

Bridging the digital financial divide: The relationship between chinese farmers' e-commerce adoption intentions and financial literacy



Jing Hua Zhu^{ab}  | Suhaila Abdul Hanan^a  | Khai Lin Chong^{ac} 

^aSchool of Technology Management and Logistics, UUM College of Business, Universiti Utara Malaysia, 06010 UUM Sintok, Kedah, Malaysia.

^bHunan Mechanical & Electrical Polytechnic, Changsha, Hunan, 410151, China.

^cDisaster Management Institute, School of Technology Management and Logistics, Universiti Utara Malaysia, 06010 Sintok Kedah, Malaysia.

Abstract This study explores the relationship between Chinese farmers' digital financial literacy and their intention to adopt e-commerce in agricultural business. Convenience sampling was used to collect data from 310 farmers in Loudi City, Hunan Province. The data were analyzed using Smart PLS 3 software, and the study found that knowledge of digital financial products, understanding of financial risks, financial control capabilities, and awareness of consumer rights significantly drive farmers' intentions to adopt e-commerce. Additionally, the study revealed the moderating role of convenience conditions. These findings have important policy implications for enhancing the e-commerce adoption intention among Chinese farmers and contribute new theoretical perspectives to the literature.

Keywords: Digital financial literacy, agriculture business, e-commerce, Chinese farmers

1. Introduction

The advancement in e-commerce has opened new gateways for people to start their businesses (Su et al., 2021). Students and homemakers have their businesses on e-commerce stores, which allow them to target a large number of people. E-commerce stores facilitate the digital transaction of money from one point to another. Furthermore, the digitalization of e-commerce aids in achieving organizational goals (Wang & Zhang, 2023). Strategic improvements in e-commerce have enhanced the way financial transactions are conducted, thus making it more convenient for people to start their businesses on e-commerce platforms. Large e-commerce platforms such as Amazon, Alibaba, and Shopee exist (Yu & Xiang, 2021). However, in different countries, many other local-level platforms are also available for selling products online. Advances in technology and internet access have revolutionized the traditional business model. People living in remote areas also have access to e-commerce stores, which are critical for economic development (Han & Li, 2020).

Farmers in China traditionally sell their agricultural products. Some of them have access to e-commerce stores, some of them have access to e-commerce stores, where managers handle store operations (Wei & Ruan, 2022). This change in farmers' behavior significantly aids in achieving organizational goals. Awareness of business development in e-commerce is crucial for farmers to expand into new market horizons (Li et al., 2023). Having access to reliable e-commerce information is crucial for improving business standards. On the other hand, farmers in the USA and UK are working to sell their products on e-commerce platforms, which are crucial for business development (Liu et al., 2021). The successful integration of e-commerce for agricultural products benefits the economic development and prosperity of farmers. Thus, farmers require new strategies for selling their products on e-commerce platforms (Jabbouri et al., 2023).

Chinese farmers also face challenges related to business development, which are crucial to the stability of business development (Li et al., 2022). Awareness of financial management on digital platforms is essential for farmers' development in the Chinese market. The successful development of farmers and their business advancement are crucial for strategic business improvements (Yang et al., 2021). The reliability of farmers' digital financial information can ensure improved behavior in digital business. The government of China has introduced many policies for sustainable business development among farmers; however, little emphasis has been placed on their emotional stability (Xie et al., 2020). Therefore, the reliability of policies and farmers' digital financial literacy are viewed as key to enhancing their behavior. However, highly motivated farmers must succeed in e-commerce to develop their business in the market (Song et al., 2023). Scholarly discussions have identified a clear research gap in understanding the impact of farmers' digital financial literacy on their e-commerce adoption (Havemann et al., 2022). According to Nasereldin et al. (2023), comprehensively measuring the impact of farmers' financial literacy on their e-commerce adoption in the changing global environment is necessary. This research focuses on the digital literacy of farmers in



China, as they can contribute to the social, cultural, and economic values of the country. Although the existing studies in literature contributed to scholarly discussion, but there is research gaps regarding the relationship between knowledge of digital financial products & services, risks, risk control and consumer rights and redress procedure and e-commerce adoption intention among farmers. Therefore, it was imperative to conduct a research which could benefit for the digital literacy of farmers in China (Gong et al., 2024; Zhao et al., 2022).

