


The Online Betting Behavior of Sport Lottery Consumers

Li-Wei Liu, Chaoyang University of Technology, Taiwan

Ying-Hsiao Lai, Chaoyang University of Technology, Taiwan*

 <https://orcid.org/0000-0002-5516-6898>

Tsung-Hua Hsieh, Chaoyang University of Technology, Taiwan

ABSTRACT

The sports lottery industry is growing globally, especially in the online betting market. This study focuses on online sports lottery behavior and tries to propose a framework applied in a virtual environment. Based on the technology acceptance model, four antecedes (subject norm, computer anxiety, computer self-efficacy, and personal innovativeness) are added to this framework. The subjects of this study from whom 268 valid questionnaires were collected from betting members of sports lottery vendors in the Taichung district. Findings show that subject norm is a good antecedent in this framework, but computer anxiety does not reach statistical significance for explanation in this study. Both computer self-efficacy and personal innovativeness positively influence perceived usefulness. The results demonstrate the value of the expanded TAM and use of the expanded model indicates a high degree of acceptance for online betting systems among sports lottery consumers. The TAM expansion proved relevant in gathering applied information on the behavior of sports lottery consumers.

KEYWORDS

Sports Lottery Consumer, Technology Acceptance Model, Virtual Online Betting

INTRODUCTION

The sports lottery market is currently very large. According to a 2020 IBIS survey, global sports betting and lottery industry revenue could be \$210.8 billion (USD) in 2021 (IBISWorld, 2020). Meanwhile, the market grew 0.5% per year between 2016 and 2021 (see Appendix 1). Technology has changed betting behaviors and online sports betting has grown rapidly worldwide (Killick & Griffiths, 2019; Lopez-Gonzalez and Griffiths, 2016). In addition, Chiu, Lee, Liu and Liu (2012) stated that more and more people will accept online sports lottery. Mao, Zhang & Connaughton (2015) believed that sports betting is the most popular lottery in the world. Hence, online betting/sports lottery is an essential issue to investigate. More than 120 countries promote sports lotteries since their ventures are primarily used to fund the development of physical education and sports and for the improvement of sports facilities (Forrest & Simmons, 2003; Liu, Tsai, Fang, & Liu, 2019). As the sustained development of modern technology has led to an 80% web surfing rate among the Taiwanese population, the Taiwan Sports Lottery (TSL) developed and built an online betting system

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*Corresponding Author

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in 2014. The TSL enables sports betters to learn the most updated information about sports events and to bet online without time or location constraints.

The purpose of this study is to propose a framework to examine the behaviors of online sports lottery consumers in Taiwan. The number of online betting customers and the percentage of betting increased after the TSL started virtual online betting in April 2014. The willingness of consumers to accept such innovative technologies in such a brief time is why TAM is applied as an indicator to explain the willingness of consumers to use a specific technology (Chiu, Lee, Liu & Liu, 2012; Davis, 1989). After Davis (1989) conducted his applied research on the TAM, numerous researchers implemented it to indicate and explain the acceptance of new informational technologies. The TAM has also been applied to numerous research fields. Indeed, the volume of related research is so large that the TAM has become a popular orientation in recent research on information management. The TAM is widely used in information and management fields like e-learning systems (Persico, Manca, & Pozzi, 2014), mobile banking services (Alsamydai, 2014), and learning management systems in higher education institutions (Fathema, Shannon, & Ross, 2015). Chiu, Lee, Liu and Liu (2012) adopted the theory of acceptance and use of technology (UTAUT) to discover the relationship between performance expectancy and social influence; their study focused on market segment and internet experiences. Hur, Ko, and Caussen (2011) developed the Sports Website Acceptance Model (SWAM), but have yet to examine it. Mahan (2011) analyzed consumers' preferences for using digital social media (e.g., Facebook and Twitter) for marketing physical education institutions, with a special focus on the field of sports. Consequently, the current study applied the Technology Acceptance Model (TAM) to understand the acceptance of alternative betting approaches among sports lottery betters in Taiwan.

The Technology Acceptance Model (TAM) is well-developed and adopted in a variety of fields. Based on TAM, we added four antecedents - subjective norm, computer anxiety, computer self-efficacy, and personal innovativeness - to explore the behaviors of online sports lottery consumers. Venkatesh and Davis (1996) suggested the antecedents of perceived ease of use were important. Through our research, previous studies (Chiu, Lee, Liu, & Liu, 2012) can be improved and the adopted antecedents can be applied to the technology environment.

This paper is sectioned into three parts. The first focuses on the history of the Technology Acceptance Model and how to apply it. The second introduces the antecedents of perceived usefulness and perceived ease of use, and proposes a framework to examine the relationship between perceived usefulness, perceived ease of use, behavioral intention, and use behavior. The final section discusses the research, conclusion, and recommendations. The goal of this study is to propose a model that applies to an online commerce environment.

