

Lee, Jia-Ling

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# User Behaviors toward Mobile Video Adoption in Taiwan: A Qualitative Study

Jia-Ling Lee

Associate Professor, Dept. of Radio, TV, & Film, SHU

[leico@cc.shu.edu.tw](mailto:leico@cc.shu.edu.tw)

## Abstract

This study was designed to examine users' usage behaviors toward mobile video adoption in Taiwan. A modified UTAUT (Unified Theory of Acceptance and Use of Technology) model was designed to be the theory basis to develop questionnaires and open-ended questions. Data were gathered from six participants from iOS and Android users, two experts, and one focus group with five members. The study was conducted from February to April, 2011. The findings in this study supported those in the literature review: "Effort Expectancy" and "Perceived Playfulness" factors had positive influence to users' usage behaviors. "Facilitating Conditions" and "Performance expectancy" also had positive effect to users' usage behaviors toward mobile video app adoption. Network quality issue was the concern and should be added in the model. Moreover, several implications and suggestions for mobile video app adoption were discussed in the study.

**Keywords: mobile video, Unified Theory of Acceptance and Use of Technology model (UTAUT), mobile video adoption, Taiwan.**

## **Introduction**

According to the data from III-FIND (2010), 68.7% of mobile users in Taiwan were mobile internet subscribers. Moreover, Smart phones, the cell phones that had advanced computing functions and connectivity, became popular cell phones in the mobile market these years. Based on the report from Insightxplorer (2010), Facebook, MyWoo, and Youtube were the top three add-on apps that people used in Taiwan. Therefore, the researchers would like to get a better picture about main factors that affect mobile users to view video or adopt video apps on their smart phones. Based on the literature reviews, Unified Theory of Acceptance and Use of Technology (UTAUT) model developed by Venkatesh, Morris, Davis, & Davis (2003) has been used by many researchers to understand users' behaviors toward mobile services. For example, mobile internet acceptance (H.-Y. Wang & Wang, 2010) or mobile banking (Shin, 2009; Zhou, Lu, & Wang, 2010). Even though mobile internet subscribers used apps like YouTube to watch video on their mobile devices often, there was no formal academic document to understand how those users adopt video apps and what factors would affect their video adoption in Taiwan. Therefore, the researchers chose UTAUT model as the theory basis, and conducted a qualitative research to robust the model based on the data from mobile internet subscribers' behaviors toward mobile video adoption in Taiwan. The research questions were as follows:

1. What factors will affect mobile internet subscribers in Taiwan to adopt video apps?
2. What are mobile internet subscribers' behaviors when they watch video apps on their mobile devices?
3. What could be the model which can describe mobile internet subscribers' behaviors on the video apps adoption?

The results of this study could contribute to the mobile industry, especially the video app fields. It will help the video app developers to get a better picture about how mobile internet subscribers use and want a video app on their mobile devices. Moreover, for the media convergence age, the results of this empirical study will provide practical suggestions on how to plan, design, and implement a mobile video environment for mobile devices.

## **Literature Review**

### **Smart phone**

Based on the definition from Rutenbeck (2006), Smart phones was referred to the mobile device which had internet capability and the functions of personal information management, such as email application, calendar, and digital camera functions. Recent years, smart phones got bigger memories and better processing speeds, moreover, their operation systems allowed applications from third parties,

which made the smart phones even smarter and more powerful. The website of ehow (<http://www.ehow.com/>) also defined the latest development of smart phones as the cell phones with standard functions of operation system, which can be installed and run in different mobile devices, moreover, the system allowed applications from third parties.

FIND's (Foreseeing Innovative New Digiservices, FIND) report in 2011 showed that Taiwan's mobile communications users was 2,784 million, 70% of them was using 3G to connect internet in the 4th quarter of 2010. Therefore, it becomes popular for people in Taiwan to use mobile phones with 3G capability to connect internet (FIND, 2011). Based on Li's report (Li, 2010), ABI Research also indicated that smart phone users were about 26% of cell phone users in Taiwan; the percentage rate was much higher when compared to the world rate of 20%. ABI Research also estimated that the percentage rate will become 30% at the end of 2011 in Taiwan, which meant that Taiwan is a growing fast market in smart phones. MIC (Market Intelligence & Consulting Institute, MIC) reported that Symbian, Android, and iOS were the top three operation systems in the smart phone market, 2010. Unlimited data plans provided by carriers and a wide variety of apps also bloomed up the mobile users to adopt smart phones (Radwanick, 2011). According to the report from PewResearch Center (2010), app users in US were younger, more educated, and richer than other mobile users. How about app users in Taiwan? According to Insightxplorer (2010), Facebook was the top one add-on app used in Taiwan. From Inside Facebook Gold (2010), Facebook app was dominated by younger person in Taiwan. How about video apps? There was very little academic information here. Therefore, the researchers would like to know more about how smart phone users' behaviors and mobile video adoption in Taiwan.

