The Influence of Technology Readiness on Use Intention toward Information System

Michael Yao-Ping Peng*, Yang Yang
School of Economics and Management, Xi'an University of Posts & Telecommunications, Xi'an, China.

* Corresponding author. Tel.: +86 13599962450; email: s91370001@mail2000.com.tw
Manuscript submitted January 10, 2019; accepted April 30, 2019.
doi: 10.17706/ijeeee.2020.10.1.1-12

Abstract: A Multiple Media Kiosk (MMK) not only saves lots of cost for organization, but plays a role in innovating of self-service technology (SST). This research wanted to find factors of improving user intention in MMK by studying MMK in convenience stores in Taiwan, making more innovations in SST will come true in the future. This study used Technology Acceptance Model (TAM) to explain the behavior of using MMK, in the meantime, we premised that user experience to the internet service and the acceptance to the application of the new technology could also affect it in the multichannel and multimedia retailing environment. So we used two dimensions, Interactive and Technology Readiness, to describe above circumstances and made assumption that these two dimensions could be the external variable of TAM. Final, confirming these relations by SEM was our research method in statistic. After analyzing data from Online-survey by AMOS, the results indicated that perceived usefulness and perceived ease of use (two factors in TAM) were significant influence on the behavior of using MMK, moreover, Technology Readiness also could be antecedent variable to the TAM. But, as moderator, Interactive did not have the interaction effect in this research. Therefore, the conclusion implies that maybe it is a good idea to corporations who try to improve their usage in MMK via developing the mobile channel.

Key words: Interactivity, multiple media kiosk, technology acceptance model, technology readiness.

1. Introduction

Multiple Media Kiosk (MMK) is a self-help service that is common in retail channels. Although its functions may vary according to the culture or channel requirements of countries all over the world, it has a touch screen and a multimedia interface or uses the voice effect to help customers quickly purchase what they need. In addition to helping retail stores create the most profits in the smallest space, this self-help service can satisfy customers' pursuit of a pleasant and novel consumer experience [1], helping retailers create new consumer value added. The largest Japanese chain convenience store, LAWSON, set up MMKs called LOPPY in its stores as early as 1997. Its diversified functions and integration of information of different industries have not only changed the consumption habits of Japanese, but also made it become a benchmark for retailers in neighboring countries. The supermarket Homeplus in South Korea launched virtual stores for subway stations in 2011, which successfully reached a 42% increase in monthly revenues for the shelf commodities by combining with the multimedia advertising billboards and mobile devices. Promoting MMKs in the retail industry is conducive to creating innovative services. To achieve the success, it is required to verify the feasibility in optimal practices, and also necessary to discuss key success factors from the markets with a low popularity of MMKs. Therefore, this study chooses convenience stores that are

highly popular in Taiwan as the main research object, and aims to understand the relevant factors to improve the usage rate of MMKs through confirming the theoretical model, which will help to replicate the research contributions and promote the application of related innovative services in countries with similar market structure.

Quite a lot of researches on the consumer behavior using the self-help service have been conducted in the past. In these researches, various external factors (e.g., trust, price, reliability, perceived risk, etc.) have been verified to significantly affect consumer behaviors [2], [3]. Although this type of research is quite mature, most of them focus on services and behaviors. This study holds the opinion that consumer behaviors are not only affected by their own cognition on services, but also subject to their experience in the use of different channels. Therefore, with the support of the literature of multi-channel retail strategy [4], we find out theories representing the cognition or experience of consumers on the use of other channels, and observe whether these theories have impacts on the behavior of consumers using MMKs. Among them, we mainly use the Technology Acceptance Model (TAM) as the behavior theory to explain the use of MMKs machines by consumers. Moreover, the technology preparation and interactivity are used to denote the willingness of consumers to apply smart devices to self-help service and their experience in using the traditional web service functions, and the two aspects are assumed to play the role of exogenous variables in TAM.

2. Literature Review

2.1. Multi-channel and Multi-media Retail Environment

The multi-channel retail strategy is a series of activities that sell goods to consumers through a variety of channels [4]. Today, the the development of the Internet plays an undeniable role in accelerating the diversification of multi-channel retail strategies. According to Kilcourse and Rowen [5], 94% of all major retailers in the US and retailers with excellent financial performance have taken the multi-channel business model. Thus, how to respond to the impact of these technologies on retailers to enhance the benefits for customers and improve the operational performance has become one of the important tasks for the management level. Zhang *et al*. [6] argue that the retailers have the following motives to adopt the multi-channel strategy: entering the market at a lower cost, improving customer satisfaction and loyalty, and establishing strategic advantages. Some other studies have pointed out that giving consumers more choices to differentiate the market is more attractive to consumers who prefer cross-channel consumption [7]. This type of consumers uses different channels to complete consumption because the difference of different channels can meet their different shopping demands [8]. With the popularity of the Internet, the number of people who use different channels for consumption is increasing. Although retailers have sufficient incentives to adopt a multi-channel strategy, they also need to consider the deployment of channels to attract consumers in different markets most effectively.

Seven articles on the development of multimedia and multi-channel retail that were lectured on the three-day Thought Leadership Conference held at Texas A&M University in 2009 were published on the *Journal of Interactive Marketing* in 2010. The seven articles focus on different entities to have a comprehensive study on the development of multimedia and multi-channel retail. Its main structure is shown in Fig. 1.