The objective of this research is to determine the relationship between farmers' level of digital financial literacy and their intention to adopt e-commerce in agricultural business in China. The study was based on a sample of 310 respondents collected from Loudi City, Hunan, China. Data were collected using convenience sampling, and Smart PLS 3 was utilized for data analysis. The study identified knowledge of digital financial products, financial risks, financial control, and consumers' rights as significant antecedents of farmers' e-commerce adoption intentions in China. The study also revealed novel findings about the moderating role of convenience conditions. This research makes a significant contribution to the body of knowledge. The study makes significant contributions to existing literature, addressing previous inconsistencies regarding the relationship between digital financial literacy and farmers' intentions to adopt e-commerce. From a practical perspective, the policy implications of this research are crucial for improving farmers' intentions to adopt e-commerce in China. The rest of the study is divided into the review of literature, the research methodology, data analysis, findings, implications, and future directions.

2. Review of Literature

The previous studies highlight the significant role of digital financial literacy in the agricultural sector's adoption of e-commerce technologies. The research Daroshka et al. (2022) emphasize that the effective use of online financial services in agriculture depends pointedly on digital financial literacy, which provides farmers and agribusiness owners with the necessary skills to access and utilize these platforms efficiently. Align with these findings, the research Nasereldin et al. (2023) discussed that the financial literacy fundamentally strengthens farmers' capabilities to manage digital payments, comprehend online transactions, and make use of e-commerce platforms for buying and selling products. In addition to it, Adegbite and Machethe (2020) discussed that better way of promoting digital literacy among farmers can reduce barriers to participation and increase confidence in using digital tools. While, another research Rabbani et al. (2021) asserted that the decision to implement e-commerce solutions within the agricultural industry is strongly affected by the level of digital financial literacy among farmers. In addition to it, the research Havemann et al. (2022) suggests that digital financial literacy directly affects how farmers perceive the ease and benefits of integrating digital solutions into traditional farming operations. By the discussion of aforementioned studies, it is found that advancing digital financial literacy is not only beneficial but essential for modernizing agricultural practices and support economies.

Digital services are essential for enhancing business stability in e-commerce (Wang et al., 2022). Advancements in digital products are helpful in achieving organizational goals. Business stability and market advancements are crucial for the proper development of the business (Akudugu et al., 2023). Financial literacy enables individuals to understand the transactions and profit margins on digital platforms. Digital platforms generate profit when store owners have the requisite financial management skills (Bontsa et al., 2023). E-commerce reliability improves with smooth financial transactions on business platforms. Consequently, awareness of e-commerce business practices is enhanced by acquiring information on digital financial stability and management (Liu et al., 2021).

H1: There is a relationship between knowledge of digital financial products and services and e-commerce adoption intention.

Financial risks are invariably associated with all businesses, including e-commerce stores (Yu & Xiang, 2021). E-commerce stores are developed to access broader markets; however, it is essential to evaluate business risks early in the process (Chen et al., 2023). Digital advancement enables reliable financial control and facilitates business development. Stable business management in e-commerce is achievable through enhanced reliability (Bai et al., 2023). Consequently, fostering awareness among individuals involved in digital business is crucial for stable business improvement. Mastery of financial control is essential for effective management of an e-commerce business (Omega et al., 2022).

H2: There is a relationship between knowledge of digital financial risks and e-commerce adoption intention.

Awareness of financial control significantly enhances business practices (Li et al., 2023). This awareness helps them mitigate potential losses in their e-commerce ventures. Digital financial control enhances both the success and reliability of e-commerce businesses (Han & Li, 2020). These financial services effectively control various risks. Business management stability is achievable with digital control, paving the way for improved business practices (Xie et al., 2020). Financial management teams in e-commerce operations must employ modern methods of digital control and management (Wei & Ruan, 2022).

H3: There is a relationship between knowledge of digital financial control and e-commerce adoption intention.

Successful e-commerce development also relies on comprehensive knowledge of consumer rights (Jabbouri et al., 2023). This approach ensures the delivery of high-quality products to consumers. Developing reliable consumer engagement strategies is essential for achieving organizational goals (Wang & Zhang, 2023). Maintaining stability via digital financial control is a proven method for achieving key organizational goals. Awareness of consumers' rights in business helps store owners

develop appropriate strategies (Xiaokang Li et al., 2021). Significant enhancements in e-commerce stores facilitate the achievement of organizational goals (Xiao et al., 2022).

