japan), it can be also save the cost for delivery. Thus, we suggest that the online shopping retailers should clearly indicate the delivery charge independent from the price of the items and the possibility of introducing slower delivery. For that reason, parcel delivery operators should prepare more delivery options reflect actual cost.

If consumers can choose delivery time considering the delivery charge, they can pay as much the cost as the service they want to receive and excess truck transportation can be reduced. Separating delivery charge from the price of items that reflects actual cost is important.

Visualization of relation between delivery charge and delivery services might affect other services. Currently, Japanese parcel delivery operators provide time window delivery as a basic service, nevertheless re-delivery service with no extra charge. So we suggest that if consumers designate time window and complete the delivery successfully, the delivery charge should be discounted. On the other hand, if they designate time window but they are absent resulting in re-delivery, they should pay extra delivery charge as a penalty.

Japanese parcel delivery operators also provide designated pick up point delivery as a basic service. It is more efficient to deliver to designated pick up point than to each consumer’s home as parcel delivery operators deliver
several items to one place at a time without failure delivery. So, if consumers designate pick up point, the delivery charge should be discounted reflecting operators’ delivery cost.

In addition, to comprehensively analyze the spread of online shopping, we have to understand various factors, such as mentioned above, in the view of consumer’s behavior. While our estimation showed the superiority of online shopping type in the aspect of retailer’s and consumer’s cost, many Japanese consumers have no experience purchasing at online shopping sites. According to the investigations of Ministry of Internal Affairs and Communications (2014), the proportion of the households with two people or more that utilized online shopping for a certain year is 24.3% in Japan. This investigation did not focus on single-person households. Other investigation (Ministry of Internal Affairs and Communications (2012)) shows the proportion of consumers (over 15 years old) who have experience purchasing items at online shopping sites is 36.5%.

There are some other reasons that consumers are not willing to purchase at online shopping site besides the delivery time, such as decrease in shopping time (leisure time), not to be able to try on and distrust of the online settlement security and online shopping retailers. These barriers that consumers may feel can also be considered as each consumer’s cost. Estimating these barriers are our future issues. However, it may be sure that consumers’ purchasing cost in online shopping type is decreasing because of the factors such as the improvement of online settlement security and parcel delivery services, increase in the number of online shopping users, consumers’ awareness that they can search many items or compare the prices easier than shopping at physical stores.

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