

*A study on behavior intention to use live streaming video platform  
based on TAM model*

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**Abstract**

Due to the high penetration of internet and well-developed technology in current Taiwan, it's enough to provide greater bandwidth and faster network. It makes users use the internet easier and save time. Some application platforms in use on computer or entertainment device is necessary of enough bandwidth and live streaming video platform is one of them. It mainly presents in a way to broadcast the scene of user's game screen or user performing video and allows viewers discuss with the user. In addition to use on the PC, it is now available on the PlayStation 4 and Xbox One. The number of users has rapidly increased in recent years. Previous studies tend to focus on video-sharing website such as YouTube or Youku. There is few researches for a live streaming video platform. Therefore, this study attempts to explore user behavior intention on live streaming video platform by questionnaire method. It is based on Technology Acceptance Model (TAM) which is proposed by Davis (1989) to establish a research framework model. The research expects to collect the sample from game and sport discussion platform which gather many users .The result will provide new understanding of user's intention to use live streaming video platform and make researchers for further research in this field in the future.

Key words: Live Streaming Video Platform, Technology Acceptance Model (TAM), Behavior Intention

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## 1. Introduction

According to Foreseeing Innovative New Digiservices (FIND) statistics in 2013, there are 17.98 million people had used the internet in Taiwan. In internet penetration, 84.81% of all households connect with the internet. Among all internet user, 61% of users' internet bandwidth is greater than 8 megabyte per second (FIND, 2013). As the development of technology, internet has greater bandwidth and higher penetration. It combined most of technology products and service in life.

(Units in Millions)

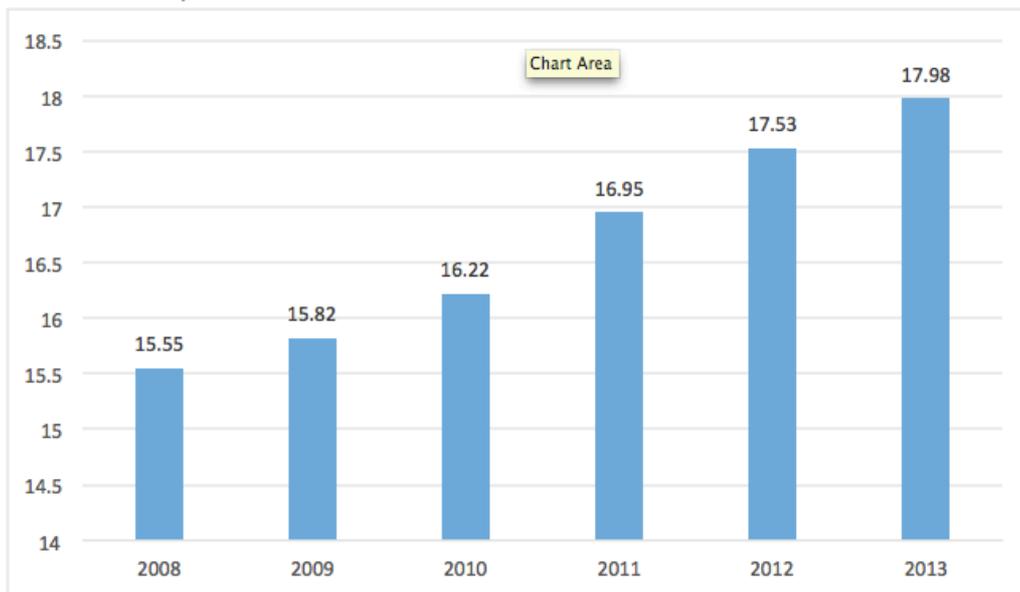


Figure1.1 Taiwan 0-100 age of internet user

Source: Foreseeing Innovative New Digiservices (FIND, 2014)

Live streaming video platform such as Twitch or Ustream is that user broadcast the scene of user's screen or user's performing video to viewer. The video content primarily are video game, sport game and talent show. Unlike YouTube which is the most famous video-sharing website, live streaming video platform provide the instant video broadcast and discussion platform for viewers chatting. Playing game is no longer an individual entertainment. Live streaming video platform offers users a performance place and offers viewers various types of channel for recreation. Through the internet, live streaming video platform broadcaster and viewers together. Owing to these incentives, the number of people use live streaming video platform rapidly increase. This study aims to analyze the Taiwanese users' behavior intention of using live streaming video platform, find out the degree to which factors are the key influential factor which affect users' intention to use live streaming video

platform and understand the factors that are influence on Taiwanese users' intention to use live streaming video platform and perceived usefulness and perceived ease of use.