### **Video apps in smart phones**

Watching good video are enjoyable. However, when good video are running on mobile devices, without suitable hardware and software environments, watching video may not be fun. Some factors might affect video quality in mobile environments, such as network impairment, video transcoding, or bandwidth limitation (Dialogic Corporation, 2009; Paul, 2011). Even though most smart phones have bigger screens than normal cell phones, Dialogic Corporation reported that most handsets provide less-than-optimal video capabilities. However, according to the market report from Microsoft, there were 200 million people watching YouTube on their cell phones every day in the world (Microsoft Tag, 2011). Therefore, using mobile devices to watch video should be more popular in the future.

There were three ways to deliver video on mobile devices: full download, progressive download, and streaming (Paul, 2011). By reviewing video apps, the

method of progressive download was adopted by most video apps, such as YouTube or CNN international. Some apps were designed to use progressive download method in Wi-Fi environments, and full download in 3G environments to ensure the video quality, such as TED Mobile. The lengths of the video provided by video apps were varied, too. Therefore, the researchers would examine participants' usage behaviors on mobile video to get a better picture on users' mobile video adoptions.

### **UTAUT model**

In order to understand how new technology was adopted and used in the society, a variety of models were developed. For example, Innovation Diffusion Theory (IDT) by Rogers (1995, 2003), or Technology Acceptance Model (TAM) by Davis (1989). In 2003, researchers Venkatesh, Morris, Davis, & Davis (2003) integrated eight prominent technology adoption models used by different fields and developed UTAUT (Unified Theory of Acceptance and Use of Technology) model. This model has been used to examine and predict users' behaviors and new technology adoption since then (for example, Koivumäki, Ristola, & Kesti, 2008; Moran, Hawkes, & El Gayar, 2010; Y.-S. Wang, Wu, & Wang, 2009). Therefore, this study was designed to adopt UTAUT model to examine users' mobile video apps adoption and usage behaviors in Taiwan.

Venkatesh et al.(2003) examined literatures and proposed four core determinants which would affect users' intention or usage of new technology, and up to four moderators of key relationships. Table 2-1 showed the definition for each factor:

Table 2-1 Definitions for the core constructs of UTAUT model (Venkatesh, et al., 2003)

Core factors	Definition
Performance expectancy	The degree to which an individual believes that using the device or the technology will help him or her to attain gains in job performance.
Effort Expectancy	The degree to which an individual believes that using the device or the technology is easy or useful.
Social Influence	The degree to which an individual perceives that important others believe he or she should use the device or the technology.
Facilitating Conditions	The degree to which an individual believes that he or she is capable of using the device or the technology, and the environment for using the device or the technology is ready.

According to the research results from Venkatesh et al.(2003), UTAUT model was developed based on the theory of human psychology; therefore, the model could be used to analyze and explain participants' usage behaviors up to 70% of accuracy.

However, the constructs of UTAUT might still have the limitation to explain or predict every characteristic of new technologies. Venkatesh et al. suggested researchers who adopt this model should consider minor constructs adjustment to fit research themes.

Research findings from Han (2010) showed that users' consumption had positive correlation with 3G mobile internet services when users adopted the services and perceived playfulness or enjoyment. Zhang, Yue, & Zhang (2009) also indicated that the "Perceived Fun" factor had positive influence to mobile video adoption. Moon & Kim (2001) investigated WWW context by extending TAM model with a new factor "Perceived playfulness", the findings validated the model with the new factor could explain users' usage behaviors much well. There were three elements in the factor "Perceive Playfulness": Concentration, Curiosity, and Enjoyment. The researchers also extended the UTAUT model with the "Perceived playfulness" factor, and used qualitative data to examine the results.

