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Grocery Shopping via T-Commerce in Korea: New Shopping Channel Adoption Behavior Based on Prior E-Commerce Experience

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Abstract

The main goal of this study is to investigate the willingness to adopt t-commerce for grocery shopping in South Korea. This study endeavors to recognize existing differences among consumer behaviors based on e-commerce experience. The sample was divided into two groups: one group with online grocery shopping experience and one group without online grocery shopping experience. The groups were compared to identify differences in willingness to adopt t-commerce as a new shopping medium. The two groups showed different motivations for t-commerce-based grocery shopping based on their previous shopping experience.

Keywords: t-commerce, online grocery shopping, Internet Protocol Television, compatibility

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Introduction

As part of a direct agricultural market policy, the Korean government informatized agriculture by developing electronic commerce (e-commerce) in the late 1990s for local farmers (Moon et al. 2012). E-commerce has been associated with policies that shortened the supply chain by minimizing the role of a middleman, and thus provide consumers fresher product at lower prices along with higher profits for farmers. This has contributed to continuously expanding the e-commerce market for agricultural products; the market has increased from 182 million USD in 2001 to 3,847 million USD in 2012 (Statistics Korea 2013). The retail formats of grocery shopping have diversified into e-commerce and other non-store formats.

Following the success of e-commerce as a medium for the direct agricultural market, TV commerce (t-commerce) based on Internet Protocol TV (IPTV) has received attention as an innovative transaction channel for increased competitiveness of the agricultural sector. T-commerce is an electronically mediated form of commerce that uses television as an interactive tool (Yu et al. 2005). T-commerce is also a non-store transaction format, similar to TV home shopping and e-commerce. This tool, like that of previous e-commerce activities, is expected to shorten the previous supply chain and thus enhance the welfare of farmers and consumers.

Although the number of IPTV subscribers in South Korea has been increasing, and exceeded 7 million in 2013, the current t-commerce market is still in initial stages relative to other non-store transaction formats (Korea On-Line Shopping & Association 2013). Moreover, only a few empirical and theoretical studies address t-commerce in academia. Only a few studies (e.g., Yu et al. 2005, Brown et al. 2006, Park 2008, Jung 2011, Kim et al. 2011) focused on finding the factors that affect users' adoption of t-commerce.

This study is the first to compare customers' attitudes toward adopting t-commerce by focusing on consumers' previous online grocery shopping experience. The main goals of this study are as follows:

(1) to examine the relationship between prior online grocery shopping experience and preference for other retail formats (Study 1) and;
(2) to investigate the differences in attitudes toward adopting t-commerce for grocery shopping, based on prior online grocery shopping experience (Study 2).

T-Commerce and IPTV in Korea

T-commerce refers to 'all kinds of commercial services that occur through a digital set top box of either a cable TV or an IPTV' (Lee 2013). As an electronically mediated business, t-commerce uses interactive television that combines video, voice, and transactional functions (Yu et al. 2005). It is one of various non-store shopping formats, such as TV home shopping and e-commerce (Dholakia et al. 2002).

Oh (2010) classified t-commerce as 'exclusive t-commerce' and 'subsidiary t-commerce'. Exclusive t-commerce provides t-commerce services only via an exclusive television channel. Subsidiary t-commerce, however, synchronizes with an existing television channel such as cable

or terrestrial channels to provide t-commerce services. Most existing t-commerce channels in Korea are subsidiary t-commerce, and usually synchronize with TV home shopping channels. T-commerce in Korea is still at an early stage.

Nevertheless, South Korea's t-commerce market is expected to increase substantially as shown in Table 1. According to the Korea Communications Commission (KCC), the t-commerce market increased by an estimated 170 million USD in 2014.

