

Research on Continuous Intentions of Consumers of Financial Management APP Based on Social Factors

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Abstract. Based on motivation theory and technology acceptance model, the social factors of network externality and subjective norms are introduced to construct the theoretical model of financial users' willingness to use continuously. The empirical results of the theoretical model are verified by the data collected from both the network and the field. The results show that: First, the network externality has a significant positive influence on perceived usefulness, perceived security, perceived ease of use, and subjective norms have a significant positive impact on perceived usefulness and perceived security. Second, perceived usefulness and perceived ease of use have a significant positive impact on financial APP users to continuous intentions. Third, perceived usefulness and perceived ease of use have a significant mediating effect in the pathways of network externality and subjective norms to continuous intentions.

1. Introduction

Financial APP is a mobile financial information system with interactive functions. It mainly provides users with financial products and services of high yield, online quick loan, online processing of credit card, income and expenditure account management and financial data analysis. According to the data released by the People's Bank of China, the deposit balance of households in China will be about 72.44 trillion CNY in 2018, laying a solid economic foundation for the development of the wealth management APP industry. Moreover, the research report of iResearch consulting showed that the top 10 platforms of monthly active users of online financial planning had reached 82.78 million in May 2018, creating a huge market space for the development of the financial management APP industry^[1]. However, the problem of continued usage of financial management APP has become increasingly prominent. Sohu had exposed 577 financial application platforms with problems in December 2018. Meanwhile some users began to ignore the existence of financial APP or even uninstalled some financial APPs. In June 2015, the China PNR (third-party payment platform) showed that the account system hosting the 600 P2P platforms had successfully traded for only thirty percent. Flurry Analytics research results showed the APP user application retention rate was of only 5% after 5 months. All kinds of signs showed that the financial management APP had passed the golden stage of explosive growth of users. It becomes the focus of financial APP development that how to meet the needs of users, consolidate the users and enhance continuous usage of behaviors in the future.

With the evolvement of financial APP and the problem of the continued use increasing, the using willingness and behavior have aroused more and more attention by the financial sector and the academic community. However, the focus of the present study is on the TRA, TPB, ECM, TAM, UTAUT, etc., and mainly on the personal factors such as perceived usefulness, perceived ease of use, perceived risk, performance expectation, satisfaction, trust, etc., which have direct influence on financial APP users. As a new, integrated social media, the social impact factors of financial APP are not given enough attention. In fact, the social factors have significant indirect effects on

continuous intentions by perceived usefulness, perceived security, perceived ease of use and so on. In view of this, the paper constructs a model that the subjective norms and network externality have effect on the financial APP users to continue intention. Through the empirical study of the questionnaire and field survey, this paper explores the difference of the influence of different social factors on the sustainable use of APP users, and analyzes the extrinsic driving factors of perceived usefulness, perceived security and perceived ease of use.

2. Literature review and research hypotheses

2.1. Social factors and motivation theory

Social factors refers to the social groups, communication, public opinion, system, moral and other social things, which strongly affect people's motivation, attitudes and behavior. Motivation is a kind of psychological activity that causes the initiation, direction, intensity and persistence of behavior.

External motivation refers to the individual motivation generated under the external requirements or pressure, while intrinsic motivation is generated by the individual internal needs. Some empirical studies of previous scholars have found that social factors affect the individual internal motivation as an external motive. For instance, Vallerand et al. proposed the order of motivations: social factors → psychological adjustment → motivation → results^[2]. Lin and Lu explained why users join social networks by combining motivation theory with network externality^[3]. Network externality, also known as the demand side economies of scale or network effects, refers to the user's utility obtained from a product will change according to user number of this product. Subjective norms refer to behavioral motives that come from the pressure of the important figures and the social environment. Recently, domestic and foreign scholars have introduced the social factors of subjective norms and network externality, perceived usefulness and perceived ease of use into the study of motivational theory, through studying the users' willingness of virtual social information system and mobile social media. For example, Hong and Xu discussed the influence of network externalities and herd behavior on continuous intentions of mobile social applications^[4]; Guo et al. experimented with mediation effect significantly of the affecting process about subjective norms in the word-of-mouth on consumer brand conversion^[5]. In fact, financial management APP is also a form of virtual community information system. Enhancing network externality and subjective norms also play an important role in users and improve their awareness of usefulness, ease of use and security of financial APP. Based on the above literature, the following hypotheses are proposed:

H1: Network externality has a significant positive impact on the perceived usefulness of financial APP users.