## **2. Literature Review**

### **2.1 Streaming Media**

Nowadays, it is simple to acquire information on the internet. Streaming media is one of the manners to access information over the internet. There are two ways to use media on the internet that are downloading and streaming. The concept of streaming video is introduced in early 1990s. The earliest reference to what we might recognize as streaming media was a patent awarded to George O Squier in 1922 for the efficient transmission of information by signals over wires. By the late 90s, streaming video had started to become the norm. Unlike in previous years, where the video had to be downloaded in its entirety before viewing, streaming is characterized by playing the video data as it's received (Bucknall, 2012).

With streaming technology, user can watch video or listen music before the files completely download. Streaming technology refers to media file be compressed on the internet. When user request the file, the compressed file is sent from the server and decompressed by a streaming media player such as Adobe Flash Player. It makes user not necessary to waste time for downloading the files and also protect the copyright of the contents. The streaming server constantly connects with user that is why users can jump to any timeline of the media files. In view of the high popularity of streaming video platform such as YouTube, another streaming technology service: online streaming video shows up. Live streaming video platform is gradually familiar by people. People can broadcast scene of user's screen or user's performing video to viewer in this kind platform as long as they have computer and webcam.

### **2.2 Technology Acceptance Model and Other Related Research Models**

Information technology (IT) is the application of computers and telecommunications equipment to send, receive, store and manipulate data (John, 2009). IT enables us to do the work faster, more efficiently, more flexibility and enables us to do things that we cannot do now, or to do them in a ways that are mainly different (Martinko et al., 1996). However, the difficulties are often encountered when new information technologies (IT) are introduced into the workplace. If the people are not willing to

apply and accept new IT, new IT doesn't bring the efficiency to work. The more people accept new IT, the more people are willing to make changes in their practices and take effort to start using new IT (Pikkarainen et al., 2004). For this reason, technology acceptance play an important role to the people make use of the new IT.

### 2.1.1 The theory of reasoned action (TRA)

The theory of reasoned action (TRA) which originated from social psychology is proposed by Fishbein and Ajzen in 1975. The theory of reasoned action (TRA) has proven successful in predicting and explaining behavior in different domains. The theory of reasoned action (TRA) assume that consumers' behave rationally and evaluate all of the available information. People consider the effects of the possible action and make the decision (Yousafzai, 2010; Pikkarainen et al., 2004; Fishbein & Ajzen, 1980).

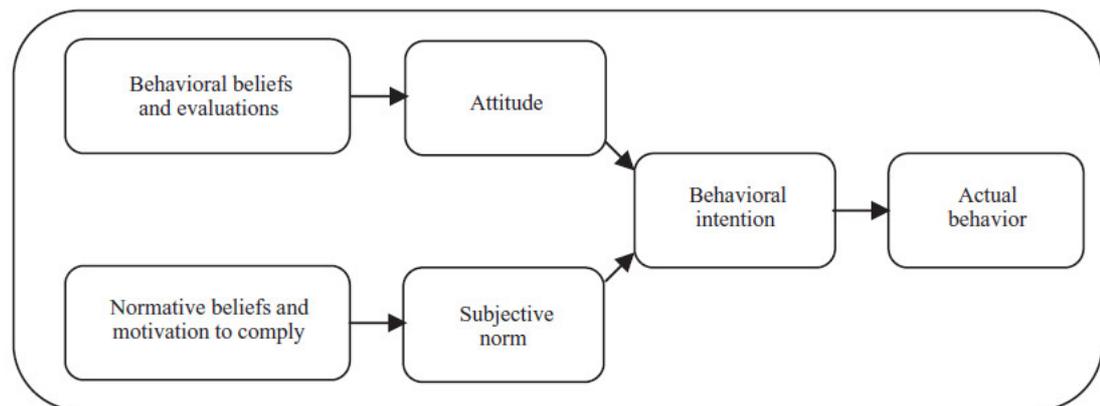


Figure2.1 Theory of resaoened action (Fishbein & Ajzen, 1975).