Table 1. Sales growth of and prospects for t-commerce (unit: million USD)

	2010	**2011**	**2012**	**2013(F)**	**2014(F)**
Sales	56.81	75.75	85.22	113.63	160.97
Growth Rate	-	33.3%	12.5%	33.3%	41.7%

Source. (Lee 2013)

There are several reasons behind these assumptions, such as digitalization of broadcasting and increased convenience of t-commerce. Since the early 2000s, the traditional cable broadcasting services have been digitalized and converged with various emerging technologies. In Korea, t-commerce has drawn attention as a new 'growth engine' for digital broadcasting.

IPTV was introduced in South Korea after the Internet Multimedia Broadcasting Law was enacted in 2008. This was later than other developed countries such as France and the United States. In these two countries, IPTV services have been provided since 2003 and 2005, respectively. However, Korea has witnessed the fastest subscription growth rate (DMC Media Team 2013). By the second quarter of 2013, the total number of subscribers exceeded 7.5 million, represented by the three major IPTV suppliers: KT, SK Broadband, and LG U+. In addition, traditional analog television service was terminated in 2012. This led more consumers to digital broadcasting, thus becoming more exposed to t-commerce.

In addition, the rapid increase in multimedia technologies has also contributed to increasing the convenience of t-commerce for users. The dissemination of smart TV and improved user interfaces are several examples. The t-commerce market has also been stimulated by the government. The Korea Communications Commission (KCC) created an activation plan for t-commerce in May 2012.

As shown in Table 2, the total number of household audiences for IPTV, digital satellite TV, and digital cable TV has increased steadily. Such figures can be interpreted as the representation of unengaged customers who have the potential to use t-commerce in the future. In 2012, this number was recorded at 15.3 million, a 28.1% increase compared to the previous year.

Table 2. Number of t-commerce subscribers (unit: 1,000 households)

	2008.12	**2009.12**	**2010.12**	**2011.12**	**2012.12**
Digital cable TV	1,912	2,675	3,423	4,185	5,196
IPTV	-	1,740	3,500	4,500	6,310
Digital satellite TV	2,354	2,457	2,830	3,260	3,790
Total	4,266	6,872	9,753	11,945	15,296
Growth rate (%)	-	61.1%	41.9%	22.5%	28.1%

Source. (Lee 2013)

Although all channels listed in Table 2 are eligible to provide t-commerce services, IPTV holds the biggest market share and expected growth (Kim et al. 2006). Therefore, in this study, the scope of defining t-commerce is limited to IPTV.

Despite the increase in t-commerce, only a few empirical and theoretical studies address t-commerce in academia. Some studies (e.g., Park 2008, Kim et al. 2011) addressed consumers' prior experience in other non-store media as an important factor that explains the current extension of t-commerce technology. Park (2008) investigated factors that influence willingness to adopt t-commerce. The results showed that the maximum willingness to pay for t-commerce tends to increase along with an increase in the average frequency of non-store transactions per month. Kim et al. (2011) also referred to compatibility in explaining the adoption of t-commerce, which they called 'media substitutability'. The positive effect of the perceived substitutability of t-commerce for e-commerce on user intention to adopt t-commerce was investigated. Here, t-commerce is assumed to have similar functions to support e-commerce transactions; therefore, t-commerce is compatible with e-commerce.

Although prior studies have attempted to draw out a relationship between a consumer's experience and t-commerce, such studies were focused on 'perceived' media substitutability (Kim et al. 2011). Instead of examining the effect of 'perceived' substitutability, the present study endeavors to recognize the existing differences among the behaviors of t-commerce adoption, based on e-commerce experience by asking directly about the frequency of and preference for each retail format. Moreover, various retail formats (i.e., physical store, TV home shopping, e-commerce) were addressed to investigate the change within existing formats used when a new retail format is adopted. Park (2008) only examined within non-store retail formats.

Theoretical Background

Kemp et al. (1998) argued that new technology or advanced technology is not easily accepted and adapted by society. There is not just one barrier to the introduction of alternative or new technologies; various factors hinder the introduction and diffusion. Numerous conditions and methods are required to fit the new technology into the world. Rodger's (1995) innovation diffusion theory explains the barriers to new technology and the adoption process of information technologies in many studies. According to Rodger (1995), the technology adoption rate is affected by five innovation attributes: relative compatibility, relative advantage, complexity, trialability, and observability.