H2: Network externality has a significant positive impact on the perceived security of financial APP users.

H3: Network externality has a significant positive impact on the perceived ease of use of financial APP users.

H4: Subjective norms have a significant positive impact on perceived usefulness of financial APP users.

H5: Subjective norms have a significant positive impact on perceived security of financial APP users.

H6: Subjective norms have a significant positive impact on the perceived ease of use of financial APP users.

2.2. Relevant research of technology acceptance model and continuous intentions

The technology acceptance model is proposed by Davis to study user acceptance of information systems^[6]. It includes perceived usefulness and perceived ease of use, which are the two main determinants. Perceived usefulness refers to the degree users perceived when using new

technologies, new products, or new services to improve operational efficiency. Perceived ease of use is an individual expectation of how easy to use of an information system. Perceived security is the subjective perceptual risk of a user's consumption. A large number of scholars confirmed the influence factors of users' desires and behaviors based on technology acceptance model. For example, Hsu et al. constructed the theoretical model of users' willingness to use TAM as the core, and added perceived security, perceived cost and subjective factors^[7]. Li et al. found that perceived security is a key factor affecting users' adoption of online shopping, online banking and mobile payment^[8]. Dai and Liu studied the willingness to use social networking services, and found that perceived usefulness and user's attitude had a significant positive impact on the usage intention of social network service platform^[9]. Zhai et al. constructed a model to study the impact of social experience on willingness to continue using^[10]. Zhou et al. argued that interactivity has a positive impact on the continuance intention of mobile APP, and verified the mediating effect of perceived interest and the moderating effect of perceived consistency^[11]. Continuous intentions are the subjective tendency of an individual to continue to use an object. As a new concept, it first appeared in the Information System Expectation Confirmation (ECM-IT) model constructed by Bhattacharjee^[12]. This model assumed and validated that perceived usefulness and satisfaction were the main factors that influenced the willingness to use continuously. In recent years, domestic and foreign scholars have made extensive research on the influencing factors of continuous intentions. For example, Agrifoglio et al. studied the effects of perceived usefulness and perceived ease of use on the willingness to use Twitter continuously, which based on a technical model from both extrinsic and intrinsic motivation^[13]. Liu explored the influencing factors of the continued use of Internet financial products taking the Yuebao as an example^[14]. Shao et al. verified that customers' trust is negatively associated with perceived risk and positively associated with continuance intention^[15]. Wang et al. proposed that interaction and fairness positively influence the solvers continuance intention^[16]. Therefore, this paper referred to domestic and foreign research results, to explore the direct impact of financial APP continuous intentions with perceived usefulness, perceived security and perceived ease of use, and the mediation effect between three factors and the subjective norms and network externality. Based on the above literature, this study proposed the following assumptions:

H7: Perceived usefulness has a significant positive impact on the continuous intentions of financial APP users.

H8: Perceived security has a significant positive impact on the continuous intentions of financial APP users.

H9: Perceived ease of use has a significant positive impact on the continuous intentions of financial APP users.

According to the above assumptions, this study constructed a conceptual model of the continuous intentions to use financial APP, as shown in Figure 1.

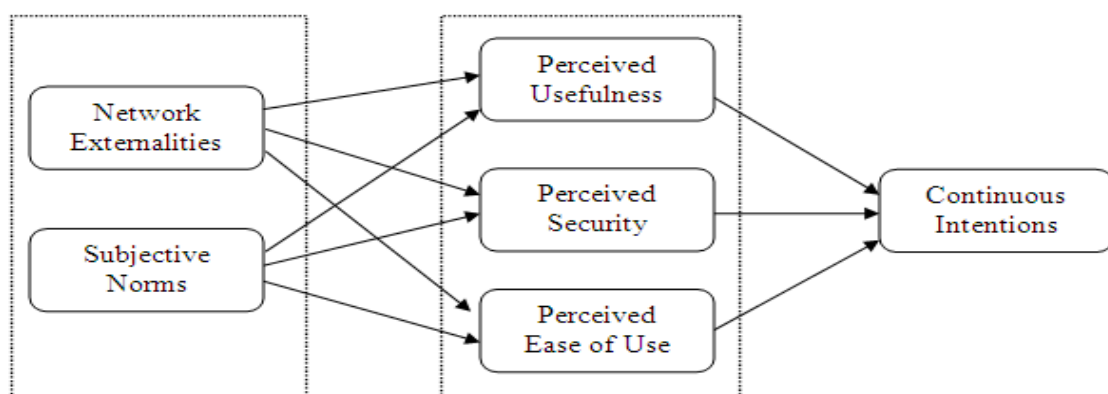


Figure 1 Continuous intentions' model of financial APP.