THEORETICAL BACKGROUND

The TAM, which was constructed based on the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975) and first proposed by Davis, Bagozzi, and Warshaw (1989), was designed to help researchers comprehend the acceptance among system users of certain technologies, especially behavior related to computers. In the TAM, two concepts explain individuals' use or adoption of certain systems: perceived usefulness and perceived ease of use. An individual's attitude toward using and perceived usefulness directly influences behavioral intention in the TAM. Moreover, behavioral intention directly influences final actual system use, and perceived ease of use not only directly influences the attitude toward using but also influences perceived usefulness (Davis, 1989).

Davis (1989) claimed that perceived ease of use influences attitude toward using and perceived usefulness because the ease of operating a system affects the user's sense of self-efficacy when using its equipment. When people feel confident operating a new technology they perceive the use of that technology positively. Although the TAM is widely used, there are still limitations to its use. Consequently, Venkatesh and Davis (2000) revised the TAM into the Revised Technology Acceptance Model (TAM2). They added other factors to the original factors of perceived ease of use

(perceived usefulness, behavioral intention, and actual system use), like the social influence process (which includes subjective norms, voluntariness, experience, image) and the cognitive instrumental process (including job relevance, output quality, result demonstrability, and perceived ease of use) (Venkatesh & Davis, 2000).

Even though the original four variables of the TAM were retained in the TAM2, the behavioral intention was revised to use as a variable, and actual system use was revised with usage behavior as a variable; both stand for the same concepts (Venkatesh & Davis, 2000). To be in accordance with the TAM2 and the perceived ease of use factor (Venkatesh, 2000), Venkatesh and Bala (2008) addressed that the main change of the TAM3 emphasizes the influential variables that affect perceived ease of use.

In the TAM3 model, according to the literature (Venkatesh & Bala, 2008), the factors that influence perceived ease of use are two-fold. First, they include the aspect of anchors: computer self-efficacy, perceptions of external control, computer anxiety, and computer playfulness. Second, they include the aspect of adjustment, including perceived enjoyment and objective usability. Briefly speaking, the primary theoretical base of the TAM is derived from the perceived ease of use and perceived usefulness of new technology, and the user behavior emerges with the behavioral intention of the user. In contrast, when a new technology is not easy to use, consumers are unlikely to keep using it. Although Venkatesh and Bala (2008) raised a profound discussion on the influential factors of perceived usefulness and perceived ease of use, there are different implementations in various academic fields and different outer influential factors.

The initial TAM (Davis, Bagozzi, & Warshaw, 1989) assumed that perceived ease of use directly influences perceived usefulness and attitude toward using; perceived usefulness directly influences attitude toward using and behavioral intention; attitude toward using directly influences behavioral intention, and behavioral intention directly influences actual system use. These assumptions have been established in different academic domains (Davis, 1993; Fathema, Shannon, & Ross, 2015; Mangin, Bourgault, Guerrero, & Egea, 2011; Moeser, Moryson, & Schwenk, 2013; Reid, 2008).

In online sports betting adoption model proposed by Lee and Xia (2009), the results showed that perceived usefulness, perceived ease of use, and attitude had either a direct or indirect influence on intention and that perceived usefulness and attitude had either a direct or indirect influence on intention to bet online. Furthermore, in a study of the online ticket purchasing behavior of World Cup football fans, Dhurup, Surujlal, and Mahlangu (2011) found that fans aware of the perceived usefulness of the network system were positively influenced in their attitudes toward online ticketing. In addition, Kwak and McDaniel (2011) found that a fan's attitude toward a televised sport (i.e., American professional football), perceived ease of use concerning a fantasy sports website, and subjective norm each played a role in explaining participants' attitudes and behavioral intentions towards playing fantasy football. Moreover, Rammile and Nel (2012) found that perceived ease of use had a strong positive influence on perceived usefulness and intention to use, while perceived usefulness had a strong positive influence on behavioral intention. This is similar to Tsai and Onoeva's research results (Tsai & Onoeva, 2013).

This study proposes a virtual online betting model for sports lottery consumers based on the TAM theory. Accordingly, the present study proposes the following hypotheses:

- H1: Perceived ease of use positively influences the perceived usefulness of the virtual online betting system.
- H2: Perceived ease of use positively affects the attitude toward using the virtual online betting system.
- H3: Perceived usefulness of the virtual online betting system positively influences the attitude toward use.
- H4: Perceived usefulness positively influences behavioral intention to use the virtual online betting system.
- H5: The attitude toward using positively affects the behavioral intention to use the virtual online betting system.

H6: Behavioral intention positively affects the user behavior of the virtual online betting system, as perceived by sports lottery consumers.

The five factors of H1 to H6 are found in the original TAM; nevertheless, the revised models of TAM2 (Venkatesh & Davis, 2000) and TAM3 (Venkatesh & Bala, 2008), as well as related research on the TAM, found various external factors that affect user behavior surrounding information technology. However, the expansionary outer factors of different research studies are different. Based on these foundations, Lee and Xia (2009) found the influence of subjective norm, perceived usefulness, and perceived ease of use on college students' implementation of the online betting system in their analysis. Additionally, when the researchers field-interviewed sports lottery online betters, some interviews indicated feelings of difficulty in adopting the online betting system, showing negative effects and even becoming anxious or fearful using computers. However, once they acquired the necessary operating system skills they perceived it as convenient. Consequently, the researchers conclude three external influential factors that affect the betters' betting behaviors: computer anxiety, computer self-efficacy, and personal innovativeness.

