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Harnessing Mobile Technology for Retail Advancement : A Scientific Exploration Gumaetan Traditional Market in Suwon City

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In the contemporary landscape of digital commerce, the ascendant trajectory of e-commerce within virtual domains is precipitating a marked decline in traditional marketplaces. This study delves into the integration of sophisticated mobile commerce technologies as a means to reinvigorate and modernize diminishing local retail sectors. The primary aim is to dissect the determinants influencing the adoption of mobile commerce applications by local retailers. Grounded in the theoretical underpinnings of the Technology Acceptance Model, this research posits a set of tailored predictors that could potentially sway retailers' attitudes and intentions towards the utilization of online marketplace applications. A methodologically robust survey was administered to 41 proprietors of traditional businesses, all of whom were active users of a specified smart market application. The ensuing data was subjected to an in-depth analysis via generalized structured component analysis. The empirical outcomes of this investigation revealed that the retailers' perceptions of the informational value of the smart market app, coupled with the cost-benefit ratio and the perceived risks linked to its usage, significantly shaped the perceived utility of the application. This perception, in turn, engendered favorable attitudes and a propensity towards embracing the smart marketplace application. This study contributes to the extant literature by elucidating the pivotal influence of perceived value and risk assessment in the adoption of innovative technologies within the realm of traditional retail.

Key Words: Traditional market, Smart market application, Mobile commerce, Perceived usefulness, Intention to use

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Ⅰ. Introduction

Today, the traditional market rarely shows signs of economic recovery. According to South Korea's Business Survey Index (BSI) for small business market economic trends, business sentiment remained below 80 points during the last three years, and the possibility of improvement was low (SEMAS, 2019). Despite the government's implementation of various policies to revitalize small businesses during the traditional market crisis, these measures have not proven effective. According to the South Korean Ministry of Small and Medium-sized Enterprises and Startups (MSS), despite a 3,655 trillion won-investment in the traditional domestic market from 2002 to 2018, sales decreased by 5,500 billion won—from 27.3 trillion won in 2005 to 21.8 trillion won in 2016 (Lee, 2018). Additionally, the 2019 Gyeonggi Traditional Market Performance Analysis Report (Gyeonggi-do Market Revitalization Agency, 2019) showed that the business status of stores that participated in the traditional market support project and the revitalization level of commercial areas were almost the same as they were before the support project.

One of the key issues with the government's existing support policies for traditional markets is the focus on facility maintenance. Despite aiming to increase the number of visitors to traditional markets, modern physical facilities alone have limitations in keeping up with the distribution market's rapidly changing trends (Lee & Ha, 2019). In fact, according to the Small Business Market Promotion Agency, in 2018 while the traditional market segment benefited from a high percentage of modern facilities (approximately 90%) such as CCTV, public toilets, drainage facilities, and sidewalks, the information-oriented business retention rates remained extremely low, including those for online shopping malls (1.3%), mobile apps (4.4%), delivery services (8.8%), and shopping services (3.5%). Moreover, the spread of COVID-19 has had an adverse effect on the traditional market, exacerbating the already depressed climate (Frasquet, Leva, & Ziliani 2021). After surveying the economic tendencies of 2,400 small business enterprises and 1,300 traditional market areas, the Small Business Market Promotion Corporation found the small business index to be 51.6 in December 2020, the lowest level since the beginning of the pandemic in March 2020. As the traditional market continues to stagnate, there is a pressing need for more accurate evaluation of the effectiveness of the government's small business activation project. Despite their importance, previous studies on these issues are lacking.

The traditional market plays a vital role in supporting cultural and economic functions (Aliyah, Setioko, & Pradoto, 2017). Through-

out history, traditional markets have been at the center of local wholesale and retail distribution. They have also played an active role in supporting the local economy (Dewey, 1962). In 2018, the number of traditional markets in South Korea was 1,437, and the total number of small business owners in traditional markets—including store merchants, employees, and street vendors—reached 359,049. The revitalization of traditional markets is significant due to its effect on social integration through the economy, including restoring the economic vitality of small businesses and building social safety networks, as well as creating a new local culture (Cha et al., 2020; Kim et al., 2013). However, the traditional market has lost its competitiveness because of various factors such as the entry of large retailers into the region, problems with product exchanges and refunds, lack of price reconnaissance systems, lack of diverse payment methods, lack of promotion and marketing, and limited technological consciousness among merchants (Jeong & Ban, 2020). Accordingly, the decline of the traditional market has led to a decrease in overall business activities (e.g., declines in customers and sales), presenting an obstacle to maintaining local commercial areas (Nam, Ryu, & Hong, 2010; Yoo, 2011).