In the same study, Rodger (1995) defined compatibility as 'the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters' (p. 224). Rodger stated that people are more likely to adopt an innovation they feel comfortable with, due to previous experience using a technology with similar functions. Wu et al. (2005) found that compatibility had the most significant influence on perceived usefulness and users' behavioral intent to use. The researchers empirically tested the integrated model of innovation diffusion theory and the technology acceptance model (TAM).

Other scholars agreed that people are more likely to adopt new information technologies compatible with those used previously (Joo et al. 2006, LaRose et al. 1992, Sarrina Li 2004). For

instance, according to Joo et al. (2006) individual intimateness, habit, and functional similarity positively influence the adoption intention when consumers adopt new technology, such as interactive TV. LaRose et al. (1992) investigated the adoption of phone-delivered information services, and Sarrina Li (2004) showed the effect of previous usage experience of similar technology in the adoption of interactive cable television.

The effect of technology compatibility has also been explored in the field of retail formats choice. For instance, Eastin (2002) assessed the effect the experience formed through telephone and Internet usage on the adoption of four e-commerce activities (online shopping, online banking, online investing, and electronic payment for Internet services). According to the results, the experience built from previous use of telephone and the Internet positively affected the adoption of all four e-commerce activities.

Hypothesis Development

Study 1. Relationship between online grocery shopping experience and other grocery shopping channels experience

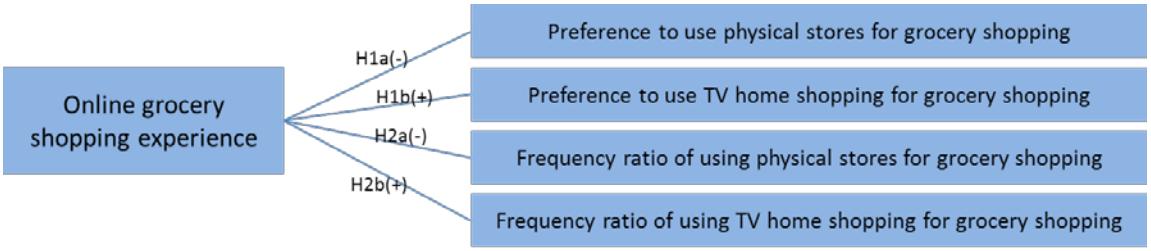

Figure 1. Relationship between online grocery shopping experience and other grocery shopping channels experience

Study 1 investigated the relationship between online grocery shopping experience and other grocery shopping channels (Figure 1). The 'compatibility' of online grocery shopping experience with existing grocery shopping channels was examined first, before addressing the effect of online grocery shopping experience on t-commerce adoption behavior.

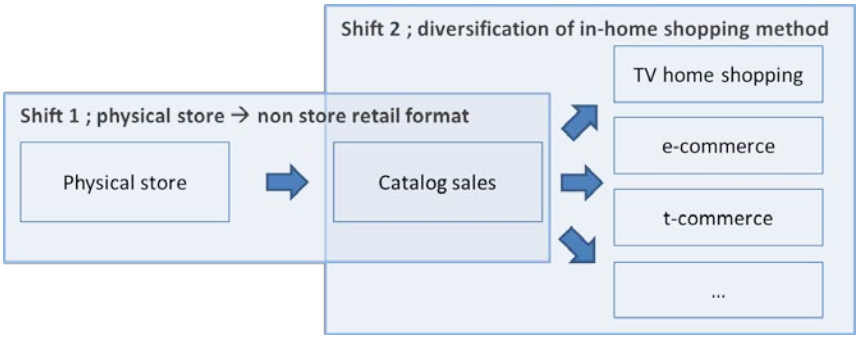

Figure 2. Shift from physical stores to non-store retail formats
Source. Dholakia et al. 2002