The subject norm originated from one of the primary variables of the theory of rational action conducted by Fishbein and Ajzen (1975). Subjective regulation refers to a sense of pressure from society when an individual engages in certain action (Ajzen, 1991; Fishbein & Ajzen, 1975). Subjective regulation is conducted with normative beliefs and motivation to comply. Normative beliefs refer to the opinions of others or a group concerning the action in which an individual is engaged. And motivation to comply refers to the degree of compliance of opinions of an individual toward others.

According to Venkatesh and Bala (2008) and Venkatesh and Davis (2000), subject norm influences perceived usefulness; subject norm also affects perceived ease of use. Yang (2007) extended the subjective regulation, social presence, socialization, and self-effect variables of the model to show the subject norm's positive influential effect on perceived ease of use. Furthermore, in a study exploring factors influencing the adoption of mobile commerce, Bhatti (2007) found that subject norm influences perceived usefulness and perceived ease of use. Consequently, the present study proposes the following hypotheses:

H7: The subject norm of sports lottery consumers positive influences perceived usefulness.

H8: The subject norm of sports lottery consumers positively influences perceived ease of use.

The computer anxiety variable refers to the degree of "an individual's apprehension, or even fear, when an individual confronts the situation" of discovering "whether he/she is capable of using a computer" (Venkatesh, 2000, p. 349). In TAM3 (Venkatesh & Bala, 2008) there are no influential effects of computer anxiety on perceived usefulness, but there are negative effects on perceived ease of use. In other words, when an information system is not easy for users to operate, they tend to feel anxious and have a decreased willingness to use it. Some studies show that students' computer anxiety can have a negative influence on perceived ease of use during the process of e-learning (Saade & Kira, 2009; Van Raaij & Schepers, 2008). Based on Venkatesh and Bala (2008), computer anxiety does not influence perceived usefulness, but it harms perceived ease of use. Consequently, the present study proposes the following hypotheses:

H9: The computer anxiety of sports lottery consumers negatively affects perceived ease of use.

Computer self-efficacy refers to the degree to which an individual believes he or she can perform a specific task/job with a computer (Compeau & Higgins, 1995a, 1995b). Its role varies depending upon the research domain. When consumers believe they are capable of using a computer, they perceive the system as easy to use and their willingness to use the product increases. The relevant research

shows that computer self-efficacy is regarded as critical in determining an individual's preference for using an information system (Fathema, Shannon, & Ross, 2015; Gefen, Karahanna, & Straub, 2003; Tan & Sutherland, 2004; Wang & Emurian, 2005). According to the above discussions, the following hypotheses are established:

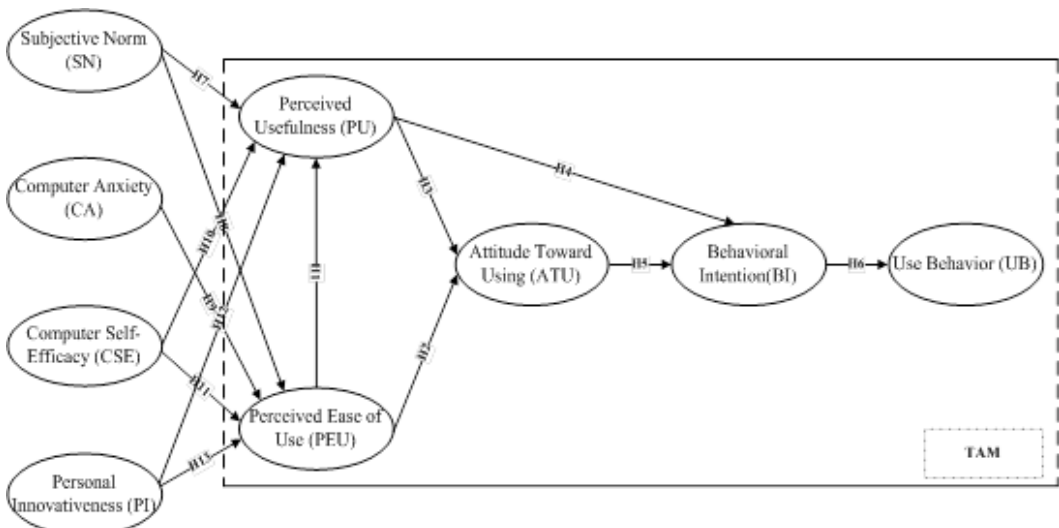
- H10: The computer self-efficacy of sports lottery consumers positively affects perceived usefulness.
H11: The computer self-efficacy of sports lottery consumers positively affects perceived ease of use.

