On Adopted Intention of Short Video Apps Based on Perceived Value and VAM Theory

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Abstract. This paper makes an empirical study on the adoption behavior of TikTok users. The empirical results show that Perceived Usefulness (PU), Perceived Enjoyment (PE) and Flow Experience (FE) have a significant positive effect on Perceived Value (PV); Perceived Ease of Use (PEOU) has a significant positive effect on PU; FE has a significant positive effect on PE. Besides, a full mediation exists between PEOU and Adopted Intention (AI) while a partial mediation exists between AI and PU, PE as well as FE.

Introduction

According to Analysis Report on the Development of China’s Mobile Internet Industry in the First Half of 2019 produced by TrustData, TikTok has the fastest growth of user size among the TOP20 mobile apps in the first quarter of 2019. With an increase of monthly active users by 144%, TikTok remained as the short video app with most monthly active users and highest downloads in the domestic market.(source: Analysis Report on the Development of China’s Mobile Internet Industry in the First Half of 2019 produced by Trustdata) TikTok is a social media app for creative short music videos operated by ByteDance and aiming to create a music social community with short music videos.(source: Everyone is a product manager: Analysis Report of TikTok) Users can shoot a 15-second short music video by choosing a background music from its music library that contains music clips of various genres, and matching it with lips, facial expressions or body movements.

The short video market is growing mature amid fierce competition while the demographic dividend is fading away. How to gain recognition and increase stickiness of users are the keys to the sustained survival in the short video industry. Domestic scholars have also conducted relevant research on the behavior of domestic short video users[1,2,3]. But, the research on user's behavior tended to base more on the theories such as TAM, Consumers Theory. In the context of mobile Internet, this paper aimed to validate whether the perceived value has a significant effect on adoption intention in an effort to enrich the theoretical basis of user behavior study.

Literature Review

Value-Based Adoption Model

David et al. (1989) innovatively proposed the Technology Acceptance Model (TAM), and the use of TAM in deciding on the individual's acceptance and use of information systems. PEOU and PU are considered as important factors in determining individual acceptance and use of information systems. The TAM model has been widely used to study user acceptance of new technologies or systems. However, in mobile social apps, the user is no longer a simple technology recipient, instead, the intention to accept has been affected by a variety of factors such as values, evaluation criteria and emotion[4,5]. Moon & Kim[6] believed that in specific technical scenarios, additional variables apart from PU and PEOU may be required, thus introducing Perceived Enjoyment (PE) to strengthen the understanding of the individual's acceptance behavior. Kim[5] applied TAM and value theories in the study of the adoption behavior of mobile Internet users from the perspectives
of technology and users, and proposed Value-based Adoption Model (VAM). Kim believed that PV is main determinant of user adoption behavior. Based on VAM, Zhu [7] proposed a Self-efficacy-based Value Acceptance Model (SVAM) integrating the VAM-based four dimensions of PV and Self Efficacy Theory and verified SVAM can effectively explain the adoption behavior of users; perceived utility value, social value and emotional value have impacts on user adoption behavior. In addition, Zhu pointed out that mobile auctions have lower requirements for new skills and new knowledge. Thus, for young people with online experience, perceived costs are negligible.

**Perceived Value**

Perceived Value (PV) comes from the Equity Theory, which was originally used to represent the trade-off between quality or benefits that customers receive, and the financial, energy, time and psychological transaction costs generated by evaluating, acquiring and using products[8,9]. Swartz & Brown [10] argued that PV depends on the context and the environment of evaluation. Sheth [11] believing that consumer choice is a function of multiple consumption values that are different and independent in different contexts. Meanwhile, PV has multiple dimensions. Sheth [11] divided consumption value into five dimensions: utility value, social value, cognitive value and conditional value, indicating that different impact of these five value dimensions on different products or services and that some dimensions do not work in certain scenes or on certain products. Sweeney [12] divided PV into four dimensions and considered that these value dimensions are mutually associated. Four dimensions are emotional value, social value, quality value (utility value), price value (utility value). In conclusion, PV is a variable with subjective, multi-dimensional, hierarchical and other characteristics (Fan & Luo, 2003).

**Research Model and Hypotheses**

**Proposed Research Model**

Lin [13] believed that the traditional TAM is mainly used for research of the working environment or production environment. In the Internet scenario with zero cost to obtain the product or service, the user's intention to use is determined by the net perceived value. It is a thorough comparison of benefits and costs. VAM discusses the user's perceived value, retains the technical characteristics and considers the user's value experience. Based on the features of TikTok and the entertaining and social experience it generates, this paper developed an exploratory research model, integrating three dimensions of PV, endogenous variables of TAM, and extra two perceptual variables—perceived interactivity and flow experience (Figure 3.1.1).