Rebuilding the traditional market requires both physical environment-oriented modernization and technological modernization (Wang et al., 2020). The advent of e-commerce boosts the demand for the online market and consistently shapes consumer purchase behavior (Liang et al., 2021). Therefore, it is crucial to devise innovative marketing strategies that stay up-to-date with current trends and enable traditional markets to survive. For example, it is necessary to propose measures to increase consumers' convenience in the traditional market, such as product function information, market presentation, and local store recommendations through mobile applications (Bang et al., 2018). For this purpose, helping small business owners to overcome the digital gap and providing technical support are priorities. In the context of activated delivery app services, difficulties in delivery system adoption, as well as the burden of money transfer, have clearly shown the digital alienation of small business owners in the traditional market (Yoo & Kim, 2019). Expanding technical support will enable revitalization of the stagnant local economy and the traditional market by enhancing sales competitiveness and increasing small business profits.

Accordingly, this study focused on the improvement of digital device usage as part of traditional market modernization. The purpose of this research was to analyze the effectiveness of the traditional market modernization project by evaluating how small business owners adopt technological advancements. Specifically, by applying cloud based

O4O services to the traditional market, we examined small entrepreneurs' willingness to embrace these technologies. Furthermore, this study aimed to extend policies supporting the proliferation of new technologies in traditional markets and to promote traditional market revitalization. Thus, we expect our analysis to have high research value as an empirical study on traditional market business owners' adoption of new technologies, as they tend to be conservative and low-tech-oriented.

Ⅱ. Literature Review

Traditional markets are commercial facilities where small retailers and wholesalers distribute their goods, such as agricultural products, food, and clothes (Kim et al., 2004). In South Korea, the traditional markets are usually located in old city centers (Kim et al., 2004), around public squares and major transportation hubs where residents conduct various cultural and daily trading activities (Lee, 2017). Despite their significant cultural function, these traditional markets have considerable disadvantages in terms of shopping convenience and flexibility from a consumer demand approach (Lee, 2017) when compared to modern commercial facilities such as supermarkets and department stores or online shopping platforms (Kim et al., 2004).

The advent of the Internet and information and communication technologies (ICT) have accelerated the inevitable decline of traditional ecosystems in the last two decades (Fan et al., 2016). Thus, the South Korean government has proposed innovative management projects to revitalize traditional markets, which emphasize better management, and marketing and advertising strategies based on ICT transactions for individual merchants (Lee, 2017). Digitalization and the design and implementation of an e-commerce strategy can help traditional ecosystems evolve

into entrepreneurial ecosystems (Song et al., 2021). Increasing digital capabilities becomes a strategic activity through which technology providers can develop business models (Schneider, 2018) for traditional market revitalization.

The Technology Acceptance Model (TAM) proposed by Davis (1989) is widely used for exploring the potential of information technology adoption in a range of situations, especially with mobile businesses (Wu et al., 2015). The TAM posits that behavioral intentions are influenced by users' attitudes toward technology use, which in turn determine in-service use behaviors.

To explain the application of usability, this study incorporated factors derived from the TAM, including perceived ease of use (PEOU) and perceived usefulness (PU), which positively influence attitudes toward using (ATU) and behavioral intentions to use (BTU) technology. Additionally, prior studies (e.g., Zhang et al., 2012) have examined other predictors expected to influence mobile commerce in traditional market adoption, such as perceived enjoyment (PE), perceived informativeness (PI), perceived cost risk (PCR), and perceived risk of use (PRU).

Perceived usefulness is the degree to which an individual perceives performance enhancement by using a certain information system. In the TAM, perceived usefulness is a significant factor predicting behavioral intentions to use technology (Davis, 1989). On the other hand, perceived ease of use refers to "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989:320). The TAM highlights perceived ease of use as a determinant of perceived usefulness, through which users acknowledge that a system is helpful and reinforces their performance when it is easily accessed and minimizes their efforts and time (Davis, 1989; Venkatesh & Davis, 2000). In the context of mobile commerce (m-commerce), perceived ease of use concerns consumers' perceptions of their purchases through m-commerce or using m-commerce as a business platform that requires minimal effort (Rind et al., 2017). According to the TAM, PEOU impacts PU while PU and PEOU both influence users' perceptions of accepting a particular behavior and attitude.