Personal innovativeness is considered the willingness of an individual to try new information systems. Innovative individuals are found to be dynamic, communicative, curious, venturesome, and stimulation seeking. Other diffusion studies confirmed that innovativeness is related to early consumer adoption behaviors (Bhatti, 2007; Fagan, Kilmon, & Pandey, 2012; Joo, Lee, & Ham, 2014; Yang, 2005). Walczuch, Lemmink, and Streukens (2007) discussed the technical preparation of service personnel and its influence on their acceptance of technology and found that personal innovativeness positively affects personal innovativeness and perceived ease of use. In a discussion of the implementation of wireless internet mobile devices (WIMDs), Parveen, Abessi, and Ainin (2009) showed that personal innovativeness positively affects perceived usefulness and perceived ease of use. Furthermore, Fagan, Kilmon, and Pandey (2012) indicated that personal innovativeness positively affects perceived usefulness and perceived ease of use in a virtual reality simulation environment. Wang, Wang & Wang (2020) proposed a framework based on the TAM to discover ride-sharing consumers' behaviors. Results showed that personal innovativeness had a positive relationship with perceived usefulness and perceived ease of use. Consequently, the present study proposes the following hypotheses:

- H12: The personal innovativeness of sports lottery consumers positively affects perceived usefulness.
H13: The personal innovativeness of sports lottery consumers positively affects perceived ease of use.

Encompassing the above discussion, 13 hypotheses are examined in this study. Figure 1 exhibits the relationships among variables and the dotted lines frame the TAM.

Figure 1. Theoretical Model



RESEARCH APPROACH

The population of this study is valid TSL members, and Taichung City is the research scope. The quota sampling method was adopted due to the speciality of the respondents. There are eight districts in Taichung City, and 40 questionnaires were randomly distributed in each district. A total of 320 TSL members were invited to fill out the questions. Data collection took two months, from April 1st to May 31st, 2016, and the overall response rate was 100%, among which 83.75% were valid.

All measures are multi-item scales adapted from prior studies. The questions items are measured on a 7-point Likert scale (1= strongly disagree; 2= disagree; 3= somewhat disagree; 4=Neutral; 5= somewhat agree; 6=agree; 7= strongly agree). The scale of perceived usefulness (PU) is adapted from Ventaktesh and Bala (2008), as is perceived ease of use (PEU). Both scales of attitude toward using (ATU) and behavioral intention (BI) are adapted from Davis et al. (1989) and Chiu, Lee, Liu and Liu (2012). The scale of the subject norm (SN) and computer anxiety (CA) is adapted from Ventaktesh and Bala (2008) and modified based on relative research in Taiwan (Wang, Lin, Fang, et al., 2011; Tang, 2004). The scale of computer self-efficacy (CSE) is adapted from Ventaktesh and Bala (2008) and modified based on Hsieh's (2001) study. The scale of personal innovativeness (PI) is adapted from Agarwal and Karahanna (2000) and Liu (2012).

RESULTS

Among those who completed the 268 valid questionnaires, there were 187 males (69.8%) and 81 females (30.2%). The largest age group ranged from 26 to 35 years old and comprised 111 people (41.4%). The unmarried group included 167 people (62.3%). The largest disposable income group included 83 people (31.0%), with an average income of 20,000 (NTD) or less per month. A summary of the demographic descriptions is provided in Table 1.

Table 1. Demographic Description of the Sample of Sports Lottery Online Betting Consumers

Demographic Variables		Numbers	Percentage (%)
Gender	Male	187	69.8
	Female	81	30.2
Age	18-25 years old	86	32.1
	26-35 years old	111	41.4
	36-45 years old	41	15.3
	46+ years old	30	11.2
Marital status	Married	101	37.7
	Single	167	62.3
Monthly disposable income	NT.20,000(and less)	83	31.0
	NT.20,001-30,000	64	23.9
	NT.30,001-40,000	62	23.1
	NT.40,001-50,000	27	10.1
	Over NT.50,001	32	11.9

The analytical results are shown in Table 2. For perceived usefulness, the factor loading of each item was above .80, CR=.91, Cronbach's Alpha=.87, and AVE=.72. For perceived use, the factor loading of each item was over .80, CR=.92, Cronbach's Alpha=.93, and AVE=.79. For attitude toward using, the factor loading of each item was above .70, CR=.93, Cronbach's Alpha=.89, and AVE=.72. For the behavioral intention scale, the factor loading of each item was over .80, CR=.94, Cronbach's Alpha=.92, and AVE=.76. For use behavior, the factor loading of each item was over .80, CR=.94, Cronbach's Alpha=.94, and AVE=.84. For subject norm, the factor loading of each item was above .60, CR=.91, Cronbach's Alpha=.93, and AVE=.67. For computer anxiety, the factor loading of each item was over .70, CR=.95, Cronbach's Alpha=.93, and AVE=.68. For computer self-efficacy, the factor loading of each item was over .60, CR=.94, Cronbach's Alpha=.94, and AVE=.63. For personal innovativeness, the factor loading of each item was above .80, CR=.91, Cronbach's Alpha=.87, and AVE=.73.