H4: There is a relationship between knowledge of consumer rights and redress procedures and e-commerce adoption intention.

Convenience conditions are regarded as vital factors for business development (Su et al., 2021). With accurate information on digital financial products and services, a suitable working mechanism can be developed to enhance e-commerce operations, the appropriate working mechanism can be developed to improve the e-commerce stores. Therefore, reliable financial information and improvements in the working mechanism aid digital financial control and awareness (Yang et al., 2021). Stability in business improvement and awareness of digital finances reliably foster a positive perception of online business development (Septiani et al., 2020). Conditions for online business development are critical and strategically vital for enhancing the business (Wang & Yang, 2021).

H5: There is a moderating role of convenience conditions on the relationship between knowledge of digital financial products and services and e-commerce adoption intention.

Convenience conditions in digital financial risk management effectively shape the narrative for online business (Li et al., 2022). Stability in online business can be achieved when appropriate financial control mechanisms are developed. Convenient and reliable working conditions help store owners develop their business more effectively (Bratha et al., 2022). The reliability of working conditions in e-commerce improves with accurate information about their management. Strategic business improvements are possible with stability and advancements in characteristics (Han et al., 2022). Convenience conditions for business management effectively aid in achieving organizational goals (Yap et al., 2023).

H6: There is a moderating role of convenience conditions on the relationship knowledge of digital financial risks and e-commerce adoption intention.

Reliable digital financial control is essential for shaping the behavior of digital businesses (Song et al., 2023). Awareness of online platforms for digital financial control is vital for the sustainable development of businesses (Xiaokang Li et al., 2021). Establishing improved business practices enhances awareness and facilitates the achievement of organizational goals. Stability in business management and the provision of appropriate resources are crucial to properly running the e-commerce store (Bai et al., 2023). Therefore, enhanced knowledge of financial control facilitates improved practices in online business (Yan & Liu, 2022).

H7: There is a moderating role of convenience conditions on the relationship knowledge of digital financial control and e-commerce adoption intention.

Awareness of customer rights is crucial for successful business development (Bontsa et al., 2023). Standardized improvements in business practices can be achieved when essential information on business sustainability is available (Omega et al., 2022). Thus, prioritizing customer rights helps establish strong branding for the online business in the market (Xiaojing Li et al., 2021). This strategy also improves the relationship between customers and online business management (Akudugu et al., 2023). Consequently, convenient conditions are crucial for strategically developing online business (Chen et al., 2023).

H8: There is a moderating role of convenience conditions on the relationship knowledge of consumer rights and redress procedures and e-commerce adoption intention. The research model is shown in Figure 1.