There were four moderators used in UTAUT model, which included gender, age, experience, and voluntariness of use. Because the researchers conducted a qualitative study and all participants were smart phone users, voluntariness of use would not be concerned. Therefore, the researchers took this moderator off the research. Figure 2-1 presented the research model for this study.

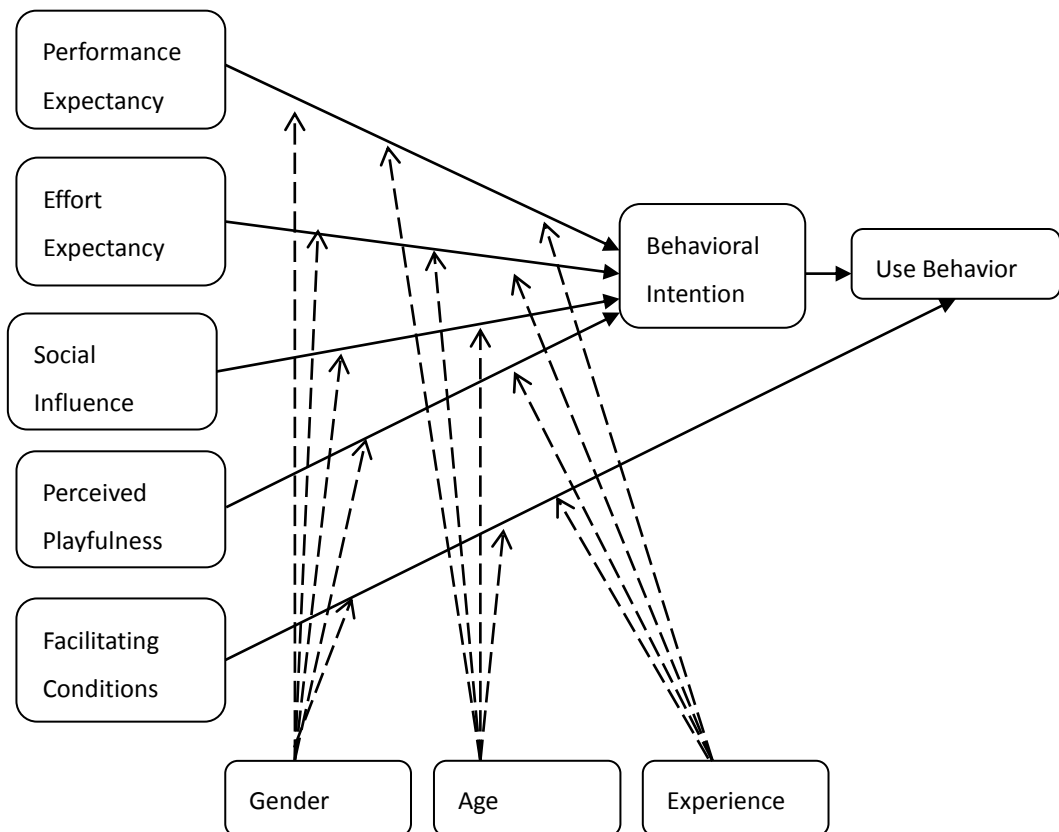


Figure 2-1 A modified UTAUT model for the study

Because smart phones became popular after 2010, most literatures were related to smart phone adoptions and general usage behaviors (for example, Chang, 2009; June, Chun-Sheng, & Chang, 2009). Zhang, Yue, & Zhang(2009) explored usage behaviors of mobile video in Beijing, China. During that time, 3G users were only small portion of the mobile users, therefore, Zhang et al. asked users' behavior intentions instead of usage behaviors for using mobile video. TAM model was adopted as the basis to develop their research methodology. Zhang et al. also added Subject Norm, Perceived Fun, Perceived Cost, and Network Quality constructs to strength the TAM model. Findings of the study showed that Percieved Usefulness was the main factor for mobile users to determin whether or not to adopt mobile video servies.