Enjoyment is defined as an outcome of emotion (Khalil & Rintamaki, 2014), a positive affective response such as pleasure, favorability, and fun (Scanlan & Simons, 1992). Perceived enjoyment (PE) is the intrinsic reward derived from using the technology or service. PE is associated with the hedonic value of new technology, which describes the degree of pleasure obtained from experiences with an application (Holdack et al., 2020). Kargin and Basoglu (2009) have argued that mobile services originate from entertainment services. The more entertainment content the mobile application provides, the more likely

customers are to adopt that mobile service. Indeed, perceived enjoyment plays a vital role in mobile commerce adoption (Zhang et al., 2012). Moreover, a study by Won et al. (2023) showed that perceived enjoyment had the most significant impact on perceived ease of use and usage intention of a branded sport application among other TAM determinants.

According to the extended uses and gratifications theory, information is one of the need-satisfying functions of media communications (McQuail, 1983). Informativeness refers to a technology's ability to provide helpful information to facilitate the greatest possible user satisfaction. Kim et al. (2013) found that informative apps are more likely to be used than other types of apps. Furthermore, studies have highlighted that the informative features of mobile apps dramatically improve consumer attitudes toward brands and increase purchase intentions (Bellman et al., 2011). Similarly, studies based on the TAM framework (Zhao & Wang, 2020; Wang et al., 2022) found that informativeness of short video marketing on social media was a significant predictor of customers' perceived usefulness.

Perceived risk refers to individuals' appraisals of the risk of using a particular technology (Verkijika, 2018). This includes perceived cost risk (PCR) and perceived risk of use (PRU). Zhang et al. (2012) have proposed that perceived risk in mobile applications comprises financial, psychological, social, physical, and temporal factors. According to behavioral decision theory, the cost-benefit ratio significantly affects both perceived usefulness and ease of use. Consumers are reluctant to pay for frustrating experiences with online applications such as slow connections, poor quality, out-of-date content, missing links, and errors or glitches (Wu & Wang, 2005). Researchers have suggested that m-commerce providers should reduce costs to facilitate access and entice new customers (Young, 2000).

Furthermore, Dwivedi et al. (2017) have suggested that consumers' perceived risks related to using internet technologies constrain their adoption of such technologies. Zhang et al. (2012) have shown that perceived risk has a considerably detrimental effect on behavioral intentions to adopt m-commerce. Moreover, perceived risk significantly affects millennials' usage behavior of mobile banking apps (Thusi & Maduku, 2020), and has a negative impact on willingness to use a ride-sharing mobile app (Wang et al., 2019). Likewise, Trivedi (2019) showed that the perceived risks of a banking chatbot application reduced the quality of customer experience. On the other hand, Qalati et al. (2021) showed that perceived risk positively influenced customer intentions when trust in e-shopping was high. Consequently, consumers are less likely to pay for goods and

services via mobile devices, which involve high perceived risks (Slade et al., 2015). When consumers perceive increased risks of use with m-commerce applications, the likelihood of adopting the technology decreases (Verkijika, 2018).

Attitude toward use (ATU) is defined as "an individual's positive or negative feelings (evaluative affect) about performing the target behavior" (Fishbein & Ajzen, 1975). Mishra (2014) has described an attitude as the degree of approval or disapproval in a person's evaluation of the consequences of performing a certain behavior. Behavioral intentions indicate the extent to which an individual plans to perform a specific behavior (Chew, 2006). According to the TAM, behavioral intentions are the strongest predictor of one's actual behavior. According to theory of planned behavior (TPB), attitudes determine behavioral intentions. Likewise, several studies have confirmed the profound impact of attitudes on intentions (Korzaan, 2003; Kelly et al., 2006).

In line with the TAM, we hypothesize significant relationships among perceived enjoyment, perceived ease of use, perceived usefulness, perceived informativeness, perceived cost risk, perceived risk of use, attitudes, and intentions to use the m-commerce application, as explained below:

H1. PI of mobile commerce applications has a direct positive effect on PU.

H2. PE of mobile commerce applications has a direct positive effect on PEU.

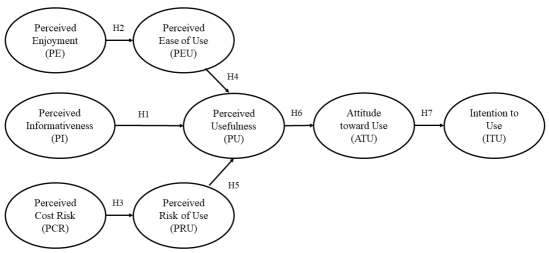
H3. PCR of mobile commerce applications has a direct positive effect on PRU.

H4. PEU of mobile commerce applications has a direct positive effect on PU.

H5. PRU of mobile commerce applications has a direct negative effect on PU.