### 2.1.2 Theory of Planned Behavior

Ajzen (1985) proposed the theory of planned behavior (TPB) that was derived from the theory of reasoned action (TRA) including the perceived behavior control. TPB suggested that person's behavioral intention is influenced by attitude, subjective norms and perceived behavioral control. TRA assumed that person's behavior is under volitional control and can be predicted from intention. To solve the situations in which people lack complete volitional control, the construct of perceived behavioral control was added (Ajzen, 2002). Perceive behavioral control refers to people's perception of the ease or difficulty of performing the behavior of interest and is a function of control beliefs and perceived facilitation. Control belief is the perception of the presence or absence of resources and and opportunities to carry out the behavior. Perceived facilitation is one's assessment of the importance of those

resources to the achievement of outcomes (Chang, 1998).

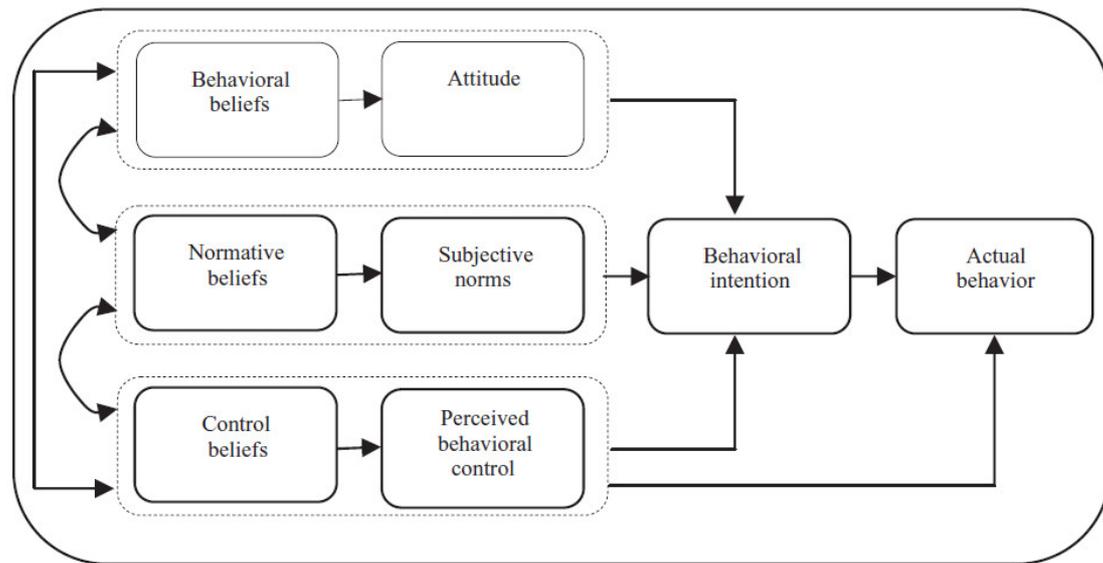


Figure 2.2 Theory of planned behavior (Ajzen, 1991).

### 2.1.3 Technology Acceptance Model

With the technological advances of the 1980s, personal computer was commonly used. Since few people have sufficient technology knowledge to operate personal computer, people was reluctant to use it. One of the most widely accepted model studying in technology acceptance is the technology acceptance model (TAM). Davis proposed technology acceptance model (TAM) in 1989 (Davis, 1989). Davis attempted to explore the behavior of user accept the information of personal computer (Chang, 2008). Users' attitudes towards and acceptance of a new information system have a greater impact on successful information technology (IT) adoption.

Davis advocated to discard the subject norms because of the uncertainty and difficulty of psychology measurement. Davis (1989) developed the the technology acceptance model (TAM) derives from the theory of reasoned action (TRA) and predicts user acceptance based on two factor: perceived usefulness and perceived ease of use. Perceived usefulness and perceived ease of use are the primary drivers to determine a person's attitude toward using technology. Perceived usefulness is define as the "prospective user's subjective probability that using a aspecific application system will increase his or her job performance within context" and perceived ease of use is "the degree to which the user expects the target system to be free of efforts" (Davis et al., 1989). Futhermore, perceived ease of use affects perceived usefulness. It is reasonable that the user believe technology which is easy to manipulate is useful.

Figure 2.3 show the technology acceptance model.