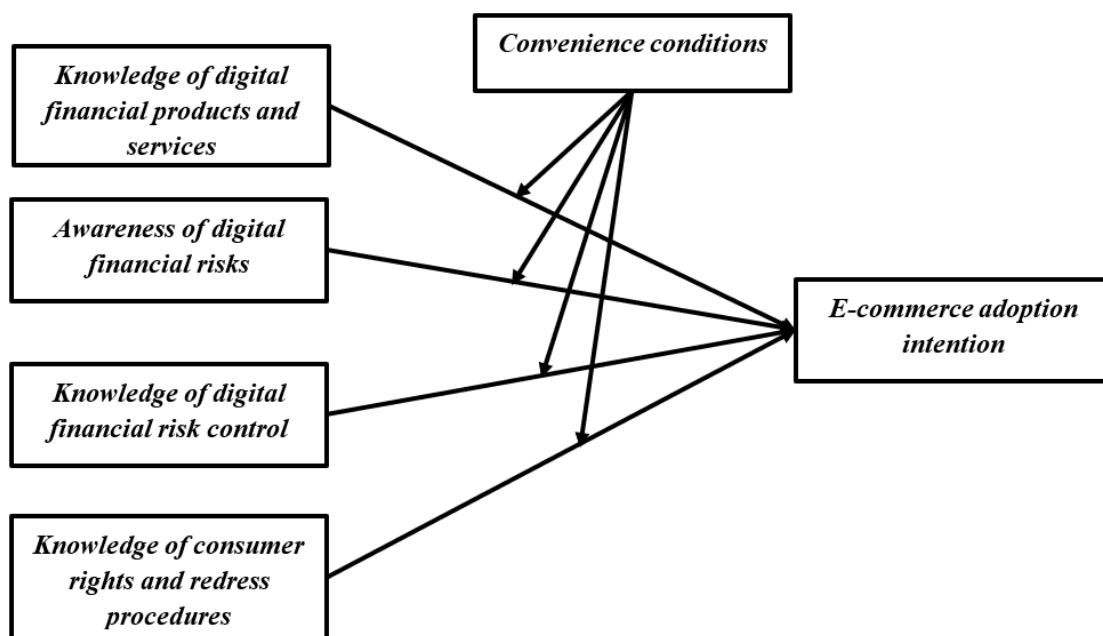


Figure 1 E-commerce Adoption Intention Model.

3. Methodology

The population for this research consisted of farmers targeted in Loudi City, Hunan. There are non-profit organizations working in Loudi City to organize digital financial literacy and e-commerce related training for the farmers. It was easy to collect data by visiting the training of farmers by these organizations. Furthermore, Chinese farmers were selected as the population because the findings of the study were generalized to them. In accordance, the digital literacy of the farmers was investigated in this study, thus they were significant population of the study. The previous research Gong et al. (2024) also collected data from farmers while measuring their digital financial literacy. Consent from these organizations and farmers was obtained before data collection. In the training sessions, farmers from various regions participated, providing the data. These respondents (farmers) were considered qualified because they possessed knowledge about digital financial literacy and e-commerce. These farmers were contacted using a convenience-based sampling method to collect the data. This sampling method was used because there was no influence on the farmers to provide the data. The convenience of the farmers was considered a top priority before data collection. Furthermore, this sampling method was used without any bias for collection of data. It was ensured that no personal interest of the researchers were involved in the data collection process. It was ensured that they provided valid data according to the study's findings. Cross-sectional data were collected using a survey-based approach, reliable for measuring research findings. The respondents of the study (farmers) were informed about the purpose of study before data collection. They were also ensured that their personal data would not be used for this research only. Although the participants of the study were human, but no data about their medical health was concerned. This study only collected data measuring the human perception and behaviour. A total of 400 questionnaires were distributed to the respondents for the collection of data. However, responses were collected from 310 respondents. This study employed a Likert scale to collect the data to measure the relationship between the variables. Scale items measuring the relationship between variables were sourced from previous studies in the literature (Dongsheng & Yulian, 2021; Liew et al., 2020). The scale items used were considered reliable, as validated by previous studies assessing Cronbach's alpha. According to Sekaran (2009), when Cronbach's alpha exceeds 0.70, the scale is considered appropriate for further research. No pilot study was performed in this research as the scale items were validated with significant thresholds.

The study employed Smart PLS 3 to analyze the data. The Partial Least Squares – Structural Equation Modeling (PLS-SEM) was used to test the findings. This tool is significant any used by the previous studies (Murad et al., 2024). The results from the measurement model and structural model assessments informed the findings. Therefore, this research utilized calculations from the PLS Algorithm and PLS Bootstrapping. This study also collected the demographic information of the respondents. 10% of respondents were aged 18–25 years, 47% 26–45 years, 26% 36–40 years, and 18% were above 40 years. Furthermore, 69% of respondents had a diploma, 29% had graduated, and 1% were uneducated. Accordingly, 12% of respondents had been familiar with e-commerce for less than one year, 52% for 1–3 years, and 36% for more than three years. Finally, 21% of respondents had been in the agriculture business for less than three years, 44% for 3–5 years, and 35% for more than five years. The demographic information is reported in Table 1.

Table 1 Demographic Information.