The shift from physical stores to non-store retail formats is divided into two levels (Figure 2; Dholakia et al. 2002). After the shift from physical stores to catalog sales, further shifts may occur within various in-house shopping media ranging from catalog sales and TV home shopping to e-commerce (Dholakia et al. 2002). Since the compatibility of newly introduced innovations with existing technologies is critical (Rodger 1995), e-commerce can be assumed to be compatible with other non-store retail formats (e.g., TV home shopping) but less compatible with traditional physical stores. Thus, consumers without e-commerce experience may favor physical stores with higher frequency compared to those with prior experience. However, consumers with online grocery shopping experience may prefer to use TV home shopping with higher prevalence than consumers without online grocery shopping experience.

H1a: Consumers without online grocery shopping experience prefer to use physical stores more than consumers with online grocery shopping experience.

H1b: Consumers with online grocery shopping experience prefer to use TV home shopping more than consumers without online grocery shopping experience.

H2a: Consumers without online grocery shopping experience use physical stores more frequently than consumers with online grocery shopping experience.

H2b: Consumers with online grocery shopping experience use TV home shopping more frequently than consumers without online grocery shopping experience.

Study 2. Relationship between online grocery shopping experience and t-commerce adoption behavior

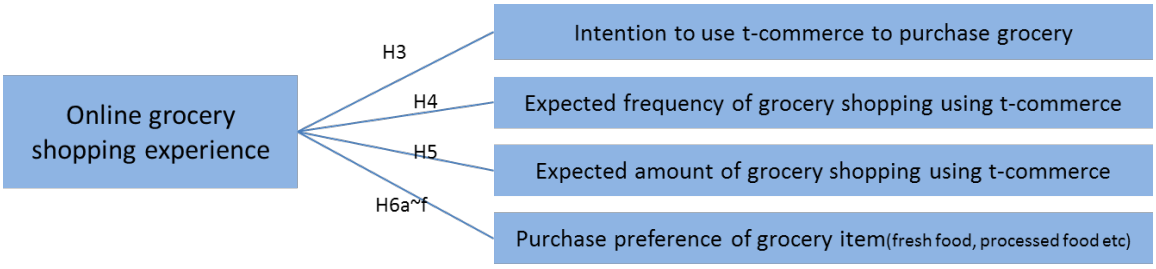

Figure 3. Relationship between online grocery shopping experience and t-commerce adoption behavior

Study 1 demonstrated the compatibility of e-commerce with other retail channels, as well as the relationship between the preference for and frequency of using such channels. Based on the results from Study 1, Study 2 addressed the association among online grocery shopping experience and t-commerce adoption behavior (Figure 3).

According to Rodger (1995), people tend to prefer technology that is familiar; thus, consumers may consider television more comfortable relative to other payment methods. Moreover, according to Rodger, the inclination to use new technology may also increase. Prior online grocery shopping experience may influence willingness to use t-commerce, expected shopping frequency per month, and expected purchase amount per transaction via t-commerce.

H3: Consumers with online grocery shopping experience have higher willingness to use t-commerce than consumers without online grocery shopping experience.

H4: Consumers with online grocery shopping experience have higher expected shopping frequency using t-commerce than consumers without online grocery shopping experience.

H5: Consumers with online grocery shopping experience have higher purchase amount expected per transaction when using t-commerce than consumers without online grocery shopping experience.

Fresh agricultural products such as vegetables, meats, and fruits are highly heterogeneous, and create different consumer perceptions of product quality (Chung et al. 2006). The complexity in describing such products increases the level of difficulty for consumers to try the goods (Choe et al. 2009). However, more standardized items such as processed or half-processed food are relatively homogeneous, where consumers are less concerned about the freshness of the product. Therefore, grocery items can be either homogeneous or heterogeneous, as can be seen in the range of agricultural products and processed items, respectively. Based on this understanding, the issue of product quality information and its effect on consumers' willingness to make e-commerce purchases was raised. The findings suggested that customers are willing to pay extra for an item in return for premium information regarding possible risks associated with the product's heterogeneity. Such data can be applied to e-commerce and t-commerce. This especially concerns the perspective that suggests consumers lack awareness to verify the quality of a heterogeneous product, which generates the issue of information quality. In the present study, six items were selected: three items (fresh vegetables, meats, and fruits) as the heterogeneous category and three other items (half-processed, processed, and grains) as the homogeneous category.