Understanding how consumers use different channels or media to complete their shopping behaviors and managing the complementarities or conflicts between channels will become increasingly significant [9]. Consumers who make good use of multichannel shopping often have the effect of cross-channel free-riding, which means that consumers often use a channel to understand product information or evaluate products, but then switch to another channel to finish the purchasing behavior. This will dilute the profits of a certain

retailer [10]. The cross-channel free-riding shopping model will be more complicated and popular with the advancement of information technology, because it will help or improve its own consumption process through the application of different new technologies. In this case, this study uses the Technology Acceptance Model as a way to understand consumer behaviors, and takes this model as a research structure to conduct the quantitative research.

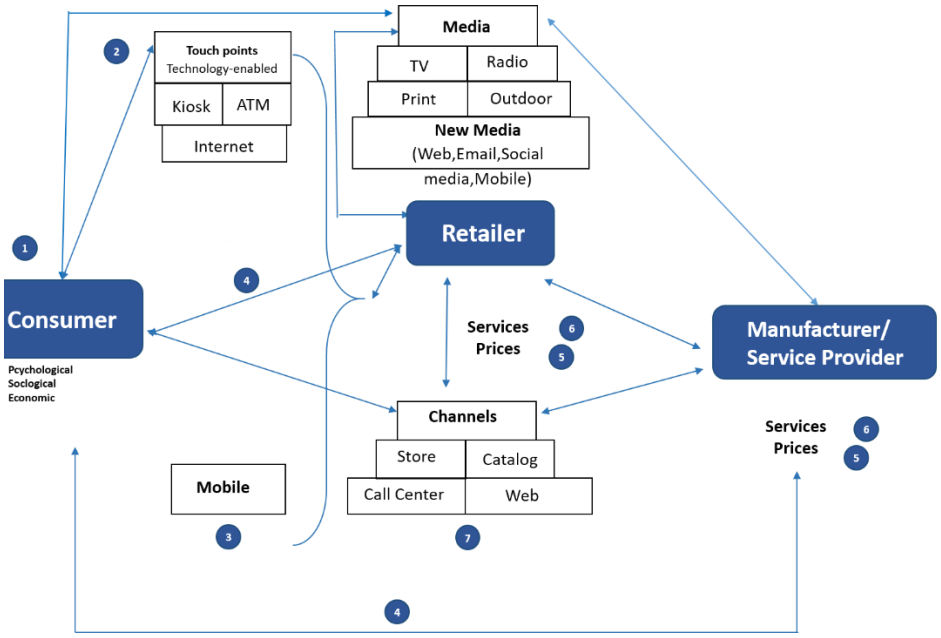

Fig. 1. Conceptual framework of multi-channel and multi-media retail environment.

Interactive technology is the method, tool or device that allows different entities (individuals, machines or organizations) to accelerate or promote consumer transactions through some intermediary communication [11]. The word “interactive” also indicates that this propagation medium has the following characteristics: bidirectionality, timeliness, mutual controllability, and responsiveness [12]. The evolution of interactive technology has a positive impact on the consumer experience [13], as well as reflects the development of information technology. In addition, some literatures indicate that interactive technology represented by the Internet helps retailers in customer relationship management [14]. All these conclusions hold that retailers can increase the customer engagement by taking appropriate interactive technologies. The use of mobile marketing in multi-channel strategies and multimedia environments can be seen as a product promotion through mobile devices, channels or technologies [15]. With increased bandwidth and the application of more advanced mobile technologies, the mobile marketing has an increasing impact in the retail environment [16], and the management can further grasp the consumer's consumption decision-making process with mature mobile technologies.

Finally, a key enabler – network is included not only in the interactive technology, but in the mobile marketing. Under the Technology Acceptance Model, the network is considered as helping to enhance the perceived usefulness, and in the technology of mobile applications, such as location-based services can also be considered as helping enhance the consumer utility (consumer utility), which leads to a large number of consumers apply this application to consumption [17].

2.2. Technology Acceptance Model

The Technology Acceptance Model (TAM) was proposed by Davis [18] to explain and predict the acceptance of information technology by research subjects, and to influence user’s cognition and belief by

studying the interference of different external variables, so that the user acceptance is strengthened and the purpose is achieved. Therefore, this model is also widely used to explore the decisive factors for users to accept a new technology. The development of TAM follows the view of Theory of Reasoned Action (TRA), which believes that attitude is the main factor that affects individual behavioral intentions [19]. In addition, it adds two new aspects: perceptive usefulness and perceived ease of use as the main determinants of attitudes. The perceptive usefulness believes that the individual's attitude for a behavior is mainly composed by whether such a behavior can help to achieve the behavioral purpose, while the perceived ease of use believes the individual's attitude for a behavior is mainly composed by the ease of such a behavior [18]. Hence, this study argues that whether consumers are willing to use MMKs is determined by whether they perceive the MMKs can help them complete their own consumption, and the ease of use of this behavior. So the hypotheses in this study are as follows:

H1a Perceived usefulness of MMKs has positive correlation with attitude toward use.
H1b Perceived ease of use of MMKs has positive correlation with attitude toward use.
H1c Perceived ease of use of MMKs has positive correlation with perceived usefulness.
H1d Perceived usefulness of MMKs has positive correlation with use intention.