Variable	Level	Proportion
Age	18 – 25 Years	10%
	26 – 35 Years	47%
	36 – 40 Years	26%
	Above 40 Years	18%
Level of Education	Diploma	69%
	Graduation	29%
	Non-Educated	1%
How long have you known e-commerce?	Less than 1 year	12%
	1 – 3 years	52%
	More than 3 years	36%
How long have you been in the agriculture business?	Less than 3 years	21%
	3 – 5 years	44%
	More than 5 years	35%

3.1. Data Analysis and Findings

The findings of this research were analyzed using descriptive statistics. The results of descriptive statistics were obtained after entering data into Smart PLS 3. The normality of data distribution was assessed by measuring skewness and kurtosis. Skewness is considered significant when the values range from -2 to +2 (Royston, 1992). However, kurtosis is considered significant when the values range from -7 to +7. The skewness and kurtosis values reported in Table 2 confirmed that the descriptive data of this study were significant. Furthermore, missing values were tested, and the analysis confirmed that no



missing values were present in the data. Consequently, the data for this research were considered appropriate for further analysis.

Table 2 Descriptive Statistics.

No.	Items	Missing	Mean	Standard Deviation	Excess Kurtosis	Skewness
1	KDFPS1	0	3.345	1.142	-0.949	-0.105
2	KDFPS2	0	3.274	1.169	-1.023	-0.024
3	KDFPS3	0	3.316	1.195	-1.147	-0.083
4	KDFPS4	0	3.423	1.169	-1.199	-0.153
5	ADFR1	0	3.352	1.162	-1.159	-0.033
6	ADFR2	0	3.348	1.134	-1.077	-0.061
7	ADFR3	0	3.403	1.168	-1.081	-0.131
8	ADFR4	0	3.39	1.153	-1.167	-0.118
9	ADFR5	0	3.397	1.197	-1.154	-0.134
10	KDFRC1	0	3.371	1.167	-1.132	-0.071
11	KDFRC2	0	3.471	1.126	-1.018	-0.24
12	KDFRC3	0	3.477	1.215	-1.189	-0.208
13	KDFRC4	0	3.465	1.185	-1.101	-0.225
14	KCRRP1	0	3.432	1.125	-1.08	-0.131
15	KCRRP2	0	3.371	1.167	-1.154	-0.12
16	KCRRP3	0	3.39	1.172	-1.06	-0.217
17	KCRRP4	0	3.474	1.199	-1.032	-0.3
18	CC1	0	3.71	1.172	-0.777	-0.53
19	CC2	0	3.629	1.184	-0.957	-0.363
20	CC3	0	3.697	1.152	-0.855	-0.443
21	EAI1	0	3.284	1.235	-1.213	-0.058
22	EAI2	0	3.342	1.21	-1.243	-0.022
23	EAI3	0	3.381	1.212	-1.294	-0.042"

It is important to investigate common method variance in the data. This study tested for common method variance using Harman’s Single-Factor Assessment approach. Jakobsen and Jensen (2015) recommended that a result of the extraction sum of squared loadings less than 50% is acceptable for ensuring no bias in data and findings. The results reported in Table 3 confirmed that the cumulative percentage is less than 50%. Hence, the data were considered suitable for further analysis.

Table 3 Harman’s Single-Factor Assessment.

Extraction Sums of Squared Loadings		
Total	% of Variance	Cumulative %
19.254	31.411	31.411

The findings from PLS Algorithm calculations were used to assess the reliability of individual items. This reliability was confirmed by conducting a measurement model assessment, as reported in Figure 2. The factor loadings for each item were tested to confirm the reliability of individual items. A factor loading value above 0.50 is considered significant for data analysis (Hair et al., 2010). The results reported in Table 4 confirmed that all item factor loadings exceeded 0.50. Hence, the reliability of individual items was established. Therefore, the data were considered suitable for further analysis.

Convergent validity was assessed to measure the reliability of the construct. Internal consistency among the items was assessed using Cronbach's alpha and composite reliability. Both Cronbach's alpha and composite reliability values exceeded 0.70, considered a significant threshold (Cronbach, 1949; Peterson & Kim, 2013). Furthermore, variance in the data was confirmed with an average variance extracted (AVE) threshold greater than 0.50 (Alarcón et al., 2015). Convergent validity findings reported in Table 5 confirmed significant variance among the data.