Based on this information, a question regarding the differences in grocery shopping behavior shown between e-commerce and t-commerce experience was raised. Previous e-commerce experience may minimize the level of information necessary to increase the preference for t-commerce as a medium for grocery shopping to match that of e-commerce.

H6a–f: Consumers with online grocery shopping experience prefer to shop for grocery items such as fresh vegetables (H6a), meats (H6b), fruits (H6c), half-processed food (H6d), processed food (H6e), and grains (H6f) using t-commerce more than consumers without online grocery shopping experience.

Data Collection and Sample

A survey was conducted to study the willingness of consumers to use t-commerce for grocery shopping. The survey was conducted in South Korea in May of 2012 with 498 female consumers aged 25 to 59 years who currently subscribe to IPTV services. The average household income was $4,000USD per month, 10% of which was allocated to purchase food on average.

Questionnaires were developed to explore the relationship between online grocery shopping experience and other grocery shopping channels (see Appendix). The respondents were asked to indicate their preference for each grocery shopping channel, such as physical store, TV home shopping, and e-commerce, using a seven-point Likert scale. There was also an open question that asked about the usage frequency per month of each channel. From this, the relationship between online grocery shopping experience and t-commerce adoption behavior was investigated. After brief instructions were provided about how to use t-commerce for grocery shopping, participants were asked to indicate their willingness to use the channel with a seven-point scale. Expected frequency and expected purchase rate using t-commerce were asked about as open questions. Last, when t-commerce is used, the preferences for each item for grocery shopping were asked with the same seven-point scale.

Data Collection and Sample

The demographic characteristics of the respondents are presented in Table 3. The average age of the participants was 39 years old. The majority was married, and about half of the respondents were housewives.

Table 3. Demographic characteristics of respondents

		Frequency	**Percentage**
Age (n=498)	25-34	160	32.1
	35-44	200	40.2
	44-60	138	27.7
Marital status (n=498)	Married	427	85.7
	Single	71	14.3
Occupation (n=498)	Housewife	241	48.4
	Other	257	51.6

Profile of Consumers with Online Grocery Shopping Experience and Consumers without Online Grocery Shopping Experience

This study divided respondents into two groups according to their previous online grocery shopping experience: one group with online grocery shopping experience and one group without online grocery shopping experience. This study tried to investigate the characteristics of and differences between these groups, focusing especially on age, marital status, occupation, income, and IPTV usage frequency. Table 4 lists the profile of each group, where the differences among the groups are shown in age and occupation. The majority of the consumers between 35 and 44 had previous online grocery shopping experience. In terms of occupation, consumers with online grocery shopping experience were generally employed female. There were no significant differences between the two groups in terms of marital status, IPTV use frequency on weekdays, and the monthly average income per household.

Table 4. Profile of consumers with and without online grocery shopping experience (n=498)

		Customers without online grocery shopping experience (n=191, 38.4%)	**Customers with online grocery shopping experience (n=307, 61.6%)**
Age*	25-34	69 (13.9%)	91 (18.3%)
	35-44	60 (12.0%)	140 (28.1%)
	44-60	62 (12.5%)	76 (15.2%)
Marital status	Married	164 (33.0%)	263 (52.8%)
	Single	27 (5.4%)	44 (8.8%)
Occupation*	Housewife	106 (21.3%)	135 (27.1%)
	Employed	85 (17.1%)	172 (34.5%)
IPTV use frequency during weekdays	Less than 6 hours	120 (24.1%)	198 (39.7%)
	More than 6 hours	71 (14.3%)	109 (21.9%)
Monthly average income		4,423 USD	4,540 USD

*p<0.01

Data Analyses and Results

Study 1. Relationship between online grocery shopping experience and other grocery shopping channels

An independent sample t-test was performed to see whether differences existed in the preferences for and frequency of using other channels of grocery shopping for customers with online grocery shopping experience compared to those without any previous experience. The frequency ratio of TV home shopping and physical stores was used as a comparison in controlling the total grocery shopping frequency. The results shown in Figure 3 support the proposed hypotheses H1 and H2.