Confirmatory factor analysis (CFA) was performed to assess the composite reliability (CR) and convergent and discriminant validity. Results showed that composite reliability was between 0.91 and 0.95, and all values were greater than 0.7, which meant high levels of reliability (Hair et al., 2006). Furthermore, the average variance extracted (AVE) by each construct exceeded 0.5, which indicated high levels of reliability. (Fornell & Larcker, 1981).

Researchers suggest the test standard of the AVE root should be at least equal to or greater than .70 (Venkatesh, Tahong, & Xu, 2012). The resulting values range from 0.800 to 0.944, indicating high levels of reliability (See Table3).

Note 1: The diagonal line displays the square roots of AVE, and the non-diagonal line displays the correlation coefficients among variables; they demonstrate discriminant validity when they are greater than the correlation coefficient values.

The evaluation of model fit is based on several indices. The chi-square value is at a significant level ($=680.265, p=0.00$), indicating overall model fit. Normed Chi-sqr ($=1.394$) is also within acceptable ranges based on Tabachnick and Fidell (2007). Other indices were GFI=0.832, AGFI=0.767, RMSEA=0.065, SRMR=0.046, TLI(NNFI)=0.916, CFI=0.926, and IFI=0.928. Overall, the fit indices suggest the proposed model is a reasonable explanation of observed covariance among the given constructs (Bagozzi & Yi, 1988; Kline, 2005).

The structural equation modeling (SEM) (path analysis) and results are presented in Table 4, where the underlined values are the standardized regression coefficients (β values). Perceived ease of use significantly influences perceived usefulness and attitude toward using, which means H1 and H2 are supported. Perceived usefulness significantly influenced attitude toward using; therefore, H3 is supported. The impact of perceived usefulness on behavioral intention does not reach statistical significance, which means H4 is not supported. Attitude toward using positively influenced behavioral intention, and behavioral intention positively influenced use behavior. In other words, H5 and H6 are supported. Subjective norm positively influenced perceived usefulness and perceived ease of use, which means H7 and H8 are supported. The impact of computer anxiety on perceived ease of use does not reach statistical significance, which means H9 is not supported. Computer self-efficacy positively influenced perceived usefulness, which means H10 is supported. The impact of computer self-efficacy on perceived ease of use does not reach statistical significance, which means H11 is not supported. Personal innovativeness positively influenced perceived usefulness, which means H12 is supported. The impact of personal innovativeness on perceived ease of use does not reach statistical significance, which means H13 is not supported (see Figure 2).

The explanatory variance of the subject norm, computer self-efficacy, and personal innovativeness for explaining the perceived usefulness variables was 47%. The explanatory variance of perceived usefulness and perceived ease of use for explaining the attitude toward using variables was 53%. The explanatory variance of attitude toward using for explaining the behavioral intention variables was 77%. The explanatory variance of behavioral intention for explaining the use behavior variables was 68%.

Table 2. Summary of Questionnaire Reliability and Validity Analysis

Factors	Item	Factor loading	CR	Cronbach's Alpha	AVE
PU	PU1	.82	.91	.87	.72
	PU2	.88			
	PU3	.85			
	PU4	.84			
PEU	PEU1	.86	.92	.91	.79
	PEU2	.90			
	PEU3	.91			
ATU	ATU1	.85	.93	.91	.72
	ATU2	.90			
	ATU3	.90			
	ATU4	.75			
	ATU5	.84			
BI	BI1	.88	.94	.92	.76
	BI2	.90			
	BI3	.87			
	BI4	.86			
	BI5	.86			
UB	UB1	.86	.94	.94	.84
	UB2	.95			
	UB3	.93			
SN	SN1	.88	.91	.87	.67
	SN2	.86			
	SN3	.82			
	SN4	.87			
	SN5	.63			
CA	CA1	.76	.95	.93	.68
	CA2	.81			
	CA3	.83			
	CA4	.87			
	CA5	.82			
	CA6	.85			
	CA7	.82			
	CA8	.85			

continued on next page

Table 2. Continued

Factors	Item	Factor loading	CR	Cronbach's Alpha	AVE
CSE	CSE1	.60	.94	.94	.63
	CSE2	.63			
	CSE3	.75			
	CSE4	.88			
	CSE5	.90			
	CSE6	.89			
	CSE7	.88			
	CSE8	.80			
	CSE9	.80			
	CSE10	.74			
PI	PI1	.87	.91	.87	.73
	PI2	.86			
	PI3	.86			
	PI4	.82			

Table 3. Summary of Discriminate Validity Analysis

PU	PEU	ATT	BI	ASU	SN	CA	CSE	PI	PU
PU	.848								
PEU	.643	.890							
ATU	.706	.677	.852						
BI	.673	.624	.869	.875					
ASU	.492	.526	.749	.788	.944				
SN	.525	.533	.702	.774	.750	.817			
CA	-.244	-.433	-.289	-.255	-.259	-.252	.821		
CSE	.482	.583	.484	.447	.360	.390	-.577	.800	
PI	.439	.396	.439	.416	.382	.367	-.423	.561	.851