Based on ABI research, 26% of mobile users were smart phone users in Taiwan. Moreover, video app services became more or more popular. To identify users' mobile video adoptions and usage behavours, walled gardens can provide better services to fit users' needs and earn more money. However, literatures realted to mobile video adoptions or usage behaviors in Taiwan were relatively low. Therefore, the researchers adopted qulaitative research to strength factors of UTAUT model and tried to identify factors to affect users' mobile video adoptions and usage behaviors.

### **Research Methodology and Results**

The samples for this study were the six participants and two experts who used mobile devices with iOS, or Android systems. Participants' ages were ranged from 19-29 and two experts' age from 35-45. Four of them were students, the other were full-time workers. Based on the literature review, the main participants should be the mobile subscribers which devices with iOS, Symbian, or Android systems. However, several studies also indicated that Symbian users had been downgrade since 2009 (Radwanick, 2011). Moreover, during the research, we also found most Symbian users in Taiwan used 2G instead of 3G devices, or used 3G devices without any unlimited data plan. Therefore, it's quite expensive to adopt video apps in those situations. We also gathered information from a focus group (five members) which were represented for the carriers in Taiwan. Data were gathered from February to April, 2011. Main concepts and themes were collected, coded, and refined from those in-depth interviews. Data collection instruments included (a) open-ended questionnaires for participants and the experts. Moreover, (b) a modified UTAUT questionnaire developed by the researcher was used to collect participants' feedback about video app adoptions. Five-point Likert scale was used in the questionnaire, the higher scores were represented the more positive attitudes from the participants. All collection instruments were viewed and modified by three other experts in mobile fields. All participants' privacy will be protected by the study. Qualitative data were coded and presented by the participant (P), the expert (E), or the focus group (F):

the answer for specific questions (for example, P1:Q1 meant the answer for the question 1 by the participant 1). Statistical analysis methods were conducted on the modified UTAUT questionnaire for triangulation, which included Descriptive Statistics Analysis and Multiple Choice Analysis.

Research results were as follows:

**1. The factors affected mobile internet subscribers in Taiwan to adopt video apps.**

Table 3-1 showed the results from the modified UTAUT questionnaire. Data collected from six participants and two experts. The findings supported the literatures that Effort Expectancy factor, Perceived Playfulness, and Facilitating Condition had positive effect to mobile video adoption. The factor of Performance expectancy had less positive effect to mobile video adoptions or usage behaviors when compared to the factors mention above. The researchers found one item in this factor got lower scores, and that was related to job promotion. The reason might be half of the participants were students. The factor of Social Influence did not pass the mean score. Because there were only about 26% of mobile users were smart phone subscribers in Taiwan based on ABI research data, these participants were more like the persons to influence others. Therefore, it might be the reason why the Social Influence did not affect their mobile video adoption or usage.

Table 3-1 Results for the research model

Factors	M	SD
Performance expectancy	3.56	0.95
Effort Expectancy	<b>4.02</b>	0.43
Social Influence	2.98	0.54
Facilitating Conditions	3.91	0.35
Perceived Playfulness	3.80	0.48

Note: N=8

**2. Mobile internet subscribers' behaviors when they watched video apps on their mobile devices.**

By examining qualitative data, the findings also supported the quantitative results. Main themes were identified as follows:

**A. Participants liked to watch mobile video during their interstices of time in daily life.**

"It's always my dream to be able to watch video in bed." (P2:Q6)

"...It took me 20 to 30 minutes to commute by Mass Rapid Transit (MRT)...I always watch iPhone video when I take MRT." (P2:Q11)



"I always take advantage of spare time to watched mobile video. I think this device was most useful when I had 3 or 5 minutes and couldn't do anything special, and this device could kill time. For example, you could watch mobile video when you were waiting a bus... (E1:Q6)

From qualitative data, participants expressed enjoyment for watching video in bed. One participant even mentioned that if there was no other (device) available, she still would watch mobile video and made herself a little bit comfortable by changing positions. These descriptions might meet the "Perceived playfulness" factor. Those participants who mentioned the usefulness of smart phones above might meet the "Effort Expectancy" factor.

