The UTAUT Model in the Adoption of E-Learning Technology: An Empirical Study Using China’s Banking Industry

Jin Qiu, Guangdong University of Science and Technology, China*

ABSTRACT

To provide strategies for developing and optimising e-learning technology, this paper conducts research on the e-banking platform based on e-learning technology. Firstly, this paper points out the technical content of the electronic banking platform. Secondly, based on the Unified Theory of Acceptance and Use of Technology (UTAUT) model, empirical analysis is conducted on the influencing factors of user willingness to use electronic banking platforms, including the introduction, construction, hypothesis formulation, selection of indicator variables, and questionnaire design. Finally, the results of empirical analysis are explored. The result shows that: (1) The Cronbach’s α values of the sub-scales of the questionnaire designed are all greater than 0.7, and the load of different factors in each dimension of the scale is more significant than 0.5. (2) Perceived risk has the highest average among all influencing factors, with a value of 4.13. (3) AMOS (Analysis of Moment Structure) 21.0 was calculated using a standardized path coefficient similar to the model.

KEYWORDS
E-Learning Technology, Electronic Banking, Empirical Analysis, Perceived Risk, UTAUT Model

1. INTRODUCTION

An empirical study on the Chinese banking industry can provide valuable insights for promoting and improving mobile online banking. China is one of the largest mobile internet markets globally, and the development of mobile online banking in China holds significant importance. By conducting empirical research on the Chinese banking industry, this paper can gain an in-depth understanding of Chinese users’ acceptance level, willingness to use, and influencing factors concerning mobile online banking. These findings can offer guidance and support for the banking sector in formulating more effective promotion strategies, enhancing user experience, and increasing user satisfaction. Additionally, in investigating the adoption process of mobile online banking, empirical research utilizing the Unified Theory of Acceptance and Use of Technology (UTAUT) model can help people comprehend users’ attitudes, perceived usefulness, and ease of use of mobile online banking as well as the impact of subjective norms and perceived behavioral control on user acceptance and adoption. This paper provides important references and strategic guidance for developing mobile online banking in the Chinese banking industry by gaining deeper insights into users’ needs and behaviors.

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The foreign financial industry and e-learning technology have developed earlier. The development of the financial industry has created diversified financial needs and efficiency requirements. The progress of e-learning technology has helped mobile banking develop faster. However, among many types of research on electronic banking, there are many types of research on mobile banking security (Albashrawi, 2021). Saleh and Aqel (2021) pointed out that mobile banking was a danger, and the use of mobile banking would reveal personal information and compromise privacy. Das et al. (2021) pointed out that mobile banking consumers in Brazil have many doubts about the development mode of new banking services, especially when they fail to predict and judge the protection of consumer privacy and information security protection. These problems have also become a major factor affecting the sound development of mobile banking (Das et al., 2021). Regarding user behavior, researchers focus on the influencing factors of user adoption and usage behavior on mobile banking platforms. Studies pointed out that factors such as users’ characteristics, technological acceptance, perceived convenience, and trust significantly influence users’ willingness to adopt and their frequency of use of mobile banking. Furthermore, e-learning refers to educational and learning methods supported by information and communication technologies. With the development of the Internet and mobile technologies, e-learning has been widely applied in the field of education. Researchers paid attention to issues related to the effectiveness of e-learning technology, user experience, and instructional design. In terms of effectiveness, researchers explored the impact of e-learning on learning outcomes, learning motivation, and learning effectiveness. Research shows that e-learning can enhance learners’ learning outcomes and motivation. However, challenges exist in learners’ acceptance and adaptation to e-learning.

The development of mobile banking in China is relatively late, and many researchers have analyzed the technical characteristics of mobile banking. Chen and Xiang (2021) pointed out that biometric identification technology will be further developed and widely used due to its portability and security advantages. Dang et al. (2021) pointed out that although mobile banking is easy to operate, the client is still insecure and unstable, which is one of the problems that mobile banking should reform in the future (Dang et al., 2021). Lin et al. (2021) proposed that commercial banks will gradually and comprehensively deploy financial services in the future online services. They also pointed out that with the promotion of 5G technology, the convenience of mobile banking will become the focus of business development (Lin et al., 2021).