Discussion

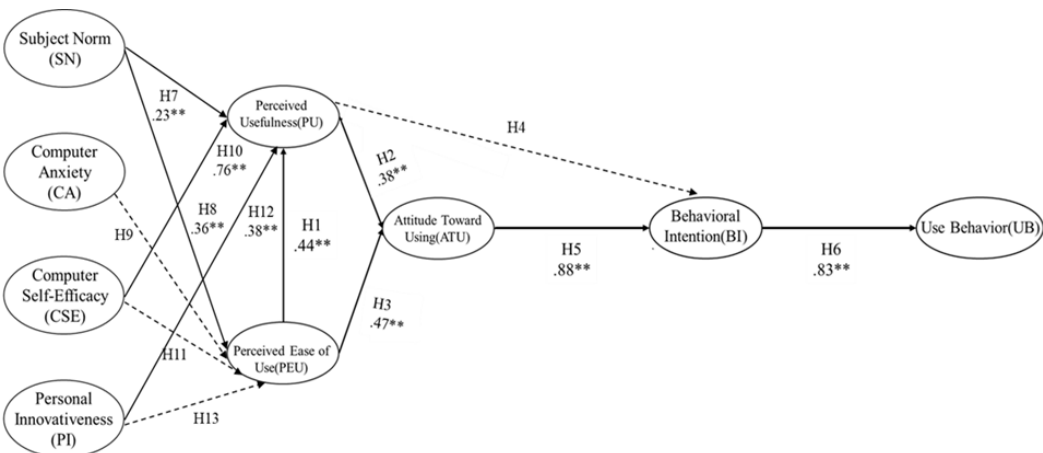
The findings show that perceived ease of using sports lottery online betting systems positively affects perceived usefulness and attitude toward using, which implies consumers think the online betting system is useful and easy to access. The study results support the TAM (Davis, Bagozzi, & Warshaw, 1989), and conform to the results of related TAM studies (Davis, 1993; Fathema, Shannon, & Ross, 2015; Mangin, Bourgault, Guettero, & Egea, 2011; Moeser, Moryson, & Schwenk, 2013; Reid, 2008).

Nevertheless, the perceived usefulness of sports lottery online betting systems has no impact on behavioral intention, which shows that even though consumers think an online betting system is useful, it does not influence their willingness to change their behaviors, such as increasing the frequency of betting, spending more time betting, etc. It is different from the results derived from the original TAM and the study of World Cup football game fans (Dhurup, Surujlal, and Mahalangu, 2001), who had a positive behavioral intention and bought tickets through an online system. The

Table 4. Summary of Test Results of the Research Hypotheses

Research hypothesis	Path coefficients (β)	Sig. (P values)	Test result
H1: Perceived ease of use → Perceived usefulness significant positive influence	.44	P<.01	Supported
H2: Perceived ease of use → Attitude toward using significant positive influence	.38	P<.01	Supported
H3: Perceived usefulness → Attitude toward using significant positive influence	.47	P<.01	Supported
H4: Perceived usefulness → Behavioral intention significant positive influence	.06	P>.01	Not supported
H5: Attitude toward using → Behavioral intention significant positive influence	.88	P<.01	Supported
H6: Behavioral intention → Use behavior significant positive influence	.83	P<.01	Supported
H7: Subject norm → Perceived usefulness significant positive influence	.23	P<.01	Supported
H8: Subject norm → Perceived ease of use significant positive influence	.36	P<.01	Supported
H9: Computer anxiety → Perceived ease of use a significant negative influence	.36	P<.01	Not supported
H10: Computer self-efficacy → Perceived usefulness significant positive influence	.76	P<.01	Supported
H11: Computer self-efficacy → Perceived ease of use significant positive influence	.38	P>.01	Not supported
H12: Personal innovativeness → Perceived usefulness significant positive influence	.38	P<.01	Supported
H13: Personal innovativeness → Perceived ease of use significant positive influence	.01	P>.01	Not supported

Figure 2. Results of the Analysis



primary reason we obtained different study results could be the influence of cultural differences. In addition, the researchers found that sports lottery consumers perceived they were satisfied with the online betting system as long as it was easy and convenient for them to use, and the effectiveness of the system was not as important.

Results also suggest that attitude toward using positively affects behavioral intention. This shows that consumers perceive the virtual online betting system as useful, resulting in a positive attitude toward their experience, which positively affects user behavior. These results are following a study of online sports betting adoption models (Lee & Xia, 2009; Tsai & Onoeva, 2013), which found that positive perception directly affects a consumer's actual use behaviors.

Concerning the antecedents that influence the TAM, results show the subject norm of sports lottery consumers positively affected perceived usefulness and perceived ease of use. This result suggests that sports lottery consumers were influenced not only by their perceptions of ease of use but they were also affected by the opinions of important others, which is consistent with the study results of an online sports betting adoption model analysis (Abdullah, F., Ward, R. & Ahmed E., 2016; Lee & Xia, 2009).

Regarding the theoretical model, the TAM 2 (Venkatesh & Davis, 2000) and the revised TAM3 (Venkatesh & Bala, 2008) also support the finding that subject norm affects perceived usefulness (Bhatti, 2007) and that of related research, which found that subject norm affects perceived ease of use (Bhatti, 2007; Yang, 2007).