2.3. Technology Readiness

Technology Readiness (TR) means the tendency of people to accept and use new technologies to achieve their family or work goals [20]. Its difference with TAM is that TR believes that people do not only have a positive feeling facing new technologies, they may also have anxiety or uneasiness. Parasuraman [20] worked together with Rockbridge Associates on a consumer group interview to understand the positive and negative perceptions of technology of the company's customers, and four variables of TR, namely optimism, innovativeness, discomfort and insecurity, were proposed based on the research results. Of these, optimism and innovativeness are enablers of TR, while incompatibility and insecurity are inhibitors. Parasuraman [20] points out TR can be a consideration for the development of Self-Server Technology (SST) to more accurately predict consumer behaviors, so there is no lack of studies on the degree of satisfaction and behavioral intentions for TR and SSTs. All the results also show that TR has a significant impact on SST [21]. Because TR is a measure of users' tendency to use new technologies to achieve their goals, its focus is to measure the user's state of cognition to new technologies, but not to directly explain the users' behavioral models. Hence, Lin, Shih and Sher [22] developed a model combining TR and TAM for the relationship between the two (TRAM, Technology Readiness into Technology Acceptance Model), as shown in Fig. 2:

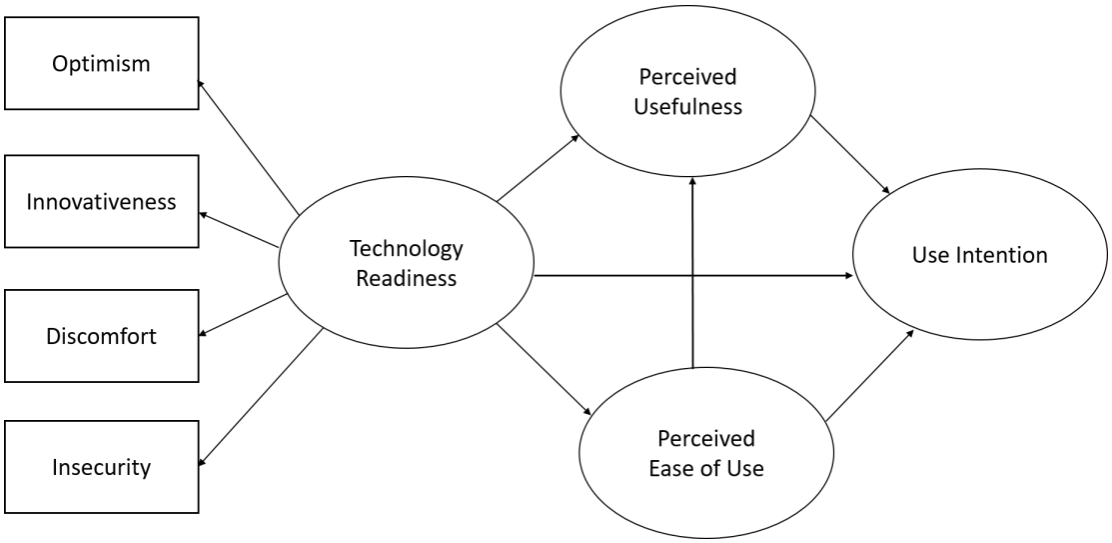

Fig. 2. TRAM (Lin, Shih and Sher, 2007).

The results of this framework show that TR has a notable correlation with behavior intension and the perceived usefulness and perceived ease of use are its mediating variables. Furthermore, Chen [23] uses TR to measure the consumer satisfaction and loyalty to 3C products. The results show that TR is a major factor that determines the consumer satisfaction and loyalty to 3C products. On this basis, this study uses TR as a measure of consumers' tendency to use technology products such as smart phones to help them achieve their goals, and explores whether the tendency is associated with the research of TRAM in the multi-channel retail environment, coming to a conclusion that the technology readiness of consumers to the application of smart devices will affect its use of the MMKs in convenience stores. Based on this, the hypothesis 2 is obtained as follows:

H2a Technology readiness has positive correlation with perceived usefulness of MMKs.
H2b Technology readiness has positive correlation with perceived ease of use of MMKs.

2.4. Interactivity

Interactivity is a quite important concept in marketing [24]. Although it does not have a so-called fairly appropriate scope or definition [25], many scholars still try to find a suitable aspect for this term. This study uses the three aspects defined by Cry *et al*. [26] for the influence of perceived interactivity on e-loyalty, namely, user control, connectedness and responsiveness. User control denotes the user's ability to control the contents and display of information; connectedness refers to whether customers share their experience in using products and services with other users; responsiveness means the ability to respond to customer requirements [24].

Many literatures have discussed the impact of interactivity on the use experience of online shopping or social network websites [26], [27], suggesting that web designers can attract and retain customers by increasing the level of interaction on the web [26] while ensuring the web security. Knowing that the interactivity is helpful to the network service design, Shina *et al*. [28] point out that consumers' perception of interactivity has a prominent moderating effect in the relationship of attitude with perceived usefulness and perceived ease of use. Similar findings have also appeared in the Web Acceptance Model (WAM) proposed by Castañeda *et al*. [29] (Fig. 3). So this study proposes the Hypothesis 3 by assuming that consumer's experience in using the traditional network channels will affect its use of MMKs:

H3a Interactivity will positively moderate the relationship between perceived usefulness and attitude toward use.
H3b Interactivity will positively moderate the relationship between perceived ease of use and attitude toward use.