Additionally, multiple collinearity issues were also assessed in the data. This research confirmed multiple collinearities using the Heterotrait-Monotrait (HTMT) ratio. An HTMT ratio less than 0.85 is considered below the significant threshold (Henseler et al., 2015). The results reported in Table 6 confirmed significant findings related to multiple collinearity issues in this research. Results in Table 5 confirmed that the HTMT ratios for all constructs were below 0.85. Hence, this research data demonstrate significant discriminant validity.

Finally, PLS Bootstrapping calculations were considered for the analysis of data. The results of t-values above 1.96 were considered significant for the acceptance of the hypothesis (Hair et al., 2011). The results of the structural model assessment are reported in Figure 3. The study found that H1 was accepted and there is a significant relationship between knowledge of digital financial products and services and e-commerce adoption intention. The study further determined that H2 was accepted and there is a relationship between knowledge of digital financial risks and e-commerce adoption intention. Meanwhile, the study found that H3 was accepted, and there is a relationship between knowledge of digital financial control and e-commerce



adoption intention. Finally, the study found that H4 was accepted, and there is a relationship between knowledge of consumer rights and redress procedures and e-commerce adoption intention. The results of direct relationships are reported in Table 8.

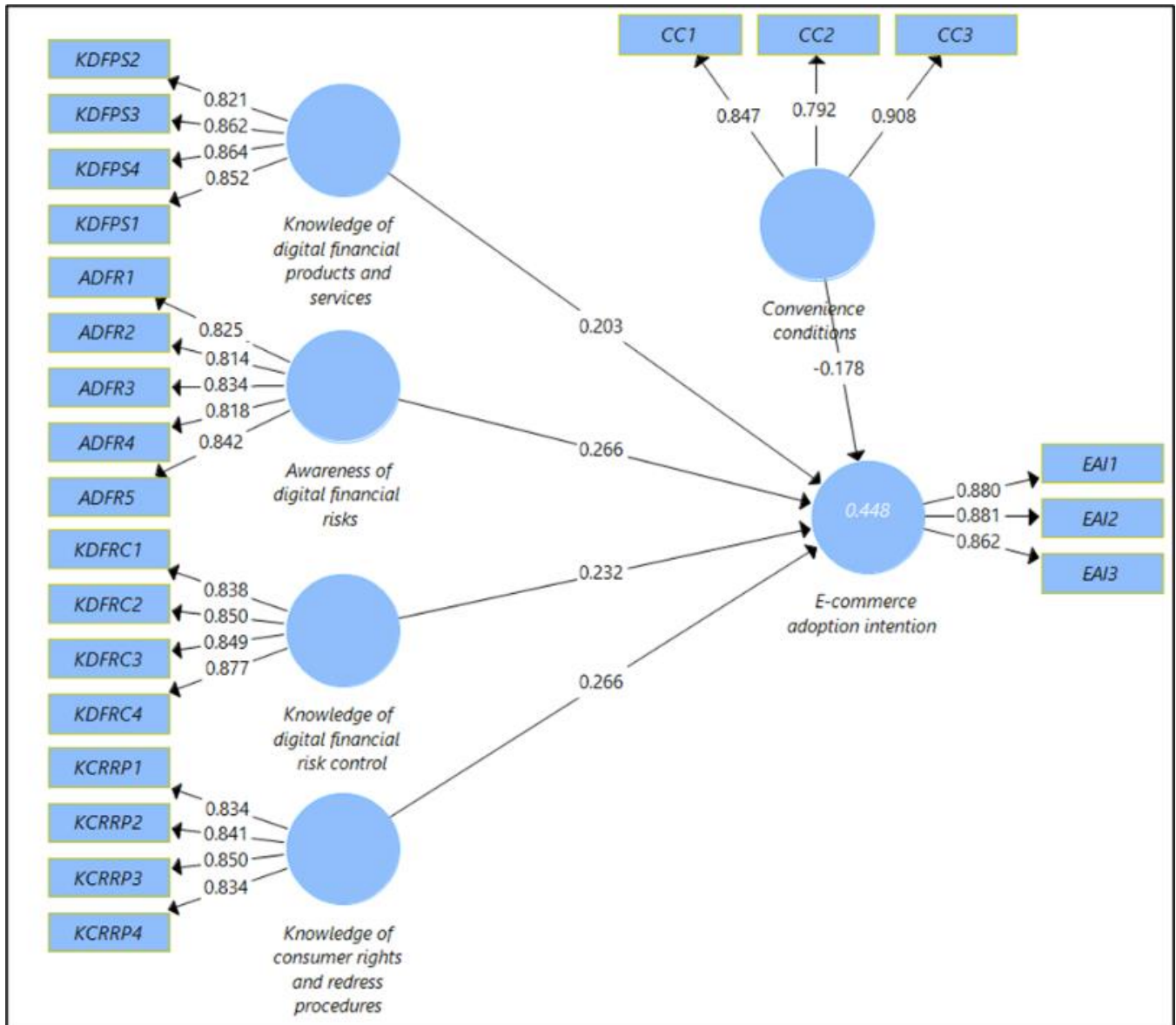


Figure 2 Measurement Model Assessment.

Similarly, the findings of cross-loadings were also tested to measure the discriminant validity. The cross-loadings are tested to confirm the data of this research's significant discriminant validity at the individual item level. The findings reported in Table 7 confirmed that the cross-loadings were significant because the loadings of the items were greater than the other items that are correlated with them. Hence, the study confirmed that there were no multicollinearity issues in the data, even at the individual level. Hence, the data was considered significant for further analysis.

Furthermore, the findings of moderating relationships were also tested. The significant threshold for acceptance of a moderating relationship was also 1.96. The results of moderating relationships are reported in Table 10. The study found that H5 was accepted, and there was a moderating role of convenience conditions on the relationship between knowledge of digital financial products and services and e-commerce adoption intention. The study confirmed that an improvement in convenience conditions strengthens the relationship between knowledge of digital financial products and services and e-commerce adoption intention (see Figure 4).

Table 4 Individual Items Reliability.

Variables	Items	Scale Items	Factor Loadings
Awareness of digital financial risks	ADFR 1	I am aware that a hacker may pretend to be institution to get the user to reveal personal data.	0.825