![Figure 3.1.1. Extension of VAM based on Moon & Kim, 2007.](image)
Research Hypotheses

PU refers to the extent to which an individual believes that the use of a particular information system can improve his/her job performance. PEOU refers to the extent to which an individual can use a particular system to help them work easily. The impact of PEOU and PU on PV of users and the relationship between PEOU and PU have been verified by a large number of scholars based on the TAM model (Gefen & Elena, 2003; Shin & Kim, 2008; Lee & & Lehto, 2013). Therefore, this paper put PU and PEOU into the dimension of utility value, and proposed the following hypotheses:

H1: PEOU has a positive effect on PU of users.
H2: PEOU has a positive effect on PV of users.
H3: PU has a positive effect on PV of users.

Jee & Lee (2002) found that the user's PI affects their attitudes and behaviors towards websites, and that the more the perceived interactions, the greater the impact. Through empirical study, Zhao & Lu (2012) believed social interaction has a greater impact on user satisfaction compared with man-machine interaction. Thorson & Rodger (2006) found that PI of blogs can enhance users' recognition of political candidates' websites and improve their attitudes and preferences for political candidates. Also, interaction affects the individual's PI, which then impacts personal attitude and behavior. Therefore, a hypothesis is suggested as follows:

H4: PI has a positive effect on PV of users.

Igbaria (1994) studied the factors contributing to microcomputer technology acceptance, confirming that PU and PE are important factors influencing the AI. Bruner & Kumar (2005) conducted an empirical study on the usage intention of mobile commercial service users and found that PE is an important factor affecting the intention to use. Teo & Noyes (2011) believed PE is an important factor affecting the AI. Besides, Trevino & Webster (1992) proposed that user enjoyment and satisfaction come from FE. Lee & Wu (2017) found that if the shopping experience is enjoyable and joyful, the shopper will feel the value of enjoyment, and the attention and PE in the experience will have a positive impact on the entertainment value. Through empirical study, Bao (2014) found PE and hard-working expectation have an indirect and positive impact on users' intention to continue to play mobile games through the FE. Therefore, hypotheses are suggested as follows:

H5: PE has a positive effect on PV of users.
H6: FE has a positive effect on PV.
H7: FE has a positive effect on PE.

Hallem (2011) proposed that Internet is a platform for information search and an intermediary for consumption of products and services, Internet will bring multiple values such as functional value, social value and cognitive value to users, and that these values will affect user behavior. Hsu & Lin (2016) studied the impact of PV on users' continued use of apps and consumption intention within the app and found entertainment value has more significant than utility value does. In sum, PV has an important impact on users' adoption behavior and proposed the following hypothesis:

H8: PV has a positive effect on the adopted intention of users.

Analysis of Questionnaire Data

Questionnaire was used as an empirical test of the model in this study. Based on the literature review and existing maturity scale, research variables of this study and the initial measurement items of the variables were determined based on the research background of this paper. In this survey, 413 questionnaires were distributed and 398 were collected, of which 79 were not users of TikTok, 47 were invalid, and 272 were valid. The effective recovery rate was 65.86%.

Descriptive Statistical Analysis

From the descriptive statistical analysis of the user profile, it is found that the number of female samples in the survey is slightly higher than that of male samples, with a male to female ratio of 48.2:51.8. In terms of the age distribution, it can be seen that 69.1% of the users are under 30 years old. In terms of educational background, users with bachelor degree has the highest proportion,
accounting for 39%, while the proportion of users with master's degree or above is 21%. In the descriptive statistical analysis of user behavior: 29.4% of users have used TikTok for less than half a year; 28.7% have been active for half a year to one year, 31.3% have used it for one to two years; 10.7% have used it for more than two years. As for average daily use of TikTok, more than half of the users spend less than 30 minutes on TikTok, followed by 30 to 60 minutes.

According to TikTok user portraits and user behavior analysis, the characteristics of the samples of this survey basically conform to the relevant reports, which is also a reflection of the representativeness and reliability of the sample of this survey.

Reliability and Validity Analysis

SPSS24.0 was used for analysis of reliability and validity of the collected data. Table 4.2.1 and Table 4.2.2 reflect the results of the reliability and validity tests.