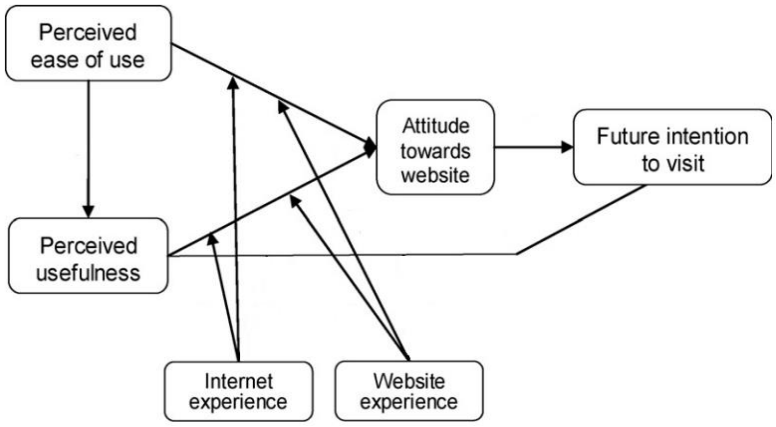

Fig. 3. WAM (Castañeda, Muñoz-Leiva, and Luque, 2007).

From the process discussed in the above literatures, the logical connection among all aspects of this study evolves from the qualitative research done by Shankar and Yadav [16] on the multi-channel retail environment. It is hoped to carry out the quantitative verification on the part discussing the consumer

behavior in the study of Shankar and Yadav [16]. This study measures the consumer's acceptance level of smart devices by TR, and expresses the consumer experience in using the traditional web services by the interactivity. Through the two facts, this paper aims to figure out whether they have influences on the use of MMKs. Further, the extension models (TRAM, WAM) of TAM are selected to complete the research framework of this study (Fig. 4):

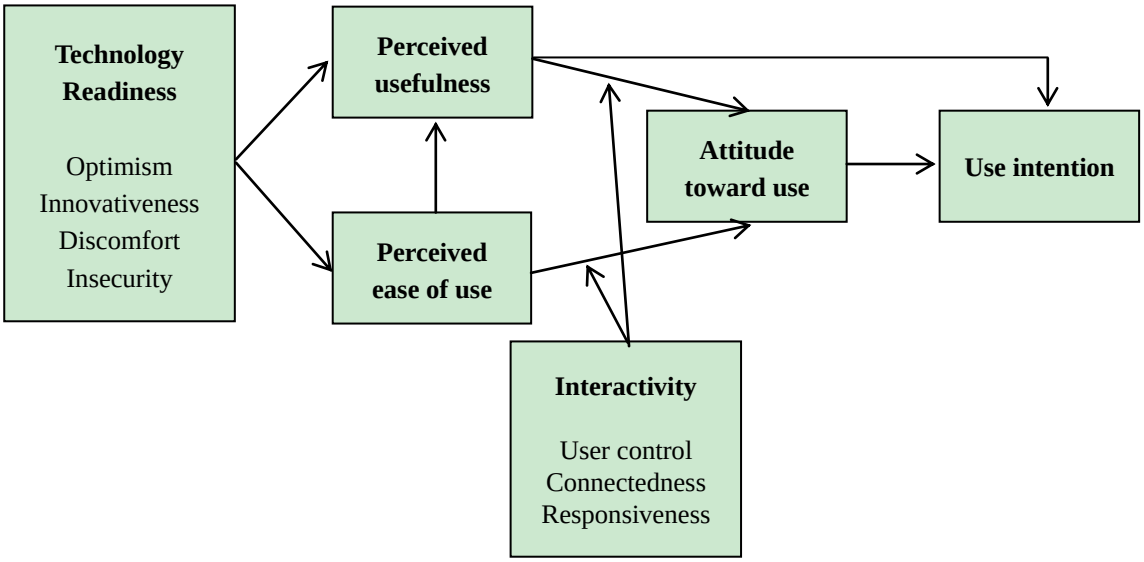

Fig. 4. Framework structure.

3. Methodology

3.1. Sampling and Participants

The questionnaires in this research were designed with literature about TAM. Three revisions and two pre-tests were undertaken. The questionnaire modified based on existing literature, contains technology readiness, perceived usefulness, perceived ease of use, attitude toward use, interactivity, and use intention. Nearly, 1000 questionnaires were circulated among MMKs consumers. 395 were returned, for a 39.5% return rate. After removing those samples considered invalid, 373 questionnaires were used in our empirical analysis. Among the valid samples, the percentage of male and female respondents was 47.5 and 52.5, respectively.

3.2. Measures

All constructs were measured by multiple-item scales based on previous studies in the technology readiness into technology acceptance model and web acceptance model literature. Similar to the scales reported by Davis [18] and Venkatesh *et al*. [30] twelve items were used to capture perceived usefulness (three items), perceived ease of use (three items), attitude toward use (three items) and use intention (three items). Technology Readiness was adapted from [20] which was measured in terms of optimism (three items), innovativeness (three items), discomfort (three items) and insecurity (three items). Following Lee [20], Johnson *et al*., [25], and Lee *et al*., [31], interactivity was measured in terms of user control (three items), connectedness (three items) and responsiveness (three items).