	ADFR 2	I am always conscious about my bank accounts and transactions.	0.814
	ADFR 3	I am aware that a virus may redirect the user to a false page to get the user to reveal personal data.	0.834
	ADFR 4	I try to hide my personal data and information behind a firewall.	0.818
	ADFR 5	I am aware that malicious software maybe inserted into the user's PC or mobile	0.842
Convenience conditions	CC1	I think our village has perfect network facilities.	0.847
	CC2	I think our village has perfect logistics facilities.	0.792
	CC3	I think our village has perfect road facilities.	0.908
E-commerce adoption intention	EAI1	I would like to encourage people around me to adopt ecommerce.	0.88
	EAI2	I think adoption of e-commerce benefits a lot.	0.881
	EAI3	I am willing to adopt e-commerce.	0.862
Knowledge of consumer rights and redress procedures	KCRR P1	I know my rights as a user of digital financial products and services.	0.834
	KCRR P2	I know where I can lodge a report if I fall victim to fraud when using financial products through digital means.	0.841
	KCRR P3		0.85
	KCRR P4	I know how to obtain redress if I fall victim to fraud.	0.834
Knowledge of digital financial products and services	KDFP S1	I am capable of using e-wallet.	0.852
	KDFP S2	I am capable of using online banking.	0.821
	KDFP S3	I am capable of using online stock trading.	0.862
	KDFP S4	I am capable of using internet-based insurance services.	0.864
Knowledge of digital financial risk control	KDFR C1	I know how to use computer programs to avoid spamming, phishing, etc.	0.838
	KDFR C2	I know how to use mobile apps to avoid spamming, phishing, etc.	0.85
	KDFR C3	I know how to protect my personal identification number (PIN).	0.849
	KDFR C4	I know how to protect my personal information when using digital financial"	0.877

Table 5 Convergent Validity.

Variables	Cronbach's Alpha	Composite Reliability	Average Variance Extracted
Awareness of digital financial risks	0.884	0.915	0.683
Convenience conditions	0.817	0.886	0.723
E-commerce adoption intention	0.846	0.907	0.764
Knowledge of consumer rights and redress procedures	0.861	0.905	0.705
Knowledge of digital financial products and services	0.872	0.912	0.722
Knowledge of digital financial risk control	0.876	0.915	0.729"

However, the study found that H6 was rejected, and there was no moderating role of convenience conditions on the relationship between knowledge of digital financial risks and e-commerce adoption intention. The findings confirmed that H7 was also rejected, and there was no moderating role of convenience conditions on the relationship knowledge of digital financial control and e-commerce adoption intention. Finally, the study confirmed that H8 was significant, and there was a moderating role of convenience conditions on the relationship knowledge of consumer rights and redress procedures and e-commerce adoption intention. The study confirmed that an improvement in convenience conditions strengthens the relationship between knowledge of consumer rights and redress procedures and e-commerce adoption intention (see Figure 5).