H6. PU of mobile commerce applications has a positive effect on ATU.

H7. ATU of mobile commerce applications has a positive effect on ITU.



〈Fig. 1〉 Proposed research model for Smart Market Service Application usability

Ⅲ. Methodology

1. Research design

We administered a questionnaire survey to address our research questions about traditional market business owners' intentions to adopt new technologies. The survey included basic demographic items such as gender, age, major sales sectors, and smart service experience; service satisfaction; detailed evaluations of service usability; and user opinions.

2. Procedure

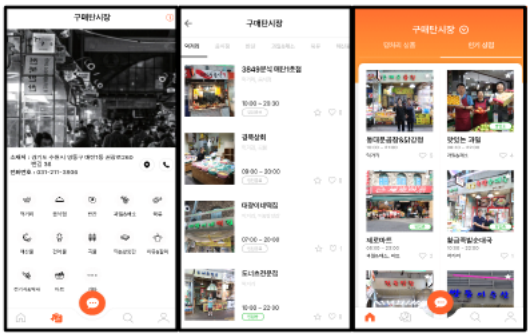
The survey's target area was Gumaetan Market in the city of Suwon-si, South Korea, which is a smart marketplace trial operation market. A total of 41 small business owners in the market (16 men and 25 women) participated in the study. The online survey took place from December 21 to December 22, 2020, when survey agents visited the market.

3. Materials

We used a mobile application called "ON Market" to assess the small business owners' intentions of adopting new technologies as smart services. Unlike the existing shopping mall system, the ON Market application has the advantage of being able to modify and manage product information directly (Table 1). The application also provides strong communication features that allow buyers and sellers to connect beyond simply exchanging information. Specifically, it offers various functions such as marketplace information sharing, event guidance, location-based marketplace guidance, and marketplace real-time shopping (Figure 2).

〈Table 1〉 Difference between existing shopping mall system and O4O smart

Category	Existing shopping mall system	O4O smart market service
Data	-Shopping mall information -Basic information (directions, store, search, parking, events, etc.) -Added custom information per shopping mall's request	-Market information, basic information (guide, search, etc.) -Product information directly modified and managed by small business owners -Integrated information on multiple marketplaces
Users	-Shopping mall, users (shopping mall visitors) -One-way service that provides users with previously registered information at shopping mall	-Business associations, small business owners, users (local residents) -Business association: marketplace management -Small business owners manage their own stores/products -Interactive service through real-time chat with users -Provided app-based additional service
Integrated management	-Integrated management of branch offices by distributors	-Integrated management of traditional markets by local government



〈Fig. 2〉 ON Market mobile application

4. Measurement

We adapted the measures of service satisfaction and service usability (perceived risk and cost, perceived usefulness, perceived ease of use, perceived informativeness, perceived enjoyment, attitudes toward use, and intentions to use) from previous studies. Each item was assessed on a 5-point Likert scale ranging from "Strongly Disagree" (1) to "Strongly Agree" (5). Table 2 summarizes the specific constructs and items.

〈Table 2〉 Survey items

Factor	Survey Item	Source
Perceived Risk of Use	I believe that using smart market commerce has potential risks.	
	I believe that there is a potential risk in purchasing products through smart market applications.	
	I think there is a risk related to "private information disclosure" when using smart market applications.	
Perceived Cost Risk	Using the smart marketplace burdens me with the cost.	
	The fee for transactions using the smart marketplace application seems to be expensive.	
Perceived Usefulness	I think using the smart marketplace app will help my business.	Davis et al., 1989; Jackson, 1997; Mathieson, 1991
	I think store management will be effective when I use the smart marketplace application.	
	I think the smart marketplace app is appropriate for traditional market business.	
	I think the smart marketplace application will be useful to me.	
Perceived Ease of Use	I can easily understand how to use the smart marketplace app.	Davis, 1989; Mathieson, 1991
	I can easily understand the features provided by the smart marketplace app.	
	I think it is not difficult to use the smart marketplace app.	
	The methods of using the smart marketplace app are clear and easy to understand.	
	It is not difficult for me to get used to using the smart marketplace app.	
Perceived Informativeness	The smart marketplace app conveys information on the market commerce situation well.	Ahn et al., 2004; Hausman & Siepke, 2009
	The smart marketplace app delivers detailed information on products sold in the market.	
	The information provided by the smart marketplace app is helpful in making my business decisions.	
	The information provided by the smart marketplace app is helpful when comparing products.	
Perceived Enjoyment	The smart marketplace service application is interesting.	Davis et al., 1989
	The diverse services provided by the smart marketplace app are enjoyable.	
	It will be entertaining to see the business through the smart marketplace application.	