4. Analysis and Results

4.1. Measurement Results

In PLS, reliability of individual items is assessed by examining the loadings of the items with their

respective latent construct; loadings of < 0.5 may represent poorly worded or inappropriate items and thus should be eliminated from the model [32]. As measurement results report, all measurement items exceed this threshold and load significantly on the expected constructs. Furthermore, all constructs have acceptable levels of reliability, with the composite reliability coefficients ranging from 0.75 to 0.93 for each construct, exceeding the 0.7 recommended threshold [33]. Convergent validity is also evident, with the AVE for each construct ranging between 0.51 and 0.82, exceeding the 0.5 benchmark [34]. To test for discriminant validity, we used Fornell and Larcker's [35] approach by examining whether the square root of the AVE of each construct (shown in the diagonal in Table 1) was greater than the correlations between variables. All constructs demonstrate discriminant validity.

Table 1. Latent Variable Correlation Matrix with Square Root of Average Variance Extracted on the Diagonal and Construct Reliability

Variable	CR	AVE	1	2	3	4	5	6
1. Perceived usefulness	0.931	0.819	0.904					
2. Perceived ease of use	0.915	0.783	0.847	0.884				
3. Attitude toward use	0.908	0.766	0.765	0.742	0.875			
4. Use intention	0.920	0.793	0.800	0.729	0.864	0.890		
5. Technology readiness	0.737	0.453	0.643	0.606	0.657	0.634	0.673	
6. Interactivity	0.898	0.747	0.695	0.606	0.665	0.656	0.608	0.864

4.2. Multi-group Testing

It has been confirmed that the measurement pattern is stable. But in order to avoid the data-driven pattern and theory from being overgeneralized, the suggestions of Hair, Black, Babin, Anderson and Tatham [34] were taken to divide the sample data into two groups based on regions (174 and 199, respectively). Besides, multi-group testing was combined with Bootstrap to gradually control the pattern parameters of the groups, including Unconstrained, Measurement weights, Structural weights, Structural residuals and Measurement residuals. The nested models developed from different limitations χ2 difference quantity to make significance analysis, in order to determine the reasonability of those parameters in controlling the two groups. The results are shown in Table 2.

Analysis results show that the value of each pattern mode of χ2/df is ranging from 1.541 to 1.598, the RMSEA is ranging between 0.038~ 0.040. It can be learned from Table III that the value of weighted measurement model, weighted structure model, covariance structure model and residual structure model χ2 has reached up to a significant level, which shows that the model has good between-group invariance. Therefore, the framework and the conclusion of this research will present difference of models.

Table 2. Multi-group Testing

Model	χ^2	df	χ^2/df	p	RMSEA
1. Unconstrained	753.77	482	1.564	.00	.039
2. Measurement weights	777.74	498	1.562	.09	.039
3. Structural weights	789.16	508	1.553	.32	.039
4. Structural residuals	796.49	517	1.541	.60	.038
5. Measurement residuals	864.63	541	1.598	.00	.040
2-1	23.97	16		.000	
3-1	35.39	26		.000	
4-1	42.72	35		.000	
5-1	110.86	59		.000	

4.3. Main Effect Analysis of the Structural Model

In this study, the structural model is established for the measurement model of each potential variable mentioned above according to the research structure, and the mode fit of the structural equation model examining theory is adopted. As the results shown, the structural model provided good fit to the data: χ2/df= 2.841; Tucker-Lewis Index (TLI) = .917; Comparative Fit Index (CFI) = .924; Standardized Root Mean Square Residual (SRMR) = .030; Root Mean Square Error of Approximation (RMSEA) = .048. In conclusion, the model fit in this paper should be acceptable.

In this study, SEM is used to detect the relationship between variables in the model, and there are many items in the consideration of certain facet scales. The results of the study are shown in Fig. 2. All the correlations among use intention, attitude toward use, perceived ease of use and perceived usefulness are positively statistical significance, so H1a, H1b, H1c and H1d were supported. In addition, technology readiness→ perceived ease of use and technology readiness→ perceived usefulness showed positive impacts and statistical significance, indicating support to H2a and H2b.

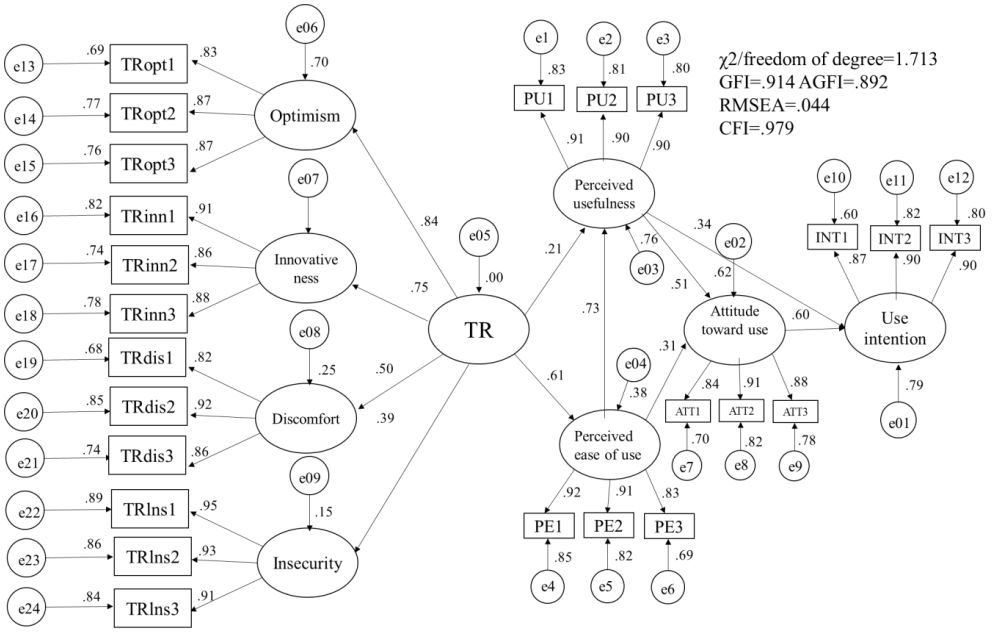

Fig. 5. Path analysis.