Concerning the other hypothesis, findings showed the computer anxiety of sports lottery consumers had no effect on perceived ease of use, which indicates they did not feel anxious about using the system. We can attribute this result to the popularity of computer gaming in Taiwan, promoted by the Taiwan government. Therefore, consumers are capable of using a computer without computer anxiety; consequently, computer anxiety does not influence perceived ease of use. Due to the popularity of computer implementation, this finding does not support either TAM3 (Venkatesh & Bala, 2008) or the studies conducted by van Raaij and Schepers (2008) and Saadé and Kira (2009). Since the majority of research respondents were aged between 26-45 years old, computer anxiety unlikely existed.

For the influence of sports lottery consumers' computer self-efficacy on perceived usefulness and perceived ease of use, results suggested that sports lottery consumers who perceived themselves as capable of operating a computer felt the online betting system was easy and practical to use. These analytical results are not consistent with previous studies showing that computer self-efficacy influences perceived ease of use (Fathema, Shannon, & Ross, 2015; Venkatesh & Bala, 2008; Reid, 2008). Since the respondents are young and can use the system, it is possible consumers feel the lottery system is not easy to use but could still operate it based on their interests, driving them to learn. Those studies also supported related research proving that computer self-efficacy is critical in determining an individual's intentions to use information systems (Fathema, Shannon, & Ross, 2015; Gefen, Karahanna, & Straub, 2003; Tan & Sutherland, 2004; Wang & Emurian, 2005).

Regarding the relationships among personal innovativeness, perceived usefulness, and perceived ease of use, findings show effects on perceived usefulness but not on perceived ease of use. Consequently, sports lottery consumers were willing to try using the online betting system and believed the system was useful to them. Thus, our research results support the claim that innovativeness is related to consumer adoption behavior (Bhatti, 2007; Joo, Lee, & Ham, 2014; Wang, Wang & Wang 2020; Yang, 2005) and that personal innovativeness influences perceived usefulness (Joo, Lee, & Ham 2014; Parveen, Abessi, & Ainin, 2009; Wang, Wang & Wang 2020; Walczuch, Lemmink, & Streukens, 2007; Wu, Li, & Fu, 2011). However, results show that the personal innovativeness of online gaming consumers had no effect on perceived ease of use, which indicates the consumers were personally willing to try using the online betting system whether or not they had easy access to it. This finding is following a study exploring the factors influencing the adoption of mobile commerce showing that personal innovativeness does not affect perceived usefulness or perceived ease of use (Bhatti, 2007).

CONCLUSION

It is reasonable to draw the following conclusions based on the findings of this study. Sports lottery consumers perceive the online betting system as easy to use, and this positively affects their perception of the usefulness of the system. Nevertheless, consumers think the system is useful as long as it is easy to use and convenient, regardless of its effectiveness. Sports lottery consumers perceive the online betting system as useful and show a positive attitude toward using it, which positively affects use behavior and in turn results in their actual behavior of using the system. However, they are influenced by the opinions of important others or peers. On the other hand, sports lottery consumers do not appear anxious about using the online betting system. As a result of the popularity of computer use in Taiwan, most consumers have basic computer operating skills without computer anxiety; therefore, computer anxiety does not affect perceived ease of use. Sports lottery consumers who perceive themselves as capable of operating a computer feel the online betting system is easy and practical to use. When sports lottery consumers are personally willing to try the online betting system, they find it useful for them; however, the willingness of consumers to try virtual betting systems is not influenced by whether or not the system is easy to use.

Although our results showed perceived usefulness did not influence behavioral intention, they proved the practicality of the TAM and showed the most important component for understanding the adoption of new gaming systems for sports lottery betters is perceived ease of use. For consumers, an easy, accessible, virtual betting system is useful and effective and will lead to betting behaviors once attitudes and preferences toward using the system develop. In other words, the most significant consideration when developing and promoting new sports lottery betting systems is the ease of access; otherwise, the willingness to engage in betting behavior will likely decrease.

As previously described, the easier the betting system, the higher its adoption rate. The most important influence on the betting behaviors of sports lottery consumers is peer groups, which implies that betting consumers' behaviors affect the people around them. This is important because consumers who have basic computer operating skills can learn to use betting systems and teach others, which encourages betting behavior. In addition, consumers accepting the use of a betting system implies they engage in innovative behaviors and consider betting systems useful and effective.

The limitation of this study is that it was restrained to lottery customers from a single district; thus, results cannot explain other areas in Taiwan. Future researchers could explore different populations. In addition, although the study was conducted based on the traditional TAM, TAM2, and TAM3, with four additional outer variables, the subject norm was the only variable that showed a significant influence on both perceived usefulness and perceived ease of use. Therefore, future research should consider related influential variables (for example, degree of involvement, sports lottery knowledge, and risk evaluation) to gain a better understanding of consumer behavior and the outer variables influencing online sports lottery systems.