3. Research design

3.1. Scale development and design

In order to ensure the quality of the questionnaire and improve the reliability and validity of the measurement variables, all of the measurement items in this paper were selected from the relevant authoritative literature abroad, and the scale was modified with the practical operation of financial APP. The variables of network externality mainly came from the scale of Lin and Lu (2011), Zhaohua Deng et al. (2010). The subjects of subjective normative variables were mainly based on Bhattachar (2002), Venkatesh & Bala (2008). The items of perceived usefulness were mainly derived from the scales developed by Davis (1989), Hu and Kettinger (2008). The subjects of perceived security were primarily based on the scales of Sheehan & Hoy (2000), Torkzadch & Dhillon (2002). The scales of perceived ease of use were based on the scales of Davis (1996) and Wang et al. (2004). The items of continuous intentions mainly referred to the Bhattacharjee (2001) and Lee (2010) scales. To ensure the accuracy of the translation, all measurement items were translated English into Chinese by a Marketing Ph.D., and then translated Chinese into English by another Associate Professor of Marketing. After comparing the two English versions, the Chinese version of the scale were modified and improved so as to ensure that the Chinese scale does reflect the meaning of measurement items.

In addition, we distributed the questionnaire to three PhDs in marketing and three marketing specialists prior to the formal survey and made improvements based on their recommendations. At the same time, in order to avoid the possibility of error in the formal large-scale sample survey, this study conducted a small-scale pre-survey, and the questionnaires were sent to 50 APP users of financial institutions. We found that the pre-survey questionnaire reliability and validity were better after disposing and analyzing, without deleting any items. In the interest of distinguishing the differences in the response of answerers, the questionnaire used the Likert 7 scale, which “1” said strongly disagreed, “7” said very much agree. To ensure the authenticity of the questionnaire, we set the fourth questions in the beginning of the screening items “Have you used Wacai, Suishouji, Qian.qq, Yuebao or other financial APP?” If the respondent chose “No”, the questionnaire automatically jumped to the end and informed that the survey was over. In addition, in order to limit the respondents to complete the questionnaire, we set up in the background of the questionnaire, “do not allow IP address duplication” to ensure that each valid questionnaires were collected for different financial APP users.

3.2. Data acquisition and sample characteristics

In this paper, the data collected by means of network questionnaire and field questionnaire. First, the official questionnaire was published on the professional survey website “Sojump”, and then the users of Micro-blog, WeChat, Forum, QQ and Mailbox were invited to fill in. The questionnaires were randomly selected from financial users of Shenzhen Haitong Securities, Huarong Securities, Dongguan Bank and other financial institutions, and citizens of Shenzhen, Guangzhou, Chengdu and other places were randomly selected as the survey object, inviting them to fill out the questionnaire. A total of 599 questionnaires were returned from June to December in 2018. A total of 516 valid questionnaires were obtained, excluding the 83 non-qualified questionnaires with incomplete answers, identical answers or over-concentration. The effective recovery rate was 86.1%.

In the valid sample, the proportion of male and female was 46.41% and 53.59% respectively. From the age level point of view, 20 to 30-year-old accounted for 49.92%, 31 to 40 accounted for 34.89%, 9.52% over the age of 41, 5.68% under the age of 20. This result was not only in line with the financial APP user's personality characteristics, but also with the financial APP survey result of Sootoo institute. From the educational angle, undergraduate education or above accounted for 60.1%, college and below accounted for 23.87%. From the perspective of purchasing financial

products, the users whose investment of 10,000 yuan to 100,000 yuan accounted for 44.96%, the proportion of less than 10,000 yuan was 45.74%, and this data was in line with IResearch survey results. From the usage time of financial APP, the users of 1 year to 2 years accounted for 37.21%, 2 years to 3 years was 31.59%, and more than 3 years was 13.37%. From the survey of demographic information, the effective sample had a certain representation. In order to test possible response bias and common method bias, this study analyzed significant differences between early and late responders and used Harman single factor testing to demonstrate that there was no response bias and homologous bias to affect the conclusions of this paper.