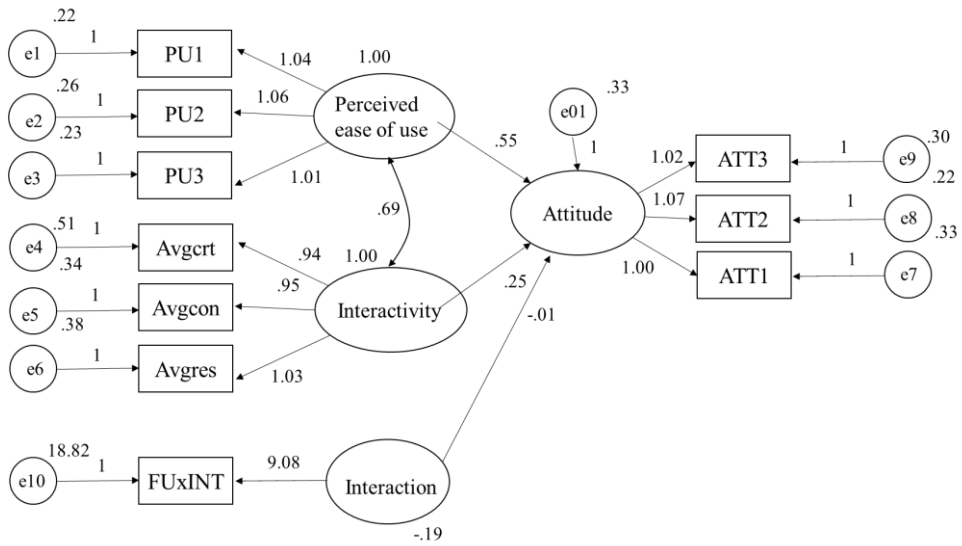

Fig. 6. Interaction terms of perceived ease of use and interactivity.

4.4. Moderated Role of Interactivity

Considering the impact on attitude toward use of perceived ease of use and perceived usefulness, the adoption of interactivity was referring as a moderated variable in the model. The two-way interaction terms of perceived ease of use* interactivity and perceived usefulness* interactivity were added in Fig. 6 and Fig. 7. The constituent variables were mean-centered prior to creating the interaction items to avoid multicollinearity. Fig. 6 and Fig. 7 The results in Fig. 6 and Fig. 7 showed that the interaction terms were not positive significant (-.01 and .00). H3a and H3b were not supported.

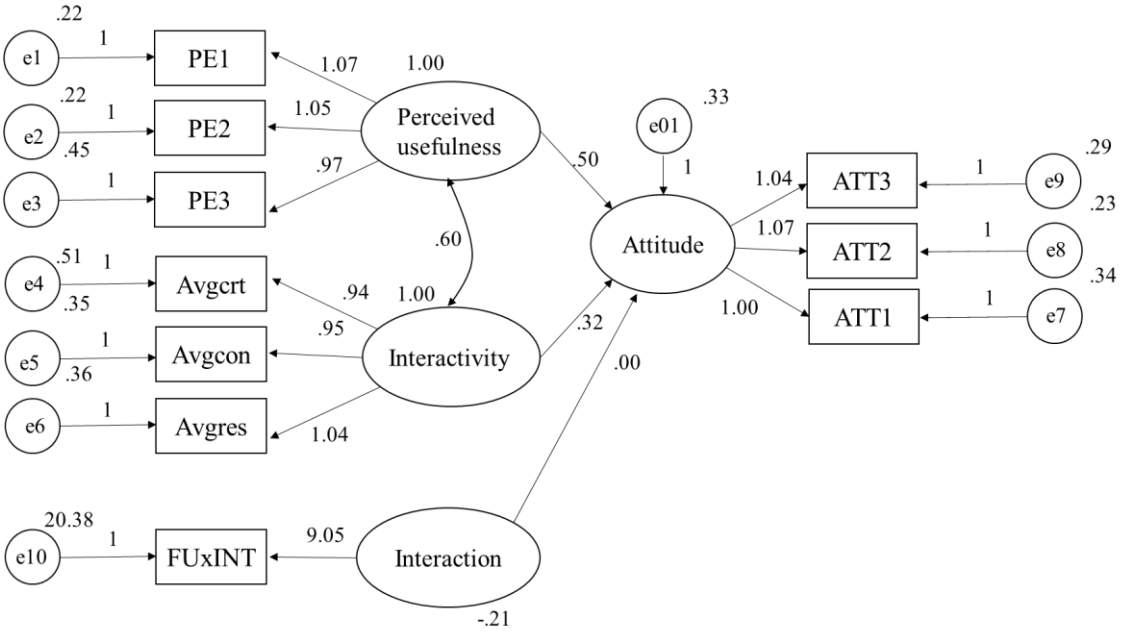

Fig. 7. Interaction terms of perceived usefulness and interactivity.