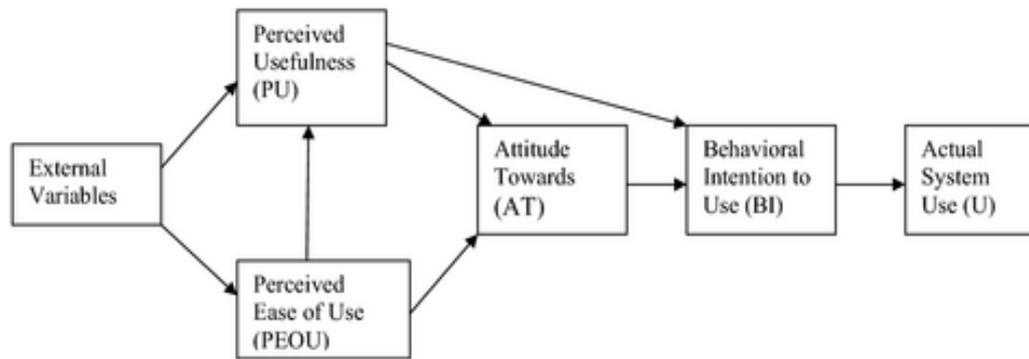


Figure 2.3 Technology acceptance model (Davis, 1989).

### 3. Research Framework and Hypotheses

The research framework is extended from the concept of the technology acceptance model (TAM). Davis (1989) suggested that with the change of the environment and time, other variables that may affect consumers' intention or even their perceived ease of use and perceived usefulness also could be taken into consideration. The main concept of this research is to find out factor which influence people using live streaming video platform. By reviewing previous research, we add three variables which are perceived playfulness, user interface design and perceived interaction into the original TAM. Figure 3.1 shows the developed research framework.

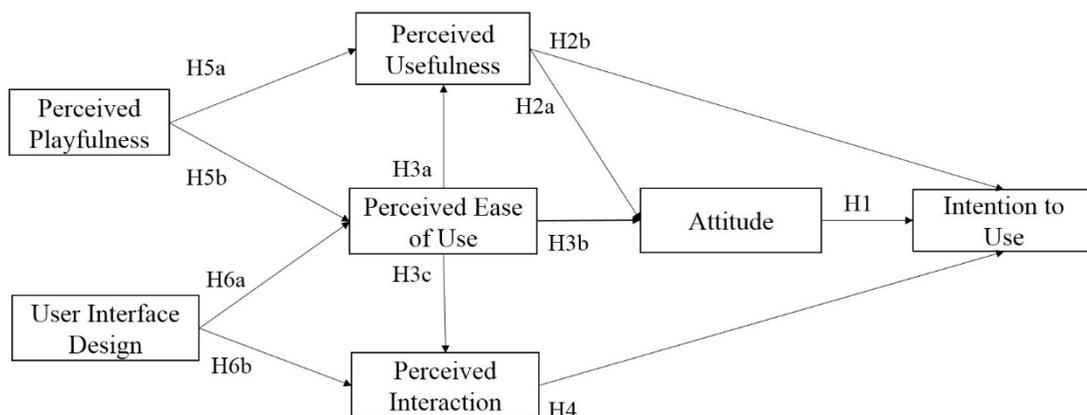


Figure 3.1 Research Framework

The operational definition of each variable:

1. **Perceived ease of use** is the degree to which a person using live streaming video platform would be free of effort.
2. **Perceived usefulness** is the degree to which a person believes that using live streaming video platform would enhance his or her performance.
3. **Perceived interaction** is the degree to which a person believes that using live streaming video platform would interact with other users.
4. **Perceived playfulness** is the degree in which the use of the live streaming video platform is perceived as fun or enjoyable by the users.
5. **User interface design** is the degree to which a person perceived the layout of live streaming video platform.
6. **Attitude** is users' positive or negative evaluation of using live streaming video platform.
7. **Intention** to use can be describe as the users' likelihood to use live streaming video platform.

We propose ten hypotheses which are listed below:

**H1:** Attitude toward using live streaming video platform would directly have an impact on users' intention to use live streaming video platform.