4. Data analysis

4.1. Reliability and validity test

Reliability analysis: Because the questionnaires involve the measurement of latent variables such as “network externalities”, “subjective norms” and “perceived security”, the reliability and validity of the data are very important. We adopted the most commonly used Cronbach's α coefficient and combined reliability to measure the consistency of the items under the same concept. The overall internal consistency of the questionnaire was 0.970. As shown in Table 1, the Cronbach's α coefficients for network externality, subjective norms, perceived usefulness, perceived security, perceived ease of use, and continuous intentions were 0.909, 0.893, 0.919, 0.902, 0.885 and 0.883 respectively, and they were higher than 0.700; the coefficient of combined reliability was 0.884-0.921, and they were all higher than 0.80; so this scale had high reliability.

Validity analysis: The validity analysis consisted of content validity and construct validity. Most of the questionnaires were from the foreign authoritative journals and most of them had been tested under the Chinese context. At the same time, before the items of the final confirmation scale, combined with the recommendations of the marketing experts and pre-survey results, the statements were revised carefully, so this questionnaire had good content validity. Structural validity is divided into convergent and discriminate validity. First, the KMO and Bartlett spheres were tested for 516 samples with a KMO value of 0.969 and higher than 0.70; a Bartlett sphere was tested with a chi-square degree of freedom ratio of 29.351; and a significance level was 0.000 and less than 0.05; so the conditions were suited for factor analysis. After analysis, all the factors of the standard factor load range was 0.768-0.893 and higher than the 0.6; all latent variables of the average variance extraction values were greater than 0.6; the combined reliability values were higher than 0.8; so this scale had better convergent validity. Table 1 showed that the root mean square of AVE values of network externality, subjective norms, perceived usefulness, perceived security, perceived ease of use, and continuous intentions were 0.813, 0.860, 0.836, 0.839, 0.847 and 0.829 respectively, Which were greater than the correlation coefficient of the variable with other variables, indicating that the variables had a good distinction between the validity.

Table 1 Reliability and validity test.

Variables	α	AVE	CR	Network Externalities	Subjective Norms	Perceived Usefulness	Perceived Security	Perceived Ease of Use	Continuous Intentions
Network Externalities	0.909	0.661	0.907	0.813					
Subjective Norms	0.893	0.739	0.894	0.697	0.860				
Perceived Usefulness	0.919	0.699	0.921	0.712	0.739	0.836			
Perceived Security	0.902	0.704	0.905	0.702	0.686	0.806	0.839		
Perceived Ease of Use	0.885	0.718	0.884	0.671	0.531	0.691	0.726	0.847	
Continuous Intentions	0.883	0.687	0.898	0.763	0.711	0.813	0.819	0.736	0.829

4.2. Structural equation modelling

Before estimating the fit of the structural model, we first tested the reasonableness of the estimated parameters without negative variance; we found that the covariance standard estimate value correlation coefficient was not greater than 1; there were no covariance matrix or correlation matrix that is not a positive definite matrix, and no a maximum or minimal standard error. Then according to the model correction principle, we calculated by AMOS22.0 the following data. Absolute fitness index: $\chi^2=181.357$, $DF=163$, $\chi^2/DF=1.113$, $P=0.154 > 0.05$; $RMR=0.027 < 0.05$, $RMSEA=0.015 < 0.05$, $GFI=0.971 > 0.90$, $AGFI=0.947 > 0.90$. Value - added fitness index: $NFI=0.984 > 0.90$, $RFI=0.972 > 0.90$, $IFI=0.998 > 0.90$, $ILI=0.997 > 0.90$, $CFI=0.998 > 0.90$. Simple fit index: $PGFI=0.528 > 0.50$, $PNFI=0.581 > 0.50$, $PCFI=0.590 > 0.50$, $CN=551 > 200$. Theoretical model value $AIC = 455.357$, less than the independent model value 600.000, while less than the saturated model value 11102.163. The theoretical model value $CAIC = 1174.073$, less than the independent model value of 2173.832, while less than the saturation model value of 11228.069. The above fitting indexes were ideal, which indicated that the general fitting degree of the model was better.

Table 2 Model fitness summary.