5. Conclusions and Discussions

According to the Technology Acceptance Model hypothesis proposed by Davis [18], the individual's attitude on the use of new technology is mainly influenced by the two factors: perceived usefulness and perceived ease of use. By referencing to the previous studies that used TAM to study the use of MMKs on the airport [1], the subject of this study is changed as the self-help service that is quite popular, and MMKs in convenience stores are used as the research object. The same result of the study with Chen [1] is that perceived usefulness has a significant impact on the use behavior of self-help services. In addition, the statistical data of this study also show that the perceived usefulness has a more significant influence on the using attitude than the perceived ease of use. Finally, as with most behavioral theories, the using attitude of individuals to MMK will remarkably affect their use intention.

Elliott *et al*. [2] have studied the relationship between the use behavior of self-help services with TR. The results show that TR does evidently affect the perceived usefulness and perceived ease of use of individuals when they use self-help services. Following this view, this study narrows the original definition of TR to the specific 3C products such as smartphones or tablets [23], hoping to know if the consumer's habit of using 3C products also have an effect on the use of MMKs. In the end, the statistical results show that this relationship will still be established, and TR has a greater impact on the perceived ease of use than on the perceived usefulness, implying that consumers may be more conscious of the ease of use of MMKs while they are more accustomed to using 3C products, but they may not agree with the usefulness of MMKs.

Interactivity in this study expresses consumers' perception on the use experience of web services [26], [27]. Based on WAM's point of view, the consumers' experience in internet using is assumed to have a mediating effect on the behavior of using network services, but the data show that this effect in this study is not prominent, which is different from the conclusion of Castañeda *et al*. [29]. This study deduces that although the self-help service like MMK is also an interactive technology taking the Internet as a service basis [16], it is more closed than other online services such as shopping websites, and consumers also have different cognitions, resulting in the difference between the hypothesis verification of mediating effect and the researches of other scholars.

5.1. Implications

After selecting MMKs in convenience stores as the research subject, this study first discusses the literature on consumer behavior theories, and then find out other factors that may influence consumer behaviors by referencing to the qualitative research of multimedia and multi-channel retail environment [16], and chooses theories that can properly express these factors and verifies them by quantitative research. Enlightened by the Homeplus case in Korea and supported by multi-channel strategy literatures, this study suggests that factors affecting consumer behaviors are not necessarily directly related to the behaviors (consumers' use of MMKs will be affected by their habit of using mobile phones). This is where the study is quite different from other traditional behavioral theories.

The Technology Acceptance Model (TAM) has been a quite mature theory for explaining the consumer behaviors. This theory was first created to explain the use of computers, and up to now, this theory can be self-defined as the related behaviors to be studied depending on the research subject, and combined with other appropriate external factors, it even can propose specific suggestions for practices. However, TR is often used in academic research as one of the external factors affecting TAM, and in most cases, it is still simply interpreted as the degree to which individuals are willing to use new technologies. The scope of "new technologies" is too broad. Therefore, after referring to the study of Chen [23], this study describes TR as the specific tendency of individuals to use mobile devices such as smart phones. In this way, a more specific and clear plan can be proposed in the subsequent part of practical suggestions. In view of the above phenomena and the support from research conclusions, if the APP functions are changed to save the operation time before the MMKs, the consumer can operate the APP on the mobile phone to use services, and then scan the service code or QR code on MMKs to obtain the payment receipt. By combining the ready-to-use features of mobile devices with the sense of security brought by the closed system of MMKs in terms of payment, consumers are certain to think this mode of use is more convenient and easy to operate. Moreover, the statistical results of this study in TR show that optimism is the most decisive factor for consumers' willingness to use mobile phones in consumer behaviors. Therefore, this study also suggests to set up a product discount zone in APP promote the use of APP, enhance the positive impression on APP, thereby increasing the usage rate.

References

[1] Ku, C. S., & Chen, C. D. (2012). Fitting facilities to self-service technology usage: Evidence from Kiosks in Taiwan airport. *Journal of Air Transport Management*, *32*, 87-94.

[2] Elliott, K., Meng, G., & Hall, M. (2012). The influence of technology readiness on the evaluation of self-service technology attributes and resulting attitude toward technology usage. *Services Marketing Quarterly*, *33*, 311-329.

[3] Lim, J., Grover, V., & Purvis, R. L. (2012). The consumer choice of e-channels as a purchasing avenue: An empirical investigation of the communicative aspects of information quality. *IEEE Transactions on Engineering Management*, *59(3)*, 348-363.

[4] Levy, M., & Weitz, B. A. (2009). *Retailing Management*, (7th ed.), New York, N.Y: The McGraw-Hill/Irwin Companies, Inc.

[5] Kilcourse, B., & Rowen, S. (2008). *Finding the Integrated Multi Channel Retailer*. Miami: Retail Systems Research.

[6] Zhang, J., Paul, W. F., John, W. I., Tarun, K., Thomas, J. S., & Barton, A. W. (2010). Crafting integrated multichannel retailing strategies. *Journal of Interactive Marketing*, *24(2)*. 168-180.

[7] Kushwaha, T., & Shankar, V. (2007). Single channel vs. multichannel customers: Determinants and value to retailers. *Working Paper.* Texas A&M University.

[8] Konus, U., Verhoef, P. C., & Neslin, S. A. (2008). Multichannel shopper segments and their covariates. *Journal of Retailing*, *84(4)*, 398-413.