There are still shortcomings in domestic and international research on mobile banking and e-learning technologies. These include insufficient research on the influencing factors of user behavior in mobile banking, limited in-depth studies on the effectiveness of e-learning technologies, and a lack of research on the comprehensive application of mobile banking and e-learning technologies. Therefore, this paper offers the following innovations compared to previous research. 1) The study shifts the focus from the initial stage of researching mobile banking applications to addressing the technical security issues of mobile banking. 2) The UTAUT model is incorporated, a widely applied theoretical framework for investigating user acceptance and adoption of new technologies. A user intention model based on the Expectation-Confirmation Model is constructed by combining the UTAUT model with perceived risk variables and considering user needs. 3) The study discusses the influencing factors of the user intention model, specifically the factors that impact users’ acceptance and willingness to use mobile banking services. This helps gain a deeper understanding of user behavior and attitudes towards electronic banking services, providing better strategic recommendations for banks in managing their electronic banking businesses. 4) This paper aims to provide strategic recommendations for banks to improve their electronic banking services and offer optimization suggestions for developing e-learning technologies. More effective strategies for promoting and enhancing electronic banking services can be developed by exploring the user intention model and its influencing factors. Meanwhile, relevant optimization approaches can be provided for applying e-learning technologies.
2. APPLICATION OF THE UTAUT MODEL IN E-LEARNING TECHNOLOGY AND E-BANKING

2.1 E-Banking Based on E-Learning Technology

There are two central systems regarding technology selection for business platforms in electronic banking platforms (Asongu et al., 2021). One is Unstructured Supplementary Service Data (USSD)/Short Message Service (SMS)/Wireless Application Protocol (WAP). USSD, SMS, and WAP are all circuit bearer services, but they use different circuit channels. During a call, USSD and SMS use Stand Alone Dedicated Control Channel (SDCCH) with a data transmission rate of approximately 600 bps. When the non-talking state, USSD uses the Fast Associated Control Channel (FACCH), with a data transmission rate of approximately one kbps, which is higher than the SMS transmission rate. Currently, users can only use WAP in non-talk mode. Data is exchanged through the TCH (Traffic Channel) voice channel, with a transmission rate of approximately 9.6 kbps (Sajid et al., 2022). With the development and maturity of mobile communication technologies such as General Packet Radio Service (GPRS) and 3G, WAP will evolve into packet-switched services and its data transmission rate will also reach 115.2 kbps (the general rate of GPRS), or even 2 Mbps (Sajid et al., 2022; Wang et al., 2022).

2.2 Analysis of Influencing Factors of e-Banking Platform Users’ Willingness to Use Based on UTAUT Model

The UTAUT model is a widely validated and applied theoretical framework that has been successfully used in various fields, including e-commerce, e-learning, and e-government. This model integrates multiple factors that influence technology acceptance and adoption, including perceived usefulness, perceived ease of use, subjective norms, and perceived behavioral control. From different perspectives, these factors impact users’ acceptance and willingness to use new technologies, enabling a comprehensive analysis of the influencing factors on user behavior and attitudes. In this paper, the UTAUT model plays a significant role by providing a set of operational variable concepts and measurement methods, which help quantify and measure users’ acceptance and willingness to use electronic banking platforms. Through the measurement and analysis of these variables, a deeper understanding of user needs and behaviors can be gained, and targeted strategies and measures can be provided for the banking industry.

2.2.1 UTAUT Model

UTAUT model is derived from the technology acceptance model, rational behavior theory, innovation diffusion theory, theory of planned behavior, and social cognition theory. The UTAUT model has four determining variables: performance expectations, effort expectations, community impact, and convenience factors (Raffaghelli et al., 2022). Additionally, four regulatory variables are added, namely, gender, age, experience, and voluntariness, as shown in Figure 1.

Figure 1 integrates each variable from several original variables in the above model. The explanation and source of variables are shown in Table 1.

2.2.2 Conceptual Models and Research Assumptions

2.2.2.1 Establishment of Model

This paper introduces the influencing factors of satisfaction, perceived risk, and consumer innovation. It constructs a UTAUT model to analyze the user behavior of electronic banking platforms, as shown in Figure 2.

