

Factors Affecting the Willingness of Using Mobile Games of University Students in Taiwan

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Keywords: Mobile Game; Product Involvement; Brand; Enjoyment; TAM.

Abstract. The development of technology has gradually increased people's reliance on mobile devices; users' demands for mobile games also rose year by year, and this also creates a new and significant revenue source for the IT industry. In this study, the researcher had developed an "Instrument of the Willingness to Use Mobile Games" and a research model based on TAM (Technology Acceptance Model) in order to investigate users' key factors affecting their adoption of mobile games; totally, 496 students' feedbacks of Taiwan's universities and colleges were collected. The results indicated that game developers' brand image would affect their levels of "Product Involvement", and the levels of "Enjoyment and Product Involvement" of mobile games would affect those users' willingness to use mobile games. This study was a pilot study, and the researcher will collect more users' feedbacks in the future expecting to provide references for the related industries.

1. Introduction

A he rapid development of technology has raised people's reliance on mobile devices; Applications (APPs) of mobile devices has made our works, recreations and lives easier. According to Cisco's statistics, Cloud Apps will stimulate 90% of mobile traffic. Flurry, an analysis platform of global mobile data, had tracked more than one million APPs across 2.6 billion mobile devices in 2017. Its survey showed that the amount of global mobile APP usage had grown by 6% in 2017, and the users' using behaviors had become more diverse. By category, the amount of "shopping" Apps usage had reached up to 54%, and this had the highest growth; the amount of "music, media, entertainment" usage also reached up to 43%. This showed that users' demands for those types of Apps gradually increased [1].

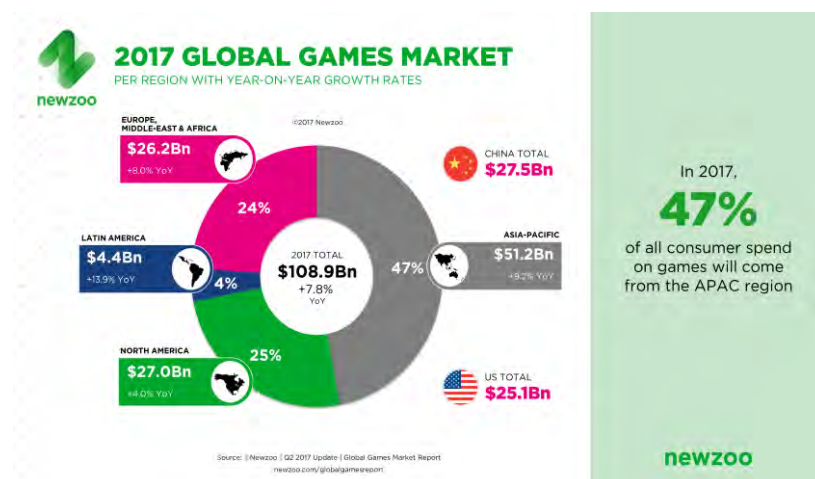


Figure 1. 2017 Global Game Market Analysis

For the game market, eSports will be an official competition in 2022's Asian Games, and hence a variety of eSports APPs also have been launched. The survey of Newzoo (2017) indicated that the current global games market reached to the scale of \$108.9 billion; among it, Asia accounted for 47% (Figure 1) [2], and Taiwan was the fifth one and its market scale reached to nearly \$1 billion. In addition, Taiwan's development momentum of game market was obviously the best in Asia. For the

yearly growth rate of 2015 and 2016, the growth rate of game market in the Asia-Pacific area was only 10.7%; however, Taiwan's growth rate was up to 40%. This had demonstrated Taiwan's critical status in the global game market.

The survey of Market Intelligence and Consulting Institute of Institute for Information Industry indicated that nearly 40% (37.7%) of players had paid for games and the percentage of male players (47.5%) among them was much higher than that of female players (28.7%); moreover, the percentage of players under 19 reached up to 63.3% [3]. This showed that students' consumption power should be valued. Therefore, the researcher had developed an "Instrument of the Willingness to use Mobile Games" and then collected college and university students' feedbacks in order to investigate the factors affecting the usage of mobile games among Taiwan's college and university students and understand the developing trend of mobile games in Taiwan.