[9] Dholakia, U. M., Kahn, B. E., Reeves, R., Rindfleisch, A., Stewart, D., & Taylor, E. (2010). Consumer behavior in a multichannel, multimedia retailing environment. *Journal of Interactive Marketing*, *24(2)*, 86-95.

[10] Chiu, H. C., Hsieh, Y. C., Roan, J., Tseng, K. J., & Hsieh, J. K. (2011). The challenge for multichannel services: Cross-channel free-riding behavior. *Electronic Commerce Research and Applications*, *10*, 268-277.

[11] Varadarajan, R., Srinivasan, R., Vadakkepatt, G. G., Yadav, M. S., Pavlou, P. A., Krishnamurthy, S., & Krause, T. (2010). Interactive technologies and retailing strategy: A review, conceptual framework and future research directions. *Journal of Interactive Marketing*, *24(2)*, 96-110.

[12] Bolton, R., Saxena-Iyer, S., & Ratchford, B. T. (2009). Interactive services: A framework, synthesis and research directions. *Journal of Interactive Marketing*, *23(1)*, 91-104.

[13] Kim, J., & Forsythe, S. (2008). Adoption of virtual try-on technology for online apparel shopping. *Journal of Interactive Marketing*, *22(2)*, 45-59.

[14] Shah, J. R., & Murtaza, M. B. (2005). Effective customer relationship management through web services. *Journal of Computer Information Systems*, *46(1)*, 98-109.

[15] Shankar, V., & Balasubramanian, S. (2009). Mobile marketing: Synthesis and prognosis. *Journal of Interactive Marketing*, *23(2)*, 118-129.

[16] Shankar, V., & Yadav, M. S. (2010). Emerging perspectives on marketing in a multichannel and multimedia retailing environment. *Journal of Interactive Marketing*, *24*, 55-57.

[17] Shankar, V., Venkatesh, A., Hofacker, C., & Naik, P. (2010) Mobile marketing in the retailing environment: Current insights and future research avenues. *Journal of Interactive Marketing*, *24(2)*, 111-120.

[18] Davis, F. D. (1989). Perceived usefulness, perceived ease of use and user acceptance of information technology. *MIS Quarterly*, *13(3)*, 319-340.

[19] Fishbein, M., & Ajzen, I. (1975). Belief, attitude, intention, and behavior: An introduction to theory and research. *Reading*. MA: Addison- Wesley.

[20] Parasuraman, A. (2000). Technology readiness index (TRI): A multiple-item scale to measure readiness to embrace new technologies. *Journal of Service Research*, *2(4)*, 307-320.

[21] Lin, J. C., & Hsieh, P. L. (2007). The influence of technology readiness on satisfaction and behavioral intentions toward self-service technologies. *Computers in Human Behavior*, *23(3)*, 1597-1615.

[22] Lin, C. H., Shih, H. Y., & Sher, P. J. (2007). Integrating technology readiness into technology acceptance: The TRAM model. *Psychology and Marketing*, *24(7)*, 641-657.

[23] Chen, S. C. (2011). Understanding the effects of technology readiness satisfaction and electronic word-of-mouth on loyalty in 3c products. *Australian Journal of Business and Management Research*, *1(3)*, 1-9.

[24] Lee, T. (2005). The impact of perceptions of interactivity on customer trust and transaction intentions

in mobile commerce. *Journal of Electronic Commerce Research*, *6(3)*, 165-180.

[25] Johnson, M. D., Herrmann, A., & Huber, F. (2006). The evolution of loyalty intentions. *Journal of Marketing*, *70(2)*, 122-132.

[26] Cyr, D., Head, M., & Ivanov, A. (2009). Perceived interactivity leading to e-loyalty: Development of a model for cognitive–affective user responses. *Human-Computer Studies*, *67*, 850-869.

[27] Zhao, L., & Lu, Y. (2012). Enhancing perceived interactivity through network externalities: An empirical study on micro-blogging service satisfaction and continuance intention. *Decision Support Systems*, *53(4)*, 825-834.

[28] Shina, D. H., Jungb, J., & Changc, B. H. (2012). The psychology behind QR codes: User experience perspective. *Computers in Human Behavior*, *28*, 1417-1426.

[29] Castañeda, J. A., Muñoz-Leiva, F., & Luque, T. (2007). Web acceptance model (WAM): Moderating effects of user experience. *Information & Management*, *44*, 384-396.

[30] Venkatesh, M., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of Information technology: Toward a unified view. *MIS Quarterly*, *27(3)*, 425-478.

[31] Lee, D., Moon, J., Kim, Y. J., & Yi, M. Y. (2015). *Antecedents and Consequences of Mobile Phone Usability: Linking Simplicity and Interactivity to Satisfaction, Trust, and Brand Loyalty, Information and Managemen*t.

[32] Capron, L., & Hulland, J. (1999). Redeployment of brands, sales forces, and general marketing management expertise following horizontal acquisitions: A resource-based view. *Journal of Marketing*, *63(2)*, 41-54.

[33] Nunnally, J. C. (1978). *Psychometric Theory*, 2nd ed. New York: McGraw-Hill Book Company.

[34] Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2009). *Multivariate Data Analysis*. Upper Saddle River, NJ: Prentice Hall.

[35] Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18(1)*, 39-50.

Michael Yao-Ping Peng is an associate professor in School of Economics and Management, XI'AN University of Posts & Telecommunications in China. He was finishing his Ph.D. program in Department of Business Administration in National Chung Hsin University. His major includes marketing management, international business, institutional research, etc.