Factor	Survey Item	Source
Attitudes toward Use	I have a favorable impression of the smart marketplace app service.	Ahn et al., 2004
	I think the smart marketplace app is a necessary service for small businesses in traditional markets.	
	I think the smart marketplace application provides good services.	
Intentions to use	I am willing to use the smart marketplace app service in the future.	Ahn et al., 2004
	I think I will use the smart market app service in the future.	
	I will recommend the smart marketplace application to acquaintances who own small businesses in traditional markets.	

〈Table 3〉 Items and descriptive statistics

Construct/ Indicator	Item	Mean	SD
Perceived Risk of Use (PRU)			
PRU1	I believe that using smart market commerce has potential risks.	1.68	0.72
PRU2	I believe that there is a potential risk in purchasing products through smart market applications.	1.73	0.84
PRU3	I think there is a risk related to "private information disclosure" when using smart market applications.	1.95	0.92
Perceived Cost Risk (PCR)			
PCR1	Using the smart marketplace burdens me with the cost.	2.44	1.03
PCR2	The fee for transactions using the smart marketplace application seems to be expensive.	2.59	0.95
Perceived Usefulness (PU)			
PU1	I think using the smart marketplace app will help my business.	4.12	0.75
PU2	I think store management will be effective when I use the smart marketplace application.	3.93	0.85
PU3	I think the smart marketplace app is appropriate for traditional market business.	3.93	0.88
PU4	I think the smart marketplace application will be useful to me.	4.10	0.75
Perceived Ease of Use (PEU)			
PEU1	I can easily understand how to use the smart marketplace app.	3.71	0.87
PEU2	I can easily understand the features provided by the smart marketplace app.	3.63	0.90
PEU3	I think it is not difficult to use the smart marketplace app.	3.66	0.76
PEU4	The methods of using the smart marketplace app are clear and easy to understand.	3.63	0.81
PEU5	It is not difficult for me to get used to using the smart marketplace app.	3.76	0.83
Perceived Informativeness (PI)			
PI1	The smart marketplace app conveys information on the market commerce situation well.	4.07	0.75
PI2	The smart marketplace app delivers detailed information on products sold in the market.	3.95	0.77
PI3	The information provided by the smart marketplace app is helpful in making my business decisions.	3.98	0.82
PI4	The information provided by the smart marketplace app is helpful when comparing products.	3.88	0.87
Perceived Enjoyment (PE)			
PE1	The smart marketplace service application is interesting.	3.61	0.80
PE2	The diverse services provided by the smart marketplace app are enjoyable.	3.76	0.80
PE3	It will be entertaining to see the business through the smart marketplace application.	3.83	0.74
Attitude toward Use (ATU)			
ATU1	I have a favorable impression of the smart marketplace app service.	4.20	0.71
ATU2	I think the smart marketplace app is a necessary service for small businesses in traditional markets.	4.29	0.56
ATU3	I think the smart marketplace application provides good services.	4.32	0.65

Cons-truct/ Indi-cator	Item	Mean	SD
Intentions to Use (ITU)			
ITU1	I am willing to use the smart marketplace app service in the future.	4.22	0.65
ITU2	I think I will use the smart market app service in the future.	4.12	0.68
ITU3	I will recommend the smart marketplace application to acquaintances who own small businesses in traditional markets.	4.22	0.76

5. Statistical analysis

We utilized generalized structured component analysis (GSCA) to analyze the data (Hwang & Takane, 2014; Hwang et. al., 2021). GSCA uniquely integrates measurement models, which encompass the observed variables, and structural models, which capture the relationships between latent constructs, within a unified framework.

GSCA belongs to the realm of component-based structural equation modeling (SEM) methods (Hwang et. al., 2010; Hwang et. al., 2021). Unlike conventional SEM approaches, GSCA offers distinct advantages in situations characterized by limited sample sizes and where strict assumptions about data distribution are untenable. Specifically, GSCA's nonparametric nature allows for effective handling of data without normal distribution assumptions, making it particularly advantageous for small sample sizes where such assumptions are often violated (Jung et al., 2018; Hwang et al., 2010; Cho et.al, 2023). This flexibility makes GSCA an ideal choice for research studies with small sample sizes that demand a comprehensive analysis of the intricate interplay between variables, demonstrating its suitability for deriving valid research outcomes even with limited data.