In Figure 2, the e-banking platform usage behavior research model mainly includes three key concepts: perceived risk, consumer innovation, and satisfaction. Among them, perceived risk is the risk expectation that users may encounter when using an electronic banking platform (Cui et al.,
Consumer innovation is the level of user acceptance of new services on the electronic banking platform (Huang et al., 2021). Satisfaction refers to customers’ inner joy and satisfaction when using an electronic banking platform (Ankita et al., 2022). This paper can gain in-depth insights into users’ acceptance level, willingness to use, and satisfaction by conducting a comprehensive analysis of perceived risk, consumer innovativeness, and satisfaction with electronic banking platforms. The research on these factors can provide important references and guidance for the banking industry to improve user experience, increase user loyalty, and propose corresponding strategies and measures to enhance the competitiveness of electronic banking platforms.

**Table 1. Introduction and source of variables in the UTAUT model**

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Interpretation</th>
<th>Variable Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance expectations</td>
<td>The extent to which using the system will help you gain benefits</td>
<td>Perceived usefulness, external motivation, job adaptation, comparative advantage, and achievement expectations</td>
</tr>
<tr>
<td>Effort expectations</td>
<td>How easy it is to use the system</td>
<td>Perceived ease of use, complexity, ease of use</td>
</tr>
<tr>
<td>Social influence</td>
<td>A perception of how important it is for others to think they should use the system</td>
<td>Subjective norms, social factors, image</td>
</tr>
<tr>
<td>Convenience factors</td>
<td>The extent to which components and technical infrastructure exist to support system use</td>
<td>Enabling conditions, compatibility, perceived behavior control</td>
</tr>
</tbody>
</table>

2022). Consumer innovation is the level of user acceptance of new services on the electronic banking platform (Huang et al., 2021). Satisfaction refers to customers’ inner joy and satisfaction when using an electronic banking platform (Ankita et al., 2022). This paper can gain in-depth insights into users’ acceptance level, willingness to use, and satisfaction by conducting a comprehensive analysis of perceived risk, consumer innovativeness, and satisfaction with electronic banking platforms. The research on these factors can provide important references and guidance for the banking industry to improve user experience, increase user loyalty, and propose corresponding strategies and measures to enhance the competitiveness of electronic banking platforms.
2.2.2.2 Scale Design

This paper will design multiple different dimensions based on previous research questionnaires. During the development of the scale, the experiment adhered to the basic principles of scientficity, typicality, ease of measurement, reliability, validity, and rationality.

Based on the research results of previous scholars on the UTAUT model and the development characteristics of the e-banking platform at the present stage, the measurement dimensions of design variables are optimized based on conforming to the basic principles of scale development, as shown in Table 2.

From the above scales, specific adjustments to the UTAUT model based on the characteristics of electronic banking are as follows:

1. In order to comprehensively reflect users’ performance expectations, the performance expectancy variable includes financial service information provided by electronic banking platforms, such as online transfers, payments, wealth management, loans, etc.
2. The effort expectancy variable emphasizes users’ existing abilities to operate electronic banking platforms independently and proficiently and the effort required to master new platform features.
3. The social influence variable includes items regarding friends recommending the use of electronic banking platforms for transactions, considering the influence of friends on users’ adoption of the platform.
4. The facilitating conditions emphasize the attractiveness of marketing activities on electronic banking platforms and the convenience of avoiding spending time queuing at physical branches.
5. The perceived risk variable includes items related to users’ concerns about the potential loss of their money when using electronic banking platforms.

Furthermore, the above scales adopt Likert’s five-point scale, where respondents select the option that best corresponds to their views. Through the measurement and analysis of these variables, researchers can understand respondents’ attitudes and opinions towards different dimensions of electronic banking platforms, thereby better understanding and interpreting the application of the UTAUT model in relevant studies. Moreover, this paper adheres to basic principles such as scientific rigor, representativeness, ease of measurement, and reasonable validity and reliability in scale design, ensuring the quality and reliability of the scales.
2.2.2.3 Research Assumptions

This paper examines the theories and research of numerous scholars, combined with daily work experience, to make research hypotheses on variables and guide empirical research directions. Finally, the empirical results are used to validate the hypothesis:

1. The relationship between performance expectations, satisfaction, and usage behavior.

   Behrens and Wexner (2021) pointed out that the popularity of technology can determine the user’s willingness to use it. Many experiments have shown that perceived usefulness is a factor that affects usage behavior, and performance expectations are variables designed based on it (Sorkun et al., 2022). The used behavior in this paper is an extension of willingness to use, indicating that performance expectations significantly impact user behavior.