2. Literature Review

2.1 Mobile Game

Mobile Game referred to game software on mobile devices which could be executed anytime, different from traditional games executed on TV sets and computers; currently, the most popular type was mobile game [4]. In recent years, mobile phones have transformed into users' mobile tools from traditional communication tools by which they could handle tasks, listen to music, play games, use navigation function, and do online search etc.; among them, mobile game industry will be a highly significant industry in the future [5]. Presently, the platforms to download mobile games were majorly App Store of iOS and Google Play of Android, and most mobile game developers provided the function of In-App Purchase allowing users to try their mobile games for free first and then purchase the following game services.

2.2 Technology Acceptance Model (TAM)

The theoretical basis of Technology Acceptance Model originated from Theory of Reasoned Action (TRA) brought up by Fishbein & Ajzen (1980) [6]. They considered that one person's behavioral intention must be understood first in order to predict whether he/she would perform the behavior or not. This intention-based model was also regarded to be able to precisely measure and predict people's actual behaviors. In TAM, "Perceived Usefulness" and "Easy to Use" were thought to have influence on users' "Attitude toward Using" and further "Behavioral Intention to Use" and "Actual System Usage" (Figure 2).

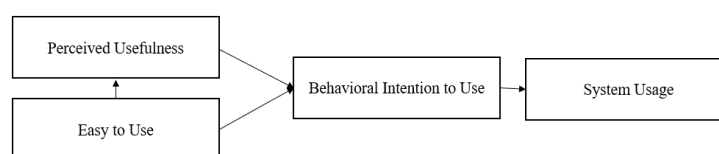


Figure 2. Technology Acceptance Model (TAM)

In using mobile games, users expected to have delight and enjoyment; hence the researcher utilized "Enjoyment" to replace the dimension of "Perceived Usefulness". Besides, the willingness to use mobile games was the main focus of this study and therefore "Actual System Use" was not discussed.

2.3 Product Involvement

The concept of ego involvement was first brought up by Sherif & Cantril in the social judgment theory of 1974 [7]. It pointed out that each individual had different levels of reaction to a certain event, and when people had higher ego involvement they would not only accept opinions that they agreed with but also expand the scope; for opinions that they didn't agree with, they would have more negative explanations or have no opinion. Lastovica & Gardner (1979) also considered that different consumers had different involvement levels for the same product; for the same consumer, he/she had

different involvement levels for different products [8]. In their study, Hawkins & Mothersbaugh (2007) also pointed out that involvement was a motivation of consuming behavior and it would be influenced by consumers' perceived level of interest. As consumers started to perceive that products could achieve their expectations, then they would have higher involvement in them [9]. Therefore, the researcher would investigate whether "Product Involvement" would influence users' willingness to use mobile games or not.

Nevertheless, Huang et al. (2010) also indicated that consumers' product involvement would be affected by price, enjoyment, and brand etc. in their study. Zaichkowsky (1985) mentioned that each individual's involvement for a certain thing would be influenced by his/her needs, values and interests [10]. Hence, the researcher would also investigate the influence of "price", "brand", and "enjoyment" on product involvement in this study.

2.4 Facilitating Conditions

"Facilitating Conditions" was a significant dimension of Unified Theory of Acceptance and Use of Technology (UTAUT); Venkatesh et al. (2003) defined facilitating conditions as "the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system" [11]. Therefore, facilitating conditions referred to the provision of service organization and system infrastructure which could support users, and the researcher considered those mobile game developers' services would influence the willingness and hence this dimension would be included in this study.

3. Research Method

3.1 Proposed Model

Based on the above literature review, the researcher used TAM as the basis for this proposed model and further added "Product Involvement" and "Facilitating Conditions" dimensions in order to investigate factors influencing the willingness to use mobile games. In addition, "Product Involvement" could be influenced by "Price", "Brand" and "Enjoyment" and hence they would be included for investigation. The research model and 10 research hypotheses proposed by the researcher were shown in the figure 3.

3.2 Questionnaire

The researcher finally developed the "Instrument of the Willingness to Use Mobile Games" by amending the questionnaire items of Technology Acceptance Model, items of "Facilitating Conditions" dimensions in UTAUT, and items of "Product Involvement" and "Price" of Lu, Lin & Lin's study (2016) and integrating Chang et al.'s questionnaire items (2010). Then, the researcher collected 40 pre-test questionnaires to conduct the item analysis to ensure the reliability of this questionnaire. The analysis was listed in the following table; Cronbach's Alpha of "Price" dimension was higher than .7 (Acceptable) and the Cronbach's Alpha values of other dimensions were all higher than .9 (Excellent). After adjustment, there were totally 55 items in the final questionnaire.