For the analytical aspects of this study, we employed GSCA Pro (Hwang et al., 2023), a specialized software explicitly designed for GSCA analysis. GSCA Pro offers tailored features and functionalities for model estimation, hypothesis testing, and assessing model fit and validity. By utilizing GSCA Pro, we conducted a more comprehensive exploration and interpretation of the data, resulting in a deeper comprehension of the relationships between variables and enhancing the overall rigor of the analysis. We also analyzed basic information on major sales sectors and age.

〈Table 4〉 Estimates of loadings and reliability measures

Construct /Indicator	Estimate	SE	95%CI LB	95%CI UB	AVE	Composite reliability	Cronbach's α
Perceived Risk of Use (PRU)					.72	.88	.80
PRU1	0.87	0.04	0.76	0.93			
PRU2	0.94	0.02	0.92	0.98			
PRU3	0.71	0.10	0.46	0.87			
Perceived Cost Risk (PCR)					.86	.93	.85
PCR1	0.95	0.02	0.90	0.98			
PCR2	0.91	0.03	0.84	0.96			
Perceived Usefulness (PU)					.75	.92	.88
PU1	0.85	0.05	0.75	0.93			
PU2	0.80	0.06	0.66	0.89			
PU3	0.87	0.04	0.78	0.94			
PU4	0.92	0.03	0.84	0.98			
Perceived Ease of Use (PEU)					.80	.95	.93
PEU1	0.90	0.03	0.85	0.96			
PEU2	0.88	0.03	0.82	0.95			
PEU3	0.91	0.03	0.85	0.96			
PEU4	0.90	0.03	0.84	0.95			
PEU5	0.88	0.05	0.79	0.96			
Perceived Informativeness (PI)					.70	.90	.86
PI1	0.86	0.03	0.79	0.92			
PI2	0.76	0.09	0.52	0.88			
PI3	0.83	0.04	0.74	0.89			
PI4	0.88	0.03	0.83	0.94			
Perceived Enjoyment (PE)					.70	.88	.79
PE1	0.74	0.08	0.55	0.86			
PE2	0.88	0.04	0.80	0.94			
PE3	0.89	0.03	0.83	0.95			
Attitudes toward Use (ATU)					.70	.87	.78
ATU1	0.93	0.02	0.88	0.97			
ATU2	0.62	0.11	0.39	0.80			
ATU3	0.92	0.04	0.83	0.97			
Intentions to Use (ITU)					.78	.91	.86
ITU1	0.85	0.05	0.05	0.94			
ITU2	0.88	0.04	0.79	0.93			
ITU3	0.91	0.03	0.85	0.96			

Ⅳ. Results

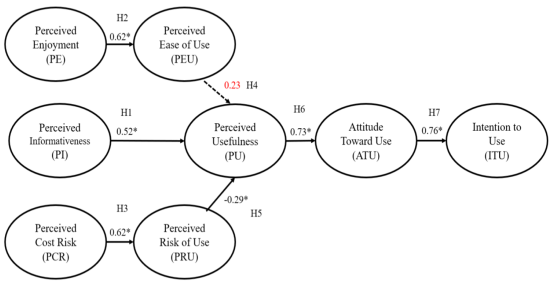
Of the 41 individuals returning valid online survey responses, almost half of the respondents were 50–59 years old. The main industry types were restaurants (12 cases, 29.3%), livestock (7 cases, 17.1%), farming (6 cases, 14.6%), fishing (6 cases, 14.6%), and processed food (5 cases, 12.2%).

Table 4 provides the loading estimates for the items along with their standard errors (SEs) and 95% bootstrap percentile confidence intervals' (CIs) lower bounds (LB) and upper bounds (UB). We used 100 bootstrap samples to calculate the CIs. For interpretation purposes, we assumed a parameter estimate to be statistically significant at the .05 level if the 95% CI did not include a value of zero. The results showed that all the loading estimates were statistically significant, indicating that all items were good indicators of the constructs. Table 4 also provides the average variance extracted (AVE), composite reliability, and Cronbach's. The AVE serves to evaluate a construct's convergent validity for all items on each construct. The AVE for all constructs exceeded .50, indicating acceptable convergent validity (Fornell & Larcker, 1981). The composite reliability also indicated reasonable reliability for every variable, exceeding the desired threshold of .70 (Hair et al., 2019). Additionally, all Cronbach's α values surpassed the suggested threshold of .70 (Nunnally & Bernstein, 1994), indicating reasonable reliability for the measurement model.