   In addition, Haffke (2022) proposed that performance is divided into operational and expressive, and users need a certain performance value or both to be greater than or equal to the expected value to be satisfied. If e-banking platform users want to improve their satisfaction, they need to meet the performance requirements. Otherwise, their satisfaction will be reduced (Haffke, 2022).

   Some assumptions are proposed:

   **H1:** The impact of performance expectations on customer usage behavior on the electronic banking platform presents a positive correlation.

   **H2:** The impact of performance expectations on customer satisfaction on electronic banking platforms presents a positive correlation.

2. The relationship between effort expectations, satisfaction, and use behavior.

   Yu et al. (2021) pointed out that users’ willingness to use new technologies is generally related to effort expectations. If users feel that mastering new technologies requires less effort, their desire to use them is stronger. The simpler a user feels, the stronger their usage behavior becomes (Yu et al., 2021).

   In addition, Arboleda et al. (2022) pointed out that the development of electronic banking platform business is closely related to the innovation of mobile terminal technology. Users need to complete some banking operations on their mobile phones. The lower the difficulty of the process, the higher the user satisfaction (Arboleda et al., 2022).

   Some assumptions are proposed:

   **H3:** There is a positive correlation between effort expectation and customer usage behavior on the electronic banking platform.

   **H4:** The impact of effort expectation on customer satisfaction on e-banking platforms presents a positive correlation.

3. The relationship between community influence and usage behavior.

   The user’s use behavior is strong if a certain technology or product is highly popular among surrounding groups or highly promoted in the social environment. E-banking platforms are similar to mobile networks in that they are affected by communities, which affect usage behavior (Luo et al., 2022). Therefore, this paper makes the following assumptions:

   **H5:** The impact of community influence on the user behavior of e-banking platform customers presents a positive correlation.
4. The relationship between convenience factors and usage behavior.

Convenience factors refer to the reasons that promote users’ use of the product, allowing users to achieve satisfaction beyond performance expectations. For e-banking platforms, the measurement is mainly based on the impact of external convenience factors of the e-banking platform. In addition, online products often require creative activities to attract and retain users (Hosen et al., 2021). For this purpose, the following assumptions are made in this paper:

**H6:** The impact of convenience factors on the user behavior of e-banking platform customers presents a positive correlation.

5. The relationship between perceived risk, satisfaction, and usage behavior.

Perceived risk can have a certain negative impact on user behavior. As a new form of online finance, the current electronic banking platform bears more uncertainty for users, making them always cautious during the use process (Ngure et al., 2021). If the user feels that the potential risks exceed their ability to bear them, they will no longer continue to use the electronic banking platform.

In addition, the efforts made by users in accepting technology can have a corresponding negative impact on satisfaction, and the cost paid is also negatively correlated with satisfaction. In other words, user satisfaction with technology is often affected by its security and privacy (Ns et al., 2022).

Some assumptions are proposed:

**H7:** The impact of perceived risk on the usage behavior of e-banking platform customers shows a negative correlation.

**H8:** The impact of perceived risk on customer satisfaction on electronic banking platforms presents a negative correlation.

6. The relationship between consumer innovation and performance expectations, effort expectations, and perceived risk.

Innovative users generally pay great attention to new technologies, are willing to experience new things, and discover the practicality of these technologies and the convenience they may bring to humans. Experiments have shown a positive correlation between user innovation and perceived usefulness. These users tend to be more receptive to new technologies or products and be able to explore their usefulness (Barnes & Ruyter, 2022).

In addition, highly innovative users are more interested in new technologies or products. They can use their knowledge and skills to experience and master the different experiences brought by new products. Moreover, research results on wireless networks indicate that consumer innovation positively correlates with perceived ease of use. The more innovative users are, the faster they master new technologies or products and the easier they feel when operating and using them. In addition, users with vital innovation have a low-risk perception of new technologies or products but high tolerance (Li & Guo, 2023).

Some assumptions are proposed:

**H9:** The impact of consumer innovation on customer performance expectations on e-banking platforms presents a positive correlation.

**H10:** The impact of consumer innovation on customer effort expectations on e-banking platforms presents a positive correlation.
H11: The effect of consumer innovation on customer perceived risk on e-banking platforms presents a negative correlation.

7. The relationship between satisfaction and usage behavior.

The relevant analysis results of the expectation confirmation theory indicate that user satisfaction greatly determines the willingness to use for a long time. The satisfaction experienced by users when initially applying a new product or application can significantly impact their continued use in the future. The impact of initial user satisfaction on subsequent service is decisive. Therefore, the following assumptions are made in this paper:

H12: There is a positive correlation between the impact of satisfaction on the user behavior of e-banking platform customers.