Statistical Inspection	Adaptation Criteria or Thresholds	Test Result Data	Model Adaptation judgment
Absolute Fitness Index			
χ^2	$P > .05$	181.357 ($P=0.154 > .05$)	Yes
RMR	< 0.05	0.027	Yes
RMSEA	< 0.05	0.015	Yes
GFI	$> .90$ 以上	0.971	Yes
AGFI	$> .90$ 以上	0.947	Yes
Value - Added Fitness Index			
NFI	$> .90$ 以上	0.984	Yes
RFI	$> .90$ 以上	0.972	Yes
IFI	$> .90$ 以上	0.998	Yes
TLI(NNFI)	$> .90$ 以上	0.997	Yes
CFI	$> .90$ 以上	0.998	Yes
Simple Fit Index			
PGFI	$> .50$ 以上	0.528	Yes
PNFI	$> .50$ 以上	0.581	Yes
PCFI	$> .50$ 以上	0.590	Yes
CN	> 200	551	Yes
χ^2 Degree of Freedom Ratio	< 2.00	1.113	Yes
AIC	The theoretical model values are less than the independent model values and the saturation model values	455.357 < 600.000 455.357 < 11102.163	Yes
CAIC	The theoretical model values are less than the independent model values and the saturation model values	1174.073 < 2173.832 1174.073 < 11228.069	Yes

4.3. Hypothesis testing and path analysis

In this paper, the structural equation model based on maximum likelihood method was used to systematically analyze the mutual influence of variables. The adaptive model showed that the latent variables of perceived usefulness, perceived security, perceived ease of use, and continuous intentions R² were 0.562, 0.654, 0.718 and 0.840 respectively, suggesting that extrinsic variables were associated with higher variability of latent variables. Assuming test results were shown in Table 3: H1, H2, H3, H4, H5, H7, H9 were validated and supported, while H6 and H8 were not validated and supported. Hypothesis test results showed that with the popularity of financial APP, the perceived usefulness and security with network externality and subjective norms would also increase. The reason for perceived ease of use not being support empirically with subjective norms may be that financial APP user groups were younger, more emphasis on independence or personal privacy. At the same time, because subjective norms emphasized the internalization and recognition of the majority of well-educated financial APP users, the impact of perceived ease of use will be minimal. The perceived usefulness is more significant than the perceived ease of use, reflecting the strong return on investment (ROI) of financial APP users, as evidenced by the direct path of willingness to use. Even more interesting was that the perceived safety had not a significant positive impact on continuous intentions, which from the user's angle, it revealed the external reason (social factors) that a number of financial APP companies easily raised funds and went away.

Table 3 Hypothesis test results.

Hypothesis	Path Relationship	β Values	T Values	P Values	Conclusions
H1	Network Externalities \longrightarrow Perceived Usefulness	0.453	8.118	***	Support
H2	Network Externalities \longrightarrow Perceived Security	0.445	7.436	***	Support
H3	Network Externalities \longrightarrow Perceived Ease of Use	0.686	10.49	***	Support
H4	Subjective Norms \longrightarrow Perceived Usefulness	0.447	8.386	***	Support
H5	Subjective Norms \longrightarrow Perceived Security	0.414	7.132	***	Support
H6	Subjective Norms \longrightarrow Perceived Ease of Use	0.08	1.339	0.181	Not Support
H7	Perceived Usefulness \longrightarrow Continuous Intentions	0.696	3.186	0.001	Support
H8	Perceived Security \longrightarrow Continuous Intentions	-0.123	-0.496	0.620	Not Support
H9	Perceived Ease of Use \longrightarrow Continuous Intentions	0.507	5.16	***	Support

4.4. Mediator effect test and bootstrap analysis

According to the recommendations of experts, this study adopted the Bootstrap program to test the perceived usefulness, perceived security and perceived ease of use of the mediating effect of significance. We adopted the method of repeated random sampling to extract 1000 Bootstrap samples in the original data (N = 516). After calculating the estimated values, we formed an approximate sampling distribution, and then used the 2.5th percentile and the 97.5th percentile to estimate 95 % Median Confidence Interval. The results showed that at the 95% confidence level, the confidence interval (LLCI = 0.512, ULCI = 0.708) did not include 0, indicating that the perceived usefulness and perceived ease of use had significant mediation effect on the network externalities, so the network externalities increased financial APP users' perception of the usability and ease of use, and had a significant indirect impact on continued usage behaviours. At the 95% confidence level, perceived usefulness, perceived security, and perceived ease of use did not include 0 for the overall confidence interval for subjective normative mediation effects (LLCI = 0.195, ULCI = 0.398), indicating a significant mediating effect. The indirect effect estimate of perceived security normalization was -0.051 and the perceived ease of use was estimated to be 0.041, and the standardized indirect effect estimate of perceived usefulness was 0.311, so the indirect effect of subjective norms on continuous intentions was mainly due to perceived usefulness.