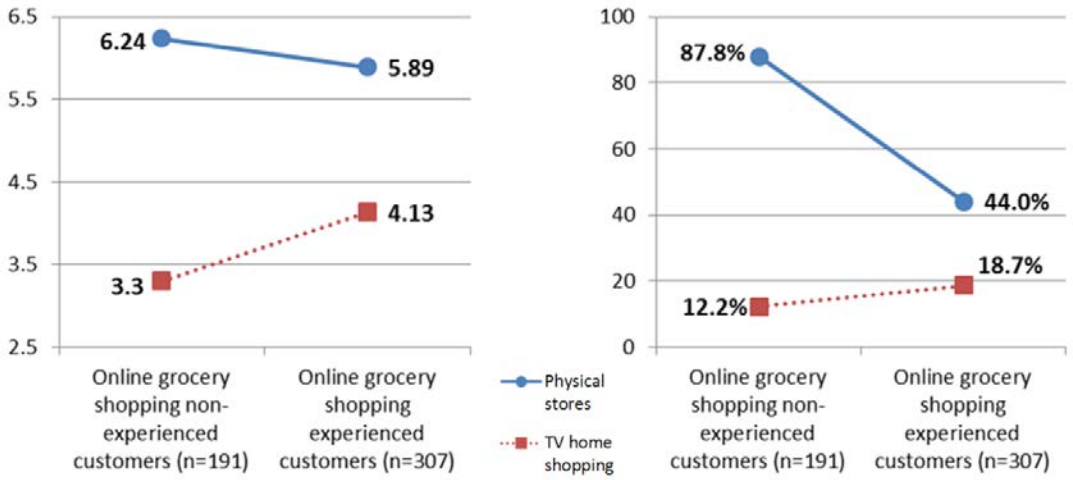

Figure 4. Shopping place preference (left) and purchase frequency per month (right)

Following the previous assumption, consumers without online grocery shopping experience preferred to use physical stores (*H1a*, $p<0.01$) and shopped more frequently in physical stores (*H2a*, $p<0.001$) compared to consumers with previous online grocery shopping experience.

Significant differences were observed among the preference (*H1b, p<0.001*) and shopping frequency ratio (*H2b, p<0.001*) of purchasing using TV home shopping channels for the group with previous experience compared to those without experience. The results suggest that consumers with previous online grocery shopping experience tend to prefer TV home shopping to make purchases compared to the other group. This tendency can be explained using the relationship between TV home shopping and e-commerce, which has similar characteristics, since both are non-store-based retailer channels (Yang et al. 2010).

Study 2. Relationship between online grocery shopping experience and t-commerce adoption behavior

Willingness to Use T-Commerce for Grocery Shopping

The differences among willingness to use t-commerce (*H3, H4, H5*) for grocery shopping were analyzed using the independent sample t-test, along with one-way ANOVA. The results are presented in Table 5.

The results partially support the hypothesis regarding willingness to use t-commerce (*H3, H4, H5*). Following expectations, the consumer group with previous e-commerce experience showed higher willingness to use t-commerce for grocery shopping (*H3*, p<0.001), as well as higher expected frequency of shopping per month via t-commerce (*H4*, p<0.001). Nonetheless, the expected purchase amount per transaction did not differ significantly between the groups (*H5*, p=.18).

The functional similarity of e-commerce and t-commerce significantly affects willingness to use t-commerce and its expected frequency of use. However, no significant differences in the purchase amount were observed, which can be assumed to have a higher relation with customers' income, and income levels did not differ significantly between the groups as shown in Table 5.