In summary, the assumptions are summarized in Table 3.

2.2.3 Design and Distribution of Questionnaires

2.2.3.1 Respondents

This paper surveyed 200 electronic banking platform customers from a commercial bank. The distribution of customer types and numbers is as follows: individual users account for 40%, corporate users account for 38%, and investor users account for 22%. These users access the bank’s electronic banking platform either by downloading the bank’s mobile application or accessing the web-based version. They can perform various financial transactions, including checking account balances, transfers, bill payments, investment and wealth management, loan applications, and more. The analysis focuses on the factors influencing electronic banking platform usage behavior. As the platform is an online service, an online survey was conducted without specific restrictions on target individuals or regions.

<table>
<thead>
<tr>
<th>Number</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>There is a positive correlation between the impact of performance expectations on customer usage behavior on e-banking platforms</td>
</tr>
<tr>
<td>H2</td>
<td>The impact of performance expectations on customer satisfaction on e-banking platforms presents a positive correlation</td>
</tr>
<tr>
<td>H3</td>
<td>The impact of effort expectations on customer usage behavior on e-banking platforms is positively correlated</td>
</tr>
<tr>
<td>H4</td>
<td>The impact of effort expectations on customer satisfaction on e-banking platforms is positively correlated</td>
</tr>
<tr>
<td>H5</td>
<td>There is a positive correlation between the impact of community influence on customer usage behavior on the electronic banking platform</td>
</tr>
<tr>
<td>H6</td>
<td>The impact of convenience factors on customer usage behavior on electronic banking platforms presents a positive correlation</td>
</tr>
<tr>
<td>H7</td>
<td>The impact of perceived risk on customer usage behavior on electronic banking platforms shows a negative correlation</td>
</tr>
<tr>
<td>H8</td>
<td>The impact of perceived risk on customer satisfaction on e-banking platforms presents a negative correlation</td>
</tr>
<tr>
<td>H9</td>
<td>The impact of consumer innovation on customer performance expectations on e-banking platforms presents a positive correlation</td>
</tr>
<tr>
<td>H10</td>
<td>The impact of consumer innovation on customer effort expectations on e-banking platforms is positively correlated</td>
</tr>
<tr>
<td>H11</td>
<td>The impact of consumer innovation on customer perceived risk on e-banking platforms presents a negative correlation</td>
</tr>
<tr>
<td>H12</td>
<td>The impact of satisfaction on customer usage behavior on electronic banking platforms is positively correlated.</td>
</tr>
</tbody>
</table>
2.2.3.2 Questionnaire Design

The questionnaire survey is based on the UTAUT model and specifically addresses issues related to the electronic banking platform. Likert’s five-point scale method is employed in the questionnaire to measure customers’ opinions regarding the platform’s functionalities and design. The scale consists of five standards, ranging from “strongly agree” to “strongly disagree,” allowing respondents to choose the option that best aligns with their views. Through the questionnaire survey, researchers can gather customers’ attitudes and opinions regarding various functionalities and design aspects of the electronic banking platform.

2.2.3.3 Questionnaire Distribution and Collection

In this survey, the wjx.cn platform is used as the survey tool, and the questionnaire is distributed online by embedding the wjx.cn page into the electronic banking platform. This platform provides a counting system to track the time taken for each response. Responses that exceed a certain time threshold are considered invalid and are discarded.

Regarding the questionnaire collection, the researchers screened and eliminated responses. Firstly, responses that exceed the time threshold are invalidated. Secondly, incomplete questionnaires, where not all questions are answered are screened and removed. Additionally, questionnaires that contained irrelevant or systematically patterned responses were also eliminated.

A total of 200 questionnaires were distributed in this survey, out of which 190 were deemed valid, resulting in a valid response rate of 95%. This indicates that most participants answered the questions seriously, enhancing the credibility and representativeness of the research findings.

The specific distribution of demographic information of the respondents is presented in Table 4.

3. APPLICATION RESULTS OF THE UTAUT MODEL IN ELECTRONIC BANKING

3.1 Empirical Analysis Results of User Behavior on E-Banking Platform

3.1.1 Descriptive Statistics of Data

The influence factor survey in this paper uses the Likert five-point method, with a score of 5 for “strongly agree,” decreasing in order, and a score of 1 for “strongly disagree.” Descriptive statistics of the influencing factors of variables are shown in Figure 3.