Reliability test. According to the above criteria, as the Cronbach's Alpha value of each variable is higher than 0.8, the scale has good reliability (Nunnally, 1978; Zhou Jun, 2017). And all CR values in the table are higher than 0.8, reflecting the high reliability of the scale (Fornell & Larcker, 1981). In summary, the data in this study has high reliability and can be further analyzed.

Validity test. It can be seen from Table 4.2.1 that the AVE value of each variable is greater than 0.5. According to the test results, the load of each index is higher than 0.7, and the AVE value of each variable meets the criterion of being higher than 0.5. The square root of the AVE value of each variable in Table 4.2.2 is higher than the correlation coefficient of other variables. Therefore, it can be concluded that the scale of this paper has good convergence validity and discriminant validity (Chin, 1998).

| Variable             | Item | Load Leveling | Mean | α Value | CR   | AVE |
|----------------------|------|---------------|------|---------|------|-----|
| Flow Experience      | FE1  | 0.765         | 3.311| 0.91    | 0.935| 0.781|
|                      | FE2  | 0.405         |      |         |      |     |
|                      | FE3  | 0.385         |      |         |      |     |
|                      | FE4  | 0.385         |      |         |      |     |
| Adoption Intention   | AI1  | 0.562         | 3.507| 0.91    | 0.94 | 0.84 |
|                      | AI2  | 0.562         |      |         |      |     |
|                      | AI3  | 0.562         |      |         |      |     |
| Perceived Ease of Use| PE1  | 0.813         | 4.115| 0.91    | 0.935| 0.784|
|                      | PE2  | 0.813         |      |         |      |     |
|                      | PE3  | 0.813         |      |         |      |     |
|                      | PE4  | 0.813         |      |         |      |     |
| Perceived Interaction| PI1  | 0.912         | 3.451| 0.92    | 0.94 | 0.798|
|                      | PI2  | 0.912         |      |         |      |     |
|                      | PI3  | 0.912         |      |         |      |     |
|                    | PI4  | 0.912         |      |         |      |     |
| Perceived Enjoyment  | PE1  | 0.94          | 3.809| 0.94    | 0.958| 0.852|
|                      | PE2  | 0.94          |      |         |      |     |
|                      | PE3  | 0.94          |      |         |      |     |
|                      | PE4  | 0.94          |      |         |      |     |
| Perceived Usefulness | PU1  | 0.88          | 3.439| 0.84    | 0.885| 0.72 |
|                      | PU2  | 0.88          |      |         |      |     |
|                      | PU3  | 0.88          |      |         |      |     |
|                      | PU4  | 0.88          |      |         |      |     |
| Perceived Value      | PV1  | 0.918         | 3.302| 0.91    | 0.939| 0.793|
|                      | PV2  | 0.918         |      |         |      |     |
|                      | PV3  | 0.918         |      |         |      |     |
|                      | PV4  | 0.918         |      |         |      |     |

| FE   | AI  | PEOU | PI  | PE  | PU  | PV  |
|------|-----|------|-----|-----|-----|-----|
| 0.884| 0.917|
| 0.401|     |      |     |     |     |
| 0.356| 0.307| 0.885|
| 0.358| 0.616| 0.393| 0.893|
| 0.466| 0.723| 0.492| 0.598| 0.923|
| 0.309| 0.669| 0.384| 0.768| 0.648| 0.848|
| 0.42  | 0.816| 0.29  | 0.601| 0.683| 0.68 | 0.891|

Table 4.2.1. Reliability test.
Table 4.2.2. Discriminant Validity Checklist.
Verification of Hypotheses

MATLAB was used to analyze the path and verify the hypotheses of the model. As can be seen from Table 4.3.1, the significance level is low in two paths, PEU→PV and PI→PV, indicating that the assumptions of PEU having a positive impact on PV and PI having a positive impact on PV are not valid. If we assume that the path coefficients of H1, H3, H5, H6, H7 and H8 all pass the significance test (P < 0.05), and all the path coefficients are positive values, it can be perceived that the PEOU positively affect the PU (β = 0.384 ***, P < 0.001); PU, PE and FE positively affect the PV; FE has a positive impact on PE (β = 0.466 ***, P < 0.001); and PV has a significant positive impact on the adopted intention of users. Among the dimensions affecting PV, PE has the most significant impact on PV (β=0.392***, P<0.001), followed by PEOU (β=0.384***, P<0.001), PU (β=0.366***, P<0.001) and then FE (β=0.392*, P<0.05).