Table 5. Comparison of willingness to use t-commerce for grocery shopping between consumers with online grocery shopping experience and consumers without experience

		Customers without online grocery shopping experience	**Customers with online grocery shopping experience**	
		(n=191)	**(n=307)**	**t**
Willingness to use t-commerce	Willingness to use	4.92	5.6	-6.864**
	Expected shopping frequency per month	1.87	2.67	-5.530**
	Expected purchase amount per transaction	$33.08 USD	$37.66 USD	-1.858

**p<0.001

Grocery Shopping Product Preference Using T-Commerce

The differences in grocery shopping behavior using t-commerce were analyzed with the independent sample t-test. The proposed hypothesis (*H6*) was supported; the results are

presented in Table 6. Consumers with online grocery shopping experience preferred to purchase every product category in grocery shopping using t-commerce compared to consumers without online grocery shopping experience (*H6a, H6b, H6c, H6d, H6e, H6f*).

Higher preference for purchasing processed food (4.94, 5.32) and grains (5.15, 5.54) compared to fresh agricultural products was found in both groups. This is due to the heterogeneity found among fresh agricultural products, which generates a certain perception among consumers of the products' quality (Chung et al. 2006). This, in turn, decreases the opportunity for consumers to experience the products (Choe et al. 2009).

Table 6. Preference for products while grocery shopping using t-commerce

		Customers without online grocery shopping experience (n=191)	**Customers with online grocery shopping experience (n=307)**	**t**
Preference for grocery shopping products using t-commerce	Fresh vegetables	4.18	4.83	-5.202**
	Fresh meats	4.16	4.89	-5.707**
	Fruits	4.73	5.31	-4.988**
	Half-processed food	4.77	5.34	-4.797**
	Processed food	4.94	5.32	-3.068*
	Grains	5.15	5.54	-3.370*

*p<0.01, **p<0.001

Discussion and Conclusion

Summary of Findings

The main goal of this study was to investigate willingness to adopt t-commerce in grocery shopping in South Korea. This study compared consumers' inclinations based on their e-commerce experience, with a specific focus on grocery shopping. The study further analyzed the effect of prior experience on online grocery shopping on willingness to adopt t-commerce as a new shopping medium. The sample was divided into two groups: one group with online grocery shopping experience and one group without online grocery shopping experience. The groups were compared to identify differences in willingness to adopt t-commerce as a new shopping medium.

Table 7 shows the results of the hypotheses test; most hypotheses were supported by the data analysis except for one (*H5*). Study 1 (*H1a, H1b, H2a, H2b*) examined the relationship between prior e-commerce experience and preference for other retail formats. Study 2 (*H3, H4, H5, H6a~f*) identified willingness to adopt t-commerce in terms of prior e-commerce experience and preference for grocery items using t-commerce.

Table 7. The result of the hypotheses test

No.	Hypotheses	Result
Consumers without online grocery shopping experience…		
H1a	…prefer to use physical stores more than consumers with online grocery shopping experience.	Supported
H1b	…prefer to use TV home shopping more than consumers without online grocery shopping experience.	Supported
H2a	…use physical stores more frequently than consumers with online grocery shopping experience.	Supported
H2b	…use TV home shopping more frequently than consumers without online grocery shopping experience.	Supported
H3	…have higher willingness to use t-commerce than consumers without online grocery shopping experience.	Supported
H4	…are expected to make purchases more often using t-commerce than consumers without online grocery shopping experience.	Supported
H5	…are expected to purchase more per transaction using t-commerce than consumers without online grocery shopping experience.	Not supported
H6a~f	…prefer to shop for grocery items such as fresh vegetables (H6a), meats (H6b), fruits (H6c), half-processed food (H6d), processed food (H6e), and grains (H6f) using t-commerce more than consumers without online grocery shopping experience.	Supported

Theoretical Contributions

This study further investigated prior online grocery shopping experience and its effects, especially in terms of t-commerce adoption. The findings have the potential to contribute to various fields of academia. First, this study examined the possibility of t-commerce and its expansion by focusing on consumers' previous grocery shopping experience through e-commerce as an example of diffused innovation. Only a few studies have been conducted regarding t-commerce although its importance is growing significantly.