Table 4. Distribution of characteristic information of respondents

<table>
<thead>
<tr>
<th>Feature Name</th>
<th>Content</th>
<th>Number</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>20-25 years old</td>
<td>40</td>
<td>21%</td>
</tr>
<tr>
<td></td>
<td>25 -35 years old</td>
<td>50</td>
<td>26%</td>
</tr>
<tr>
<td></td>
<td>35-45 years old</td>
<td>40</td>
<td>21%</td>
</tr>
<tr>
<td></td>
<td>Over 45 years old</td>
<td>60</td>
<td>32%</td>
</tr>
<tr>
<td>Gender</td>
<td>female</td>
<td>102</td>
<td>54%</td>
</tr>
<tr>
<td></td>
<td>male</td>
<td>88</td>
<td>46%</td>
</tr>
<tr>
<td>Education level</td>
<td>low</td>
<td>52</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>moderate</td>
<td>60</td>
<td>32%</td>
</tr>
<tr>
<td></td>
<td>high</td>
<td>78</td>
<td>41%</td>
</tr>
<tr>
<td>Income level</td>
<td>low</td>
<td>55</td>
<td>29%</td>
</tr>
<tr>
<td></td>
<td>moderate</td>
<td>65</td>
<td>34%</td>
</tr>
<tr>
<td></td>
<td>high</td>
<td>70</td>
<td>37%</td>
</tr>
</tbody>
</table>
Figure 3 shows the average perceived risk value among all influencing factors is the highest, 4.13. Convenience factors have the lowest mean among all influencing factors, with only 3.57. The average degree of satisfaction is also common, at 3.62. The above data indicate that people believe that the risks of e-banking platforms are high, including the technical and financial risks of e-banking platforms. The marketing activities on the e-banking platform are relatively monotonous and lack particular attractiveness for customers. The e-banking platform has not satisfied customers very much and needs further optimization.

3.1.2 Reliability and Validity Testing of the Questionnaire

3.1.2.1 Reliability Test

Statistical Product Service Solutions (SPSS) software is used to analyze the reliability of the questionnaire, as shown in Figure 4.

In Figure 4, Cronbach’s α of each dimension of the designed questionnaire exceeds 0.7. The data shows that the questionnaire has good consistency and reliability.

3.1.2.2 Validity Analysis

The principal component analysis method in SPSS is used to measure Kaiser Meyer Olkin (KMO) in the questionnaire. Additionally, it is subjected to a Bartlett sphericity test. The validity results of the questionnaire are shown in Table 5.

In Table 5, KMO=0.895>0.7, the significance is 0.000 and less than 0.001. The data indicate that the questionnaire in this paper is suitable for factor analysis. In addition, factor analysis of the questionnaire showed that the load values of different factors in each dimension of the scale are more significant than 0.5. The data show that the designed scale has good validity.
3.2 Model Validation Results and Analysis

3.2.1 Analysis Results of the Structural Equation Model

After the questionnaire data meets the reliability and validity requirements, this paper draws the model’s path in Analysis of Moment Structure (AMOS) 21.0 based on the questionnaire results. The maximum likelihood method is used to test the model, as shown in Figure 5.

In Figure 5, the values of indicators such as the Goodness of Fit Index (GFI), Non-Normal of Fit Index (NNFI), and Parsimony Goodness of Fit Index (PGFI) meet the requirements. Additionally, the Root Mean Square Error of Approximation (RMSEA) value is 0.051, which meets the requirement of no more than 0.08. The data shows that Structural Equation Modeling (SEM) fits well and does not require optimization.

3.2.2 Test Results of Structural Equation Paths

Combining the analysis results of AMOS21.0, the standardized path coefficients of the model are shown in Figure 6.