**B. Short video was the main choice for smart phone users. YouTube were the main source to access mobile video.**

"I watched YouTube video most. Because I was a MRT commuter, it took only a short time from one stop to the next. The length of YouTube video was suitable for that." (P4:Q6)

"Half hour should be the time I could stand for (watching mobile video)...Because my hands sored and I had to keep changing positions. If the length of video can less than few minutes, then it will be wonderful." (P2:Q9)

"Five to ten minutes!" (P5:Q6)

Some participants mentioned the video apps like TED or CNN had good video quality, however, TED limited 3G users to watch streaming video, and CNN app might limit users who were not good at English. For those fee-based video apps, some participants were not satisfied with video contents from those apps. They also mentioned if content providers cannot provide better video contents and quality than free apps or channels, these participants will not subscribe those apps or channels. Moreover, several participants expressed that advertisers instead of consumers should pay the fee.

**C. Substitution effect was happened between computers and smart phones.**

Several participants described that they used smart phones instead of computers to watch video at home. For example,

"Because the fact that I need to turn on the computer and wait for booting to use it. You can bring this (smart phone) to anywhere. Moreover, the smart phone is network connected. Why bother to turn on another device?" (E1:Q6)

"I think it's enough for me to watch video with smart phones."(P5:Q6)

Some participants also felt that the video quality on smart phones was enough when they watched that at home, no matter under Wi-Fi or 3G environments.

**D. Network quality was the issue to watch mobile video.**

Several participants expressed their concerns with network quality. Mobile

video took more bandwidth when compared to other data in smart phones. How to provide an enjoyable experience to smart phone users should be considered. Those qualitative data were as follows:

“I seldom watched mobile video on the road because the video kept lagging...”(E1:Q6)

“I think the facilitating conditions of mobile video in Taiwan, such as content richness, image quality, or bandwidth supports still have a long way to go.”(P3:Q8)

“Theoretically, the network connection should be available inside of MRT. However, it’s a miserable experience when watching mobile video under Wi-Fi connection, the video kept lagging.”(E1:Q6)

“Network quality should be an issue. If carriers provided 3.5 or 3.75G environments, then theoretically the bandwidth should be ok for watching mobile video. However, the quality was not as good as we thought.”(E1:Q11)

The researchers found some participants downloaded video to their smartphones in advance to avoid from lagging issue. Some of them were just bear with the problem and watched video. When the researchers asked the network problem to the focus group, representatives from carriers replied that 3.5 or 3.75G environments were a bandwidth sharing basis environment. That was, the more users used the bandwidth, the slower network connection users got. On the other hand, Wi-Fi environments had distance limitations, which system would stop and start the network service when users passing from one Wi-Fi spot to another spot. Therefore, when users watched mobile video with Wi-Fi connections in a moving condition, the video would keep lagging. Those carriers wanted to build more 3.5 or 3.75G facilities but got against from communities. To plan or construct the fourth generation network environment was another solution to solve the problem. However, if the smart phone users got more, the situation should be worse. This issue should be taken seriously.

From qualitative data, we also found age and experience difference would affect users’ mobile video app adoption. The researchers will conduct a quantitative research in the future to examine the difference.

### **3. What could be the model which can describe mobile internet subscribers’ behaviors on the video apps adoption?**

By examining qualitative and quantitative data, only “Social Influence” factor did not over the mean score. However, these participants were mainly early adopters of smart phones. It’s reasonable that “Social Influence” factor was not effective in this study. This model did not specifically cover network quality issue, and the researchers will add items under “Facilitating Conditions” factor to strength the research model. By reviewing moderators of the model, only one participant was

female. Therefore, gender difference was not examined in this study. Generally speaking, these factors and moderators should be able to present the picture of smart phone users who adopted mobile video apps in Taiwan. We will conduct a quantitative study based on this model to validate the results.

### **Conclusions and Suggestions**

Based on the qualitative and descriptive data, smart phone users in Taiwan were satisfied with the usefulness and playfulness when they watched mobile video. They also felt to be able to watch video at any time and any place was the main reason to adopt mobile video. Friendly interface also enhanced their use behavior. Some of them even chose smart phones instead of desktops or notebooks to watch video. However, Network quality should be the concern for viewing video on the road, especially that smart phone users will be getting more in the future. Participants would accept fee-based video apps if the content and the quality of video were better than free ones. Quantitative study is needed to validate the research model.

The interpretation of results from the study was based on the following assumptions and limitations: The conclusions were limited to the population presented by the sample. Gender was not balanced in this pilot study; therefore, the effect from gender should be validated in future study.

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