Second, this study replicated Rodger's (1995) study that the adoption process of a new technology tends to be more flexible when it shares applicability similar to that of the old version. Thus, people with previous experience in a technology that has similar characteristics to a new one tend to show little repulsion toward it. These findings can thus serve as a starting point for future t-commerce studies, by providing implications regarding the relationship between pre-experience of e-commerce and post-behavior of t-commerce.

Third, the shift of retail formats from physical store to non-store retail format was examined in the context of innovation diffusion theory. The result of this study points out that online grocery shopping is compatible with other non-store retail formats (e.g., TV home shopping) but less compatible with traditional physical stores.

Management Implications for Agribusiness Managers

For agribusiness managers, the appropriate market segmentation is necessary to increase customers' positive attitudes toward adopting t-commerce. In this sense, consumers with low inclination to adopt a new technology should be targeted to increase the overall adaptability. However, the findings of this study show that practitioners should target consumers with previous online grocery shopping experience to obtain t-commerce market growth. For instance, advertising a t-commerce-related product (i.e., IPTV) on t-commerce-related media (i.e., Internet shopping mall) is a good example of generating consumers' first t-commerce experience and transaction. This then contributes to repeated purchases, which are now easier due to experience. Therefore, the findings imply that an advertising strategy that encourages the expansion of the t-commerce market through effective segmentation of target customers is needed. For example, strategies that encourage adoption of t-commerce through more lenient TV advertisement could be effective for expanding the t-commerce market at the initial stage. Since t-commerce is a promising industry, this study can serve as the foundation to spread the technology further.

Moreover, this study can be applied to future studies regarding detailed investigations of a specific product category in relation to t-commerce. This is for the insight it offers for the differences in t-commerce adoption for grocery shopping, and its characteristics in terms of the homogeneity (e.g., processed food) and heterogeneity (e.g., fresh vegetables, fresh meats) of a product. In priori, processed food or grains should be promoted to sell through non-store retail format including t-commerce. After several experiences, consumers have higher tendencies to consume more heterogeneous products such as fresh agricultural products via non-store retail format.

Limitations and Future Research Directions

Although this study has several findings, there are also some limitations. The study focused solely on grocery products. Thus, in terms of future studies regarding adoption of new technology, the subject should be generalized. Moreover, throughout the study, efforts were made to control factors during the process of making comparisons. The degree of willingness to adopt between consumers with and without e-commerce experience using t-test analysis, in terms of age and occupation, is one, though there were significant differences between the two groups. Thus, in future studies, all factors that influence the results should be removed.

Acknowledgements

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Appendix

Place preference for grocery shopping

Physical stores

1. How many times do you purchase groceries at physical stores on average per week?
   _____times

TV home shopping

2. How many times do you purchase groceries from TV home shopping channels on average per month?
   _____times

Online shopping mall

3. How many times do you purchase groceries through online shopping malls on average per month?
   _____times

Willingness to use t-commerce for grocery shopping

1. If a t-commerce service that you can get related information and buy groceries is provided, are you willing to use the service?
   (Likert-type scale: 1 = Definitely will not use and 7 = Definitely will use)

2. Expected shopping frequency per month

   If you use the service, how many times are you willing to use per month?
   _____times

3. Expected purchase amount per one transaction

   If you use the service, how much are you willing to spend on average per purchase?
   KRW _____

Preference in grocery shopping products using t-commerce

Please indicate your preference for each item as products the t-commerce service sells.
(Likert-type scale: 1= No preference at all and 7= Very much prefer)

- Fresh meat
- Fruits
- Fresh vegetables
- Grains
- Half-processed food
- Processed food