The hypothesized model exhibited an overall goodness of fit index (FIT) value of .649, indicating that the model accounted for 64.9% of the total variance of all the items and their corresponding constructs. Table 5 provides estimates of the path coefficients in the structural model along with their SEs and 95% CIs. The results showed that PI had a statistically significant and positive impact on PU (H1=0.52, SE=0.10, 95% CI [0.33, 0.71]). PE had a statistically significant and positive impact on PEU (H2=0.62, SE=0.10, 95% CI [0.45, 0.84]). However, PEU did not have statistically significant impact on PU (H4= 0.23, SE=0.15, 95% CI [-0.06, 0.53]). PCR also had a statistically significant and positive impact on PRU (H3=0.62, SE=0.09, 95% CI [0.44, 0.80]). In turn, PRU had a statistically significant and negative influence on PU (H5=-0.29, SE=0.12, 95% CI [-0.50, -0.08]). We also observed that PU had a statistically significant and positive impact on ATU (H6= 0.73, SE=0.08, 95% CI [0.59, 0.88]). In turn, ATU had a statistically significant and positive impact on ITU (H7=0.76, SE=0.08, 95% CI [0.58, 0.90]).

〈Table 5〉 Estimates of path coefficients

Hypothesis	Estimate	SE	95% CI LB	95% CI UB
H1: PI→ PU	0.52	0.10	0.33	0.71
H2: PE→ PEU	0.62	0.10	0.45	0.84
H3: PCR→ PRU	0.62	0.09	0.44	0.80
H4: PEU → PU	0.23	0.15	−0.06	0.53
H5: PRU → PU	−0.29	0.12	−0.50	−0.08
H6: PU → ATU	0.73	0.08	0.59	0.88
H7: ATU → ITU	0.76	0.08	0.58	0.90



〈Fig. 3〉 The model for Smart Market Service Application adoption

Ⅴ. Discussion and Conclusions

With the rapid development of modern shopping facilities and electronic commerce in recent years, the demand for traditional markets has decreased sharply. The current study aimed to contribute to the revitalization of traditional shopping areas by examining the adoption of a new commerce system by traditional merchants. As traditional market merchants are older than retailers operating on other commercial platforms, they are more resistant to adopting innovative technology. The implementation of a new commerce system is expected to solve the challenges of traditional markets due to the accelerated shift toward digital innovation prompted by the COVID-19 pandemic.

The results of the structural equation model provided insightful revelations about the proposed hypotheses. Consistent with H1, Perceived Informativeness showed a notable effect on Perceived Usefulness. This finding underscores the importance of information quality in shaping users' perceptions of utility. In line with H2, Perceived Enjoyment significantly influenced Perceived Ease of Use, suggesting that the enjoyable aspects of technology can enhance users' comfort and ease in its use. Furthermore, supporting H3, Perceived Cost Risk emerged as a significant predictor of Perceived Risk of Use, indicating

that users' concerns about potential costs are closely tied to their overall risk perceptions.

However, a pivotal deviation was observed in H4. Contrary to our expectations, Perceived Ease of Use did not significantly impact Perceived Usefulness. This unexpected result prompts a deeper consideration of the context-specific factors. In the backdrop of the post-COVID-19 era, especially in South Korean traditional markets, consumers have grown familiar with technologies like kiosks, possibly diminishing the impact of ease of use on their perceived utility. This finding suggests a shift in user priorities, where the risk factors may overshadow ease of use in technology adoption decisions.

In support of H5, Perceived Risk of Use was found to negatively influence Perceived Usefulness, aligning with the notion that increased risk perceptions can detract from the perceived benefits of technology. Additionally, Perceived Usefulness significantly influenced Attitudes Toward Use, as posited in H6. This relationship highlights the crucial role of perceived utility in shaping positive attitudes towards technology. Finally, supporting H7, these attitudes were significant predictors of Intentions to Use, reaffirming the well-established attitude-intention link in technology acceptance models.

Overall, the model's outcomes not only validate several established relationships within the TAM framework but also bring to light the nuanced dynamics of technology acceptance in specific cultural and situational contexts, particularly highlighting the evolving user perceptions in the face of global challenges such as the COVID-19 pandemic.

Overall, the relationships predicted by the Technology Acceptance Model were mostly supported. However, in the case of traditional market merchants, perceived informativeness, perceived cost risk, and risk of use exert more substantial effects on the perceived usefulness of the application than on perceived ease of use. Moreover, we found that a high level of perceived usefulness is likely to engender positive attitudes toward the application and intentions to use it.