**H2a:** Perceived usefulness would directly have an impact on users' intention to use live streaming video platform.

**H2b:** Perceived usefulness would directly have an impact on attitude toward using live streaming video platform.

**H3a:** Perceived ease of use would directly have an impact on perceived usefulness of live streaming video platform.

**H3b:** Perceived ease of use would directly have an impact on attitude toward using live streaming video platform.

**H3c:** Perceived ease of use would directly have an impact on perceived interaction of using live streaming video platform.

**H4:** Perceived interaction would directly have an impact on intention to use live streaming video platform.

**H5a:** Perceived playfulness would directly have an impact on perceived usefulness of live streaming video platform.

**H5b:** Perceived playfulness would directly have an impact on perceived ease of use of live streaming video platform.

**H6a:** User interface design would directly have an impact on perceived ease of use of

live streaming video platform.

**H6b:** User interface design would directly have an impact on perceived usefulness of live streaming video platform.

In this research, the population is define as live streaming video platform users in Taiwan. In order to increase the convenience of sampling, save considerable time and money and to eliminate geographical limitation, survey conducted online is more desirable than offline survey (Granello & Wheaton, 2004). We set an online survey to collect the data through my3q survey website ([www.my3q.com](http://www.my3q.com)). The survey was conduct on March 1<sup>st</sup>, 2015 until March 27, 2015 and distribute to social network website Facebook and Bulletin Board System in Taiwan ([bbs:/ptt.cc](http://bbs.ptt.cc)). As for sample size, there are 347 of total respondents, only 280 respondents were usable other 67 respondents were dropped because of no experience in using live streaming video platform or incompleteness in answering the questionnaire. Comrey (1973) suggested that factor analysis is inadvisable with a small sample size, under 200 respondents. According to Gorsuch (1983), the least sample size is equal to five times of the items and higher than 100. In this study, there are 40 questions total, hence the least sample size is 200.

#### 4. Data Analysis

There are total of 280 usable questionnaire collected for study. Table 4.1 displays the sample structure. For gender, 62% are male respondents while 38% are female. The age structure of respondents are mainly aged 20 to 29 years old which are 76%, 13% under 20 years old, 10% 30 to 39 years old and 1% above 50 years old. In terms of occupation, most of respondents are students which is 56%, service is 12%, manufacturing is 7% and the other is 25%. Regarding the internet experience of respondents, respondents mainly have more than 5 years internet experience is 85%, 3 to 4 years is 4%, 1 to 2 years is 4% and the other is 7%. Concerning respondents of level of education, the highest of proportion is bachelor which is 69.2%, master is 21%, high school is 9% and the other is 0.8%.

Table 4.1 Sample Structure

Attribute	Distribution	Frequency	Percentage
Gender	Male	179	62%
	Female	110	38%
Age	20 to 29	212	76%
	Under 20	37	13%

	30 to 39	28	10%
	Above 50	3	1%
Occupation	Student	159	56%
	Service	33	12%
	Manufacturing	19	7%
	Technology	18	6%
	Military, Government, Education	15	5%
	Retired	10	4%
	Freelance	9	4%
	Business	4	1%
	Others	13	5%
Internet Experience	Above 5 years	238	85%
	3 to 4 years	12	4%
	1 to 2 years	11	4%
	2 to 3 years	8	3%
	Less than 1 year	6	3%
	4 to 5 years	6	2%
Level of Education	Bachelor	193	69.2%
	Masters	59	21%
	High School	26	9%
	Doctor	1	0.4%
	Junior high school or less	1	0.4%

Table 4.2 shows the live streaming video platform adoption circumstance of the 280 respondents. Most of the respondents usually through YouTube Live (68%) to watch live streaming video, Twitch is 21%, Ustream is 7.5% and the other live streaming video platform is 3.5%. There are only 16% of respondents have the experience of create channel for broadcasting the videos vai live streaming video platform, 84% of respondents are not. More than half of respondents chats or discuss with other users via chat room on live streaming video platform (58%), 42% of respondents are not. Regarding the category of video which respondents usually watch on live streaming video platform, gaming is 31%, music is 23%, entertainment is 16%, sport is 14%, the other categories is 17%. For the daily usage time of live streaming video platform, there are 43% of respondents' usage time is less than 30 minutes, 24% of respondents' usage time is half of hour to 1 hour, 21% of respondents' usage time is 1 hour to 2 hours and the other is 12%.