Table 1. Analysis of "Instrument of the Willingness to Use Mobile Game"

Constructs	Original items	Final items	Cronbach's Alpha
Price	5	5	.765
Brand	12	11	.905
Product Involvement	5	5	.949
Enjoyment	14	14	.938
Easy to use	15	4	.944
Intention	3	3	.959
Facilitating Conditions	3	2	.954
Total	57	55	

4. Results and Discussions

The researcher issued the electronic questionnaire of “Instrument of the Willingness to Use Mobile Games” to students of 10 colleges and universities, and there were totally 496 valid copies (301 males accounting for 60.6%, 195 females accounting for 39.3%). In the study, Partial Least Squares (PLS) was used by the researcher. It was an analyzing technique to explore or construct a predictive model; for analyzing causal model of potential variables, it was better than linear structural relations (LISREL). Because this sample was small, the researcher extracted 1000 samples by the bootstrap resampling method for parameter estimation and inference. The results were shown in the following figure.

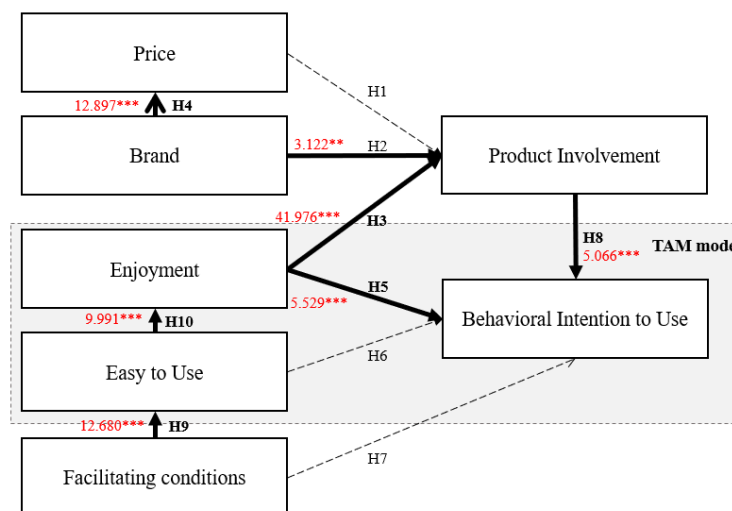


Figure 3. Results of Path Analysis

From the results of the above figure, it was known that users’ impression of “Brand” significantly influenced “Product Involvement” (H2) and “Price” (H4); the possible reason might be that currently there were many mobile game developers including famous TV and computer game developers developing mobile games and hence their evaluations in other gaming platforms would affect users’ confidence in their mobile games and then affect users’ involvement, and finally their confidence level would affect the amount that they want to spend on those games.

“Enjoyment” of games also significantly influenced “Product Involvement” (H3) and “Behavioral Intention to Use” (H5); this meant that whether users enjoyed playing games or not would affect their involvement level and willingness to use mobile games, and this agreed with common sense. “Product Involvement” would significantly influence “Behavioral Intention to Use” (H8) and this agreed with the results of Lu et al.’s study (2016); this meant that users’ involvement in mobile games would affect their using willingness.

In TAM, “Easy to Use” would affect “Useful”, and this hypothesis was also valid in this study. The researcher used “Enjoyment” to replace “Useful” in this study, and this indicated that the ease of using mobile game would significantly affect users’ “Enjoyment” (H10), and “Facilitating Conditions” significantly affected “Easy to Use” (H9). Those results were identical with the results of other studies; when users encountered problems in operating the system, whether they could be assisted immediately or not would affect users’ perceived easiness to use, and easiness to use would affect users’ perceived usefulness. For mobile games, this would affect whether users feel they could enjoy those mobile games or not.

5. Conclusions and Future Research

In this study, the researcher developed the “Instrument of the Willingness to Use Mobile Games” and collected 496 copies of questionnaire to survey the students of Taiwan’s colleges and universities in order to investigate the factors influencing their use of mobile games and understand the

development trends of mobile games in Taiwan. The results showed that mobile game developers' brand image would affect the price that those users of college and university could accept and their product involvement level. "Enjoyment" and "Product Involvement" would affect users' willingness to use mobile games. In addition, developers' support would also affect the easiness to use that they perceived and then also affect enjoyment, and therefore it was also crucial.

This study was a pilot study, and it was expected that this instrument could be issued to users of more age levels and different countries in order to investigate the differences. It also hoped that these results could provide references of developing mobile games for related industries.

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