1. Theoretical contributions

Three dimensions of usability were used as potential predictors of intention to use m-commerce based on TAM theory. The influences of perceived information, perceived risk of use, and perceived ease of use were confirmed in previous studies conducted by Lu et al. (2005), Wu and Wang (2005), Ruiz-Mafe et al. (2018). However, in this study, we only found the statistical significance of the effects of risk of use and perceived informativeness on perceived usefulness. On the other hand, no considerable influence of ease of use on perceived usefulness was shown in our study. Unlike younger users,

older traditional market business owners seem less active in using new technology, reducing the possibility of adopting m-commerce. Surprisingly, despite the lack of familiarity with new technology usage, traditional merchants still perceive the usefulness of m-commerce for their business if the application provides them helpful information and low risk of use. In this case, the importance of online market applications' informativeness and small risks of use outweigh the influences of variable ease of use for the future use of this service. Therefore, to facilitates the adoption of e-commerce systems among traditional market merchants, it is crucial for mobile applications to offer users informative services with minimal risks such as financial burden, private information violation, and purchasing insecurity.

Notably, responders evaluate the dimension of the usefulness of mobile services to be decisive for their adoption. Indeed, traditional merchants are willing to adopt a new approach for business operation when they confirm the useful value of the m-commerce applications. Consequently, this variable is considered the primary determinant of users' attitudes and intentions to use e-commerce to foster traditional market potential. Application creators and providers need to consider this aspect to develop an effective and useful m-commerce system for consumers' efficient and increasing use.

2. Managerial implications

By examining the digitalization of the traditional market, this study has academic and practical benefits for the exclusive development and activation of commerce systems for the traditional markets. The results of this study can be beneficial for the management of mobile application designers and e-commerce providers in their efforts to build improve their systems targeting aging customers. As customer research findings for the successful management of the providers' operation activities, the m-commerce system needs to provide helpful information and minimize risks to encourage its retailers and users' adoption as well as constant usage.

Moreover, since mobile services in traditional markets are new and challenging, it is imperative for the government and mobile service providers to launch appropriate educational and marketing campaigns that demonstrate the benefits and usefulness of these e-commerce systems to traditional merchants. Using m-commerce is highlighted for improving traditional business performances, financial profits, and enhancing local cultural identities.

3. Limitations and future research opportunities

The present study has several limitations

that offer opportunities for future studies. First, although we implemented the surveys with a large number of merchants in a small market in South Korea, we interpreted the results from a sample targeting only a specific market. Thus, it is necessary to survey several merchants in various markets in the future. Second, the current study acknowledges a limitation in its sampling methodology. The survey data was exclusively collected from traditional business owners who are already users of the smart market application. This sampling approach inherently introduces a selection bias, as it overlooks the perspectives of non-users. Such bias may limit the generalizability of our findings, as the experiences and perceptions of non-users could significantly differ from those of current users. Recognizing this, future research should aim to incorporate a more diverse sample that includes both users and non-users of smart market applications. This broader approach would provide a more comprehensive understanding of the factors influencing the adoption and use of such technologies across different segments of the traditional market sector.

Third, future studies should further assess individual differences between merchants. For example, when adding the innovativeness and entrepreneurship of each merchant to the model, the research could obtain more fruitful results. Lastly, although this study focused on merchants in traditional markets, it is also necessary to investigate the characteristics and differences among the consumers who visit traditional markets. Comparing the expectations and difficulties associated with digitalization between market merchants and market visitors could prove highly valuable for traditional market growth.

There is much research that could enrich the area of digitalizing traditional markets based on this study's results. Our findings provide new empirical implications and recommendations for practitioners to develop smart systems for traditional markets in the future.

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국문초록

모바일 광고 기술을 통한 전통시장 마케팅 : 수원 시구매탄 시장 사례를 중심으로

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본 연구는 디지털 상거래의 확대가 전통 시장에 미치는 영향을 분석하고, 지역 소매 부문을 현대화하고 활성화하기 위해 모바일 상거래 기술을 통합하는 방안을 모색했다. 특히, 지역 소매업체가 모바일 상거래 앱을 채택하는 데 영향을 미치는 주요 요인들을 기술 수용 모델을 바탕으로 연구했다. 총 41명의 기업 소유주를 대상으로 한 설문조사와 구조적 영향관계 분석을 통해, 스마트 마켓 앱의 정보 가치 인식, 비용 대비 편익, 인식된 위험이 앱의 유용성 인식에 큰 영향을 미치며, 이는 긍정적인 태도와 앱 수용 성향으로 이어진다는 결과를 도출했다. 본 연구는 전통적인 소매 분야에서 미디어 혁신 기술을 채택할 때 인지된 가치와 위험의 중요성을 증명하였으며, 리테일 마케팅과 구매접점 광고 문헌에 기여했다.

키워드: 전통시장, 스마트 마켓 애플리케이션; 모바일 상거래, 인지된 유용성, 사용의도

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