Table 4.2 Live Streaming Video Platform Adoption Circumstance of Respondents

Attribute	Distribution	Frequency	Percentage
Platform	YouTube Live	189	68%
	Twitch	59	21%
	Ustream	21	7.5%
	LIVEhouse.in	4	1.4%
	Piko Live	4	0.7%
	Other	2	1.4%
Create Channel	No	236	84%
	Yes	44	16%
Using Chat Room	Yes	162	58%
	No	118	42%
Video Category	Gaming	88	31%
	Music	64	23%
	Entertainment	45	16%
	Sports	39	14%
	News	31	11%
	Technology	5	1.7%
	Education	3	1.4%
	Animal & Wildlife	1	0.8%
Other	2	1.1%	
Usage Time	Less than 30mins	119	43%
	0.5 to 1 hour	68	24%
	1 to 2 hour(s)	60	21%
	More than 3 hours	19	7%
	2 to 3 hours	14	5%

Reliability and validity are used to evaluate the quality of data. Cronbach's alpha is widely used statistic tool to evaluate the reliability of measurement. Table 4.4 displays Cronbach's alpha of each construct. The seven variable in this study have the following value for Cronbach's alpha: perceived ease of use = 0.913, perceived usefulness = 0.786, perceived interaction = 0.877, perceived playfulness = 0.727, user interface design = 0.764, attitude = 0.832 and intention = 0.801. Nunnally (1978) stated that Cronbach's alpha is lower than 0.35 is low reliability, Cronbach's alpha is lower than 0.7 and higher than 0.35 is medium reliability and Cronbach's alpha is higher than 0.7 is high reliability. As table 4.4 shows that all constructs' Cronbach's alpha are higher than 0.7. In general, the reliability of this study is high.

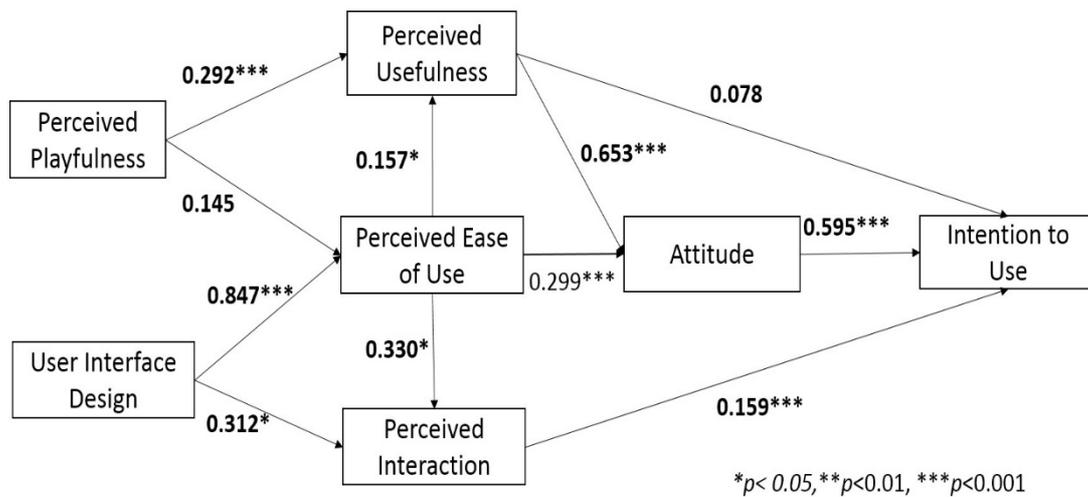
Convergent validity shows whether the observed variables are correlated with their assigned latent variables (Garson, 2009). Bagozzi and Yi (1988) suggested that standardized factor loadings of each item should exceed 0.5 and composite reliability of each latent variable should be over 0.6. As Table 4.4 displays, except PP1 and PP2, all items of standardized factor loading are greater than 0.5 and all items of composite reliability are greater than 0.6. Consequently, convergent validity of the constructs in this study is satisfied.