Table 4 Mediator effect test and Bootstrap analysis.

Path	Standardized Indirect Effect Estimation	Standardization of Indirect Effect Value	95% confidence interval	
			Lower limit	Upper limit
Network Externalities \longrightarrow Perceived Usefulness \longrightarrow Continuous Intentions	$0.453 \times 0.696 = 0.315$	0.608	0.512	0.708
Network Externalities \longrightarrow Perceived Security \longrightarrow Continuous Intentions	$0.445 \times (-0.123) = -0.055$			
Network Externalities \longrightarrow Perceived Ease of Use \longrightarrow Continuous Intentions	$0.686 \times 0.507 = 0.348$			
Subjective Norms \longrightarrow Perceived Usefulness \longrightarrow Continuous Intentions	$0.447 \times 0.696 = 0.311$	0.300	0.195	0.398
Subjective Norms \longrightarrow Perceived Security \longrightarrow Continuous Intentions	$0.414 \times (-0.123) = -0.051$			
Subjective Norms \longrightarrow Perceived Ease of Use \longrightarrow Continuous Intentions	$0.080 \times 0.507 = 0.041$			

5. Conclusions and theoretical contributions

The empirical results showed that: (1) network externality have a significant positive impact on perceived usefulness, perceived security, perceived ease of use, and subjective norms have a significant positive impact on perceived usefulness and perceived security, while the impact of subjective norms on perceived ease of use is not significant. (2) Perceived usefulness and perceived ease of use have a significant positive impact on the users' continuous intentions to use financial APP, while perceived security have no significant positive influence on the continuous intentions. (3) The perceived usefulness and the perceived ease of use are significant in the pathways of network externality and subjective norms to the continuous usage intentions, while perceived security is not significant in the pathways of network externality and subjective norms to continuous intentions of the intermediary effect. The theoretical contribution of this study is mainly manifested in three aspects: the first is to enrich the theory of social factors, which would help the follow-up study pay more attention to the social factors while noticing to the individual factors of the consumers so as to systematically, comprehensively and dynamically reveal the intrinsic and extrinsic influence mechanism of financial APP sustainable use. The second is to extend the depth and breadth of the theory of continuous intentions, and to analyze the mediating effect of perceived usefulness and perceived ease of use in social factors and continuous intentions. The third was to enrich the theory of security perception, and provided a reference to further study of mobile Internet security context.

5.1. Management Implications and practical significance

In this paper, the empirical study give the following five aspects of practical inspiration to financial APP operators: (1) Focus on improving financial APP network externalities, expand the scale of users, transform the scale to promote geometric changes of users' continuous intentions, and thus greatly affect the user's continued behaviours. (2) The strengthening of the subjective norms plays an important role in the successful APP of financial operation platform. Pay more attention to the power of the example of the social circles and opinion leaders because subjective norms have a significant positive impact on the continuous intentions. (3) Perceived usefulness significantly influence on continuous intentions of financial APP, because users not only need a higher return on investment, but also demand financial information, transfer payments, cash flow, investment portfolio and other needs. It is recommended that financial APP operators should develop high value-added products and services to enhance the user's stickiness and improve sustainable use.(4) This study shows that perceived ease of use has a significant positive impact on continued usage intentions, so it is suggested that APP operators streamline information search interface, simplify page layout and menus, and improve server response speed to reduce the user's

learning costs. (5) In this paper, the perceived security has no significant positive effect on continuous intentions. From one side it explains the reason why financial companies run away while the users do not know. But from the point of building the core competitiveness of financial management platform APP, it is proposed that APP operators cooperate with insurance companies and improve the appropriate security system to enhance the continuous usage intentions.

5.2. Research limitations and prospects

There are three limitations of this study, which are the future direction of further study and improvement. Firstly, there is no grouping of risk appetite, self-cognition, psychological emotion and other personality traits of financial APP users in this paper. The future model can explore the influence mechanism of groups with different personality traits on the continuous intentions. Secondly, this study only concerned about continuous intentions of financial APP users, rather than the real continuous use behaviours. In the future, we can consider the data mining method to obtain the data of users' continuous use behaviours, and quantify the path influence relationship between intentions and behaviours. Thirdly, the questionnaire in this paper is based on the same time point. The future survey can take into account the persistence of time, and select the longitudinal time points to analyze and study the continuous intentions.

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