In Figure 6, the standardized path coefficients of consumer innovation for perceived risk, performance, and effort expectations are -0.092, 0.704, and 0.504, respectively. The standardized path coefficients of performance expectation, effort expectation, and perceived risk on satisfaction are 0.475, 0.33, and -0.012, respectively. The standardized path coefficients of sustained use behavior are 0.248, 0.091, 0.417, 0.177, and 0.279, respectively. The standardized path coefficient of perceived risk versus usage behavior is -0.152. The data shows that all 12 hypotheses proposed are valid.
Figure 5. Model fitting

Figure 6. Statistical results of standardized path coefficients of the model
4. DISCUSSION

4.1 Analysis and Summary of Research Results

1. **Standardized Path Coefficients of Consumer Innovativeness on Perceived Risk, Performance Expectancy, and Effort Expectancy:** The path coefficient of consumer innovativeness on perceived risk is negative, indicating that consumers with higher innovativeness have a lower perception of risk. On the other hand, the path coefficients of consumer innovativeness on performance expectancy and effort expectancy are positive, suggesting that innovative consumers place greater emphasis on the performance and effort required in using the electronic banking platform.

2. **Standardized Path Coefficients of Performance Expectancy, Effort Expectancy, and Perceived Risk on Satisfaction:** The path coefficients of performance expectancy and effort expectancy on satisfaction are positive. This indicates that higher performance and effort expectancy levels lead to increased satisfaction with the electronic banking platform. However, the path coefficient of perceived risk on satisfaction is close to zero, suggesting that perceived risk has minimal impact on satisfaction.

3. **Standardized Path Coefficients of Performance Expectancy, Effort Expectancy, Social Influence, Convenience, and Satisfaction on Continuance Intention:** Performance expectancy, effort expectancy, social influence, and satisfaction on continuance intention are positive. This indicates that improvements in performance expectancy, effort expectancy, social influence, and satisfaction with the electronic banking platform will encourage users to continue using the platform. Similarly, the path coefficient of convenience on continuance intention is positive, indicating that platform convenience significantly influences users’ continuance intention.

4. **Standardized Path Coefficient of Perceived Risk on Usage Behavior:** The path coefficient of perceived risk on usage behavior is negative, suggesting that higher perceived risk of the electronic banking platform is likely to affect users’ usage behavior.

4.2 Strategies and Recommendations

Based on the research findings, commercial banks can adopt the following strategies to enhance user’ usage behavior and satisfaction with the electronic banking platform: provide innovative features and services to meet the needs of innovative users; improve performance and user experience to reduce usage expectations; strengthen security measures to lower users’ perceived risk; enhance social influence to facilitate user communication and sharing; offer convenient services and features to increase user satisfaction; address issues promptly and make necessary improvements to enhance user loyalty. By implementing these strategies, commercial banks can enhance users’ continuance intention, promote the development of the electronic banking platform, and improve user satisfaction.

5. CONCLUSION

Due to the continuous popularization of e-learning technology and the vigorous development of mobile communication technology, e-banking has become the main tool for commercial banks to obtain new customers in the current mobile internet era. Therefore, to study the role of the UTAUT model in adopting e-learning technology, this paper constructs a theoretical model suitable for studying the current development capacity of the e-banking business. The survey questionnaire is used to conduct empirical research on the existing electronic banking business. Among all factors that affect user behavior, the average value of perceived risk factors is the highest, at 4.13. The data shows that users focus on the technical risks of electronic banking.

In addition, there are potential limitations and sources of bias that need to be considered in this paper. Firstly, the research sample is limited to 200 electronic banking platform customers from a specific commercial bank, which may result in insufficient representativeness and an inability to fully
reflect the characteristics and opinions of the entire population of electronic banking users. Therefore, the research findings may lack broad applicability and generalizability. Secondly, the survey in this paper is conducted online, which may introduce self-selection bias. Only participants willing to participate in online surveys can provide data. In contrast, those unwilling or unable to participate are excluded, potentially introducing sample selection bias. Furthermore, since this paper employs a self-report questionnaire survey method, respondents’ answers may be influenced by social desirability bias. Participants may be inclined to provide answers that align with social expectations rather than their true attitudes and opinions. This may lead to data distortion and deviation in results. Lastly, the scale used in this paper is designed based on previous research and the researchers’ understanding, which may have limitations in the scale itself. The scale design may not fully cover all possible factors and dimensions, affecting variables’ accurate measurement and analysis.

In conclusion, this paper has certain limitations and potential sources of bias regarding sample selection, survey methods, and scale design. It is important to consider these limitations and potential biases in future research when interpreting and applying the research results. Additionally, integrating other research methods and data for comprehensive analysis will lead to more comprehensive and reliable conclusions. This paper aims to provide ideas for optimizing the development strategy of e-learning technology through e-banking.
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