Table 4.4 Factor loading, Composite Reliability and Cronbach's Alpha

Construct	Item	Standardized Factor Loading	Composite Reliability	Cronbach's $\alpha$
Perceived Ease of Use	PE1	0.806	0.9136	0.913
	PE2	0.856		
	PE3	0.866		
	PE4	0.878		
Perceived usefulness	PU1	0.831	0.7966	0.786
	PU2	0.500		
	PU3	0.614		
	PU4	0.839		
Perceived Interaction	PI1	0.809	0.8773	0.877
	PI2	0.851		
	PI3	0.787		
	PI4	0.754		
Perceived Playfulness	PP1	0.439	0.7272	0.727
	PP2	0.318		
	PP3	0.839		
	PP4	0.680		
User Interface Design	UID1	0.714	0.7708	0.764
	UID2	0.649		
	UID3	0.605		
	UID4	0.732		
Attitude	A1	0.736	0.8445	0.832
	A2	0.809		
	A3	0.831		
	A4	0.652		
Intention	I1	0.844	0.8186	0.801
	I2	0.847		
	I3	0.621		

## Conclusion

The objectives of this study is to find the factors which affect the intention to use live streaming video platform and which factor is the strongest influence the intention to use live streaming video platform. In this study, we apply the technology acceptance model (TAM) which include perceived usefulness, perceived ease of use, attitude and intention. According to previous studies, we add these three factors which are perceived playfulness, perceived interaction and user interface design into the research model.



**Figure 5.1 Structural Model Testing Result**

Base on the result, attitude and perceived interaction will influence the intention to use live streaming video platform. The most influential factor affecting the intention to use live streaming video platform is attitude (Beta = 0.595) which is larger than perceived interaction (Beta = 0.159). Perceived usefulness will be directly influence by perceived playfulness which beta value is 0.292 and perceived ease of use which beta value is 0.157. Perceived ease of use will be directly influence by user interface design which beta value is 0.847. Overall, the research objectives in this research is satisfied.

**Table 4.7 Hypotheses Testing Result**

Path	Estimate ( $\beta$ )	S.E	C.R	p	Result
Perceived Ease of Use ← Perceived Playfulness	0.145	0.076	1.891	0.059	Supported

Perceived Ease of Use	←	User Interface Design	0.847	0.105	9.071	***	Supported
Perceived Usefulness	←	Perceived Playfulness	0.292	0.062	4.718	***	Supported
Perceived Usefulness	←	Perceived Ease of Use	0.157	0.049	3.227	0.001	Supported
Perceived Interaction	←	User Interface Design	0.312	0.145	2.156	0.031	Supported
Perceived Interaction	←	Perceived Ease of Use	0.330	0.107	3.077	0.002	Supported
Attitude	←	Perceived Usefulness	0.653	0.096	6.822	***	Supported
Attitude	←	Perceived Ease of Use	0.299	0.051	5.835	***	Supported
Intention to Use	←	Perceived Usefulness	0.078	0.099	0.790	0.429	Not supported
Intention to Use	←	Perceived Interaction	0.159	0.047	3.409	***	Supported
Intention to Use	←	Attitude	0.595	0.095	6.272	***	Supported

Note:  $\beta$  = standardised beta coefficients; S.E. = standard error; C.R. = critical ratio; \* $p < 0.05$

## 5.2 Contribution of the Research

With the result from the research, we understand the Taiwanese users' perception and habits on using live streaming video platform. The contribution of this research is that the findings from the result provide live streaming video platform this kind of companies as reference. If these kind of companies are planning strategies, promotion or commercial, they can take the result for reference. Like the target customer is 20 to 29 years old (76% of respondents), the 58% of respondents use the chat room on live streaming video platform and the chat room design influence the intention on using live streaming video platform. The result also offer them with understanding of

Taiwanese users' acceptance behavior and intention to use live streaming video platform. Furthermore, we expected the result and the research framework could have contribution to other researchers who will do the similar research topic or framework in the future.

### **5.3 Limitation and Future Study**

There are two limitations concerning research design. First, the research respondents of this study is limited to Taiwanese users, the result of users' perceptions do not include the foreign users' perceptions. We suggest the future studies can test in other countries. Second, the research model is extended from the technology acceptance model (TAM) via adding other variables which are perceived playfulness, perceived interaction and user interface design. There are some other potential or demographical variable influence users' perception and intention to use live streaming video platform. We recommend other researchers to add into the research framework in the future. Third, the literature related to live streaming video platform are scarce. We only could take the similar topic such as blog, online learning community and streaming video platform for reference. Lastly, the live streaming video has various type of platform, such as Twitch specialized in gaming. Hence, we expect that the researchers will research in specific platform in the future study to make this research area more completely.

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