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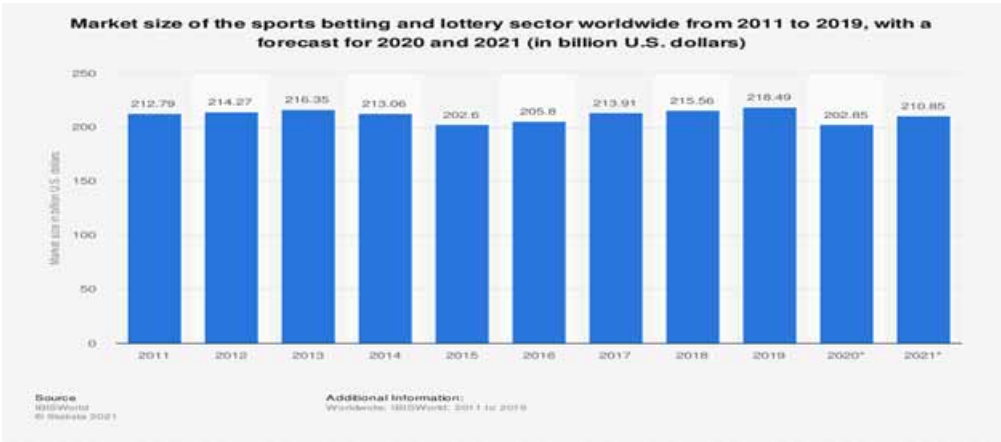
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APPENDIX A – ADDITIONAL FIGURE

Figure 3. Market size of the sports betting and lottery sector worldwide from 2011-2019 (Source: IBIS World)



APPENDIX B - MEASUREMENT ITEMS IN THE SURVEY QUESTIONNAIRE

Table 4. Measurement items in the survey questionnaire

Perceived Usefulness (PU)	
PU1	Using the online betting system promotes the effectiveness of betting in the sport lottery.
PU2	Using the online betting system helps me bet on the sport lottery.
PU3	Using the online betting system allows me to finish betting on the sport lottery faster.
PU4	Overall, using the online betting system to bet on the sports lottery is useful for me.
Perceived Ease of Use (PEU)	
PEU1	Each of the interactive functions of the online betting system are clear and easy to understand.
PEU2	It does not require too much effort to use the online betting system.
PEU3	Overall, using the online betting system to bet on the sports lottery is easy for me.
Attitude Toward Using (ATU)	
ATU1	My appraisal of the online betting system is good.
ATU2	I like to use the online betting system to bet on the sports lottery.
ATU3	I think using the online betting system is good for me.
ATU4	I think using the online betting system to bet on the sports lottery helps me save time.
ATU5	I think the experience of using the online betting system is pleasant.
Behavioral Intention (BI)	
BI1	I am planning to increase my use of the online betting system.
BI2	I think the online betting system is worth using.
BI3	I am willing to spend more time to understand how to use the online betting system effectively.
BI4	I will recommend the online betting system to others.
BI5	I am willing to increase my use of the online betting system's different functions.
Use Behavior (UB)	
UB1	I use the online betting system frequently.
UB2	I spend a lot of time using the online betting system.
UB3	I have been using the online betting system for some time.
Subject Norm (SN)	
SN1	It is important that others recommend I adopt the online betting system.
SN2	Other customers who have used the online betting system assist me in using it.
SN3	In general, the sports lottery vendors provide support to cope with problems using the online betting system.
SN4	I choose to use the online betting system because it is common.
SN5	I think using the online betting system is a future trend.
Computer Anxiety (CA)	
CA1	Using a computer makes me nervous.
CA2	Using a computer makes me uneasy.
CA3	It is difficult for me to learn to use a computer.
CA4	Handling tasks that require using a computer bothers me.
CA5	It makes me feel anxious when computer software updates are necessary.
CA6	I usually avoid tasks that require using a computer.

continued on next page

Table 4. Continued

Perceived Usefulness (PU)	
CA7	It makes me panic when observing others using a computer proficiently.
CA8	Every aspect of computer technology bothers me.
Computer Self-Efficacy (CSE)	
CSE1	I am able to use the online betting system to accomplish betting processes independently and without assistance.
CSE2	I am able to use the online betting system to finish the whole betting process if I have assistance from the beginning step.
CSE3	I think the online betting system is easy to learn.
CSE4	I think the online betting system is easy to use.
CSE5	Using the online betting system proficiently is not difficult for me.
CSE6	Using the online betting system to bet on the sports lottery is easy.
CSE7	I am able to learn to use a computer without relying on others' assistance too much.
CSE8	I am able to learn to use the online betting system by observing others.
Personal Innovativeness (PI)	
PI1	I am willing to try new things as long as I learn about them.
PI2	In general, I am willing to try new things.
PI3	I am usually the first person willing to try new things among my peers.
PI4	I always like to try new things.

Ying Hsiao (Rebecca) Lai is an Assistant Professor in the Department of Leisure Services Managements at Chaoyang University of Technology. Her research interests are in tourism marketing and consumer behaviors, particularly focusing on the determinants of repurchase and satisfaction.