Table 4.4.1. Analysis of Main Paths of Model.

| Hypothesis | Verification path | Path coefficient (β) | Sample mean | Standard deviation | T Value | P Value | Result  |
|------------|-------------------|----------------------|-------------|--------------------|---------|---------|---------|
| H1         | PEU → PU          | 0.384                | 0.385       | 0.057              | 6.736   | 0       | Established |
| H2         | PEU → PV          | -0.126               | -0.125      | 0.051              | 2.462   | 0.014   | Invalid   |
| H3         | PU → PV           | 0.366                | 0.371       | 0.083              | 4.426   | 0       | Established |
| H4         | PI → PV           | 0.085                | 0.085       | 0.081              | 1.05    | 0.294   | Invalid   |
| H5         | PE → PV           | 0.392                | 0.387       | 0.072              | 5.478   | 0       | Established |
| H6         | FE → PV           | 0.139                | 0.139       | 0.054              | 2.562   | 0.01    | Established |
| H7         | FE → PP           | 0.466                | 0.467       | 0.06               | 7.834   | 0       | Established |
| H8         | PV → IN           | 0.816                | 0.817       | 0.028              | 29.228  | 0       | Established |

Verification of Mediating Effect

This paper analyzed the mediating effect according to the Causal Steps Approach, a test method proposed by Baron & Kenny (1986). As can be seen from Table 4.4.1 and Figure 4.4.1, PEOU, PU, FE, PE and PV can significantly affect the adopted intention of users; PEOU, PU, FE and PE have significant and positive impact on the PV; there is a negative significance relationship between PEOU and PV. However, when PV is used as a mediating variable, the mediating effect between PEOU and AI is not significant (β = 0.011, P > 829). Therefore, PV performs a full mediating role between PEOU and AI. PV has a partial mediating effect between AI and PU, AI and FE as well as AI and PE.

Table 4.4.1. Table of Inter-variable Effect Analysis.

| Path    | Path coefficient | Sample mean | Standard deviation | T Value | P Value |
|---------|------------------|-------------|--------------------|---------|---------|
| PEU → IN | 0.011            | 0.014       | 0.052              | 0.216   | 0.829   |
| PU → IN  | 0.298            | 0.302       | 0.067              | 4.476   | 0       |
| PI → IN  | 0.069            | 0.07        | 0.066              | 1.046   | 0.296   |
| PE → IN  | 0.32             | 0.316       | 0.063              | 5.085   | 0       |
| FE → IN  | 0.263            | 0.261       | 0.05               | 5.297   | 0       |

Figure 4.4.1. Diagram of Inter-variable Effect Analysis.
Discussion and Conclusion

The impact of the utility value on PV and AI. The results show that PU significantly and positively affects the PV of users, and PU has a great influence on AI of users. This is in line with the conclusions drawn from past user behavior research based on perceived value. Besides, PV performs a full mediating role between PEOU and AI, and PEOU has a negative impact on PV. The reason may be that the operation of various apps tends to be simple and homogeneity, and people can skillfully use apps of different kinds without having too much experience and skills. Therefore, ease of use does not provide users with sufficient value of utility.

The impact of social value on PV and AI. According to the survey results, PI has little effect on PV and AI of users. From this result, it is known that the users of TikTok in this survey focus more on the content of the video than social interaction. Therefore, the hypothesis that the PI positively affects the PV of users is invalid. The reason may be there are very few video producers in the survey and video producers more inclined benefit from social interaction (Paolillo, 2008).

The impact of entertainment value on PV and AI. The results show that FE and PE have a significant impact on PV and AI of users. Thus, this study once again verifies that enjoyment is one of the characteristics of Internet products. FE has a direct positive impact on PE, indicating that the users are more immersed in TikTok, the easier for them to enjoy the fun. PE has a partial mediating effect between the FE and the PV, that is PE will partially affect the FE on PV. In the context of TikTok, the entertainment value is an important dimension of perceived value.

Limitations and Prospects

Firstly, because this study explored the extension of VAM based on previous research results, further studies are required to verify whether or not the selected variables are comprehensive and effective in the specific application context of TikTok. Second, this paper only considered the impact of the variables on perceived value and adopted intention of users but did not factor in the impact of demographic factors. Last but not least, this study adopted the questionnaire survey method, which has some limitation on the range of respondents, because most of the respondents were short-video audiences, not content publishers, leading to deviated conclusions from expectations for some variables. In the follow-up study, In the future, we will analyze the behavior characteristics and user types of chattering users, and further verify their behaviors according to different user types, and in-depth research on the reasons that the social interaction has a negative effect on user behavior will be conducted.

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