Table 6 HTMT.

Variables	Awareness of digital financial risks	Convenience conditions	E-commerce adoption intention	Knowledge of consumer rights and redress procedures	Knowledge of digital financial products and services	Knowledge of digital financial risk control
Awareness of digital financial risks						
Convenience conditions	0.343					
E-commerce adoption intention	0.582	0.155				
Knowledge of consumer rights and redress procedures	0.475	0.445	0.584			
Knowledge of digital financial products and services	0.479	0.364	0.509	0.421		
Knowledge of digital financial risk control	0.479	0.362	0.577	0.577	0.409"	

Table 7 Cross-Loadings.

Items	Awareness of digital financial risks	Convenience conditions	E-commerce adoption intention	Knowledge of consumer rights and redress procedures	Knowledge of digital financial products and services	Knowledge of digital financial risk control
ADFR1	0.825	0.265	0.422	0.362	0.362	0.377
ADFR2	0.814	0.276	0.407	0.313	0.343	0.345
ADFR3	0.834	0.255	0.406	0.31	0.381	0.357
ADFR4	0.818	0.265	0.372	0.366	0.341	0.316
ADFR5	0.842	0.205	0.473	0.367	0.309	0.348
CC1	0.263	0.847	0.111	0.321	0.258	0.258
CC2	0.177	0.792	0.068	0.28	0.238	0.258
CC3	0.302	0.908	0.149	0.359	0.286	0.269
EAI1	0.455	0.099	0.88	0.434	0.4	0.432
EAI2	0.425	0.097	0.881	0.436	0.387	0.442
EAI3	0.448	0.168	0.862	0.442	0.364	0.43
KCRRP1	0.352	0.303	0.392	0.834	0.297	0.36
KCRRP2	0.321	0.329	0.432	0.841	0.282	0.445
KCRRP3	0.323	0.331	0.398	0.85	0.347	0.413
KCRRP4	0.397	0.318	0.451	0.834	0.297	0.464
KDFPS1	0.35	0.258	0.369	0.331	0.852	0.299
KDFPS2	0.334	0.288	0.335	0.318	0.821	0.342
KDFPS3	0.4	0.304	0.372	0.279	0.862	0.292
KDFPS4	0.34	0.209	0.411	0.31	0.864	0.283
KDFRC1	0.369	0.215	0.443	0.42	0.342	0.838
KDFRC2	0.351	0.291	0.418	0.406	0.292	0.85
KDFRC3	0.389	0.283	0.41	0.457	0.327	0.849
KDFRC4	0.332	0.253	0.424	0.436	0.253	0.877"

Table 8 Direct Relationships.

Direct Relationships	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values	Results
Knowledge of digital financial products and services -> E-commerce adoption intention	0.145	0.146	0.051	2.833	0.005	Accepted
Awareness of digital financial risks -> E-commerce adoption intention	0.224	0.223	0.051	4.404	0	Accepted
Knowledge of digital financial risk control -> E-commerce adoption intention	0.192	0.191	0.053	3.603	0	Accepted
Knowledge of consumer rights and redress procedures -> E-commerce adoption intention	0.251	0.25	0.055	4.54	0	Accepted"

Meanwhile, the findings of effect size were also determined. According to Cohen (1992), effect size > = 0.02 is small, > = 0.15 is medium and > = 0.35 is large. The study found that the effect of all independent variables was significant and medium on the dependent variable (e-commerce adoption intention). The result of the effect is reported in Table 9.



Table 9 Effect Size.

Variables	E-commerce adoption intention
Awareness of digital financial risks	0.09
Knowledge of consumer rights and redress procedures	0.083
Knowledge of digital financial products and services	0.056
Knowledge of digital financial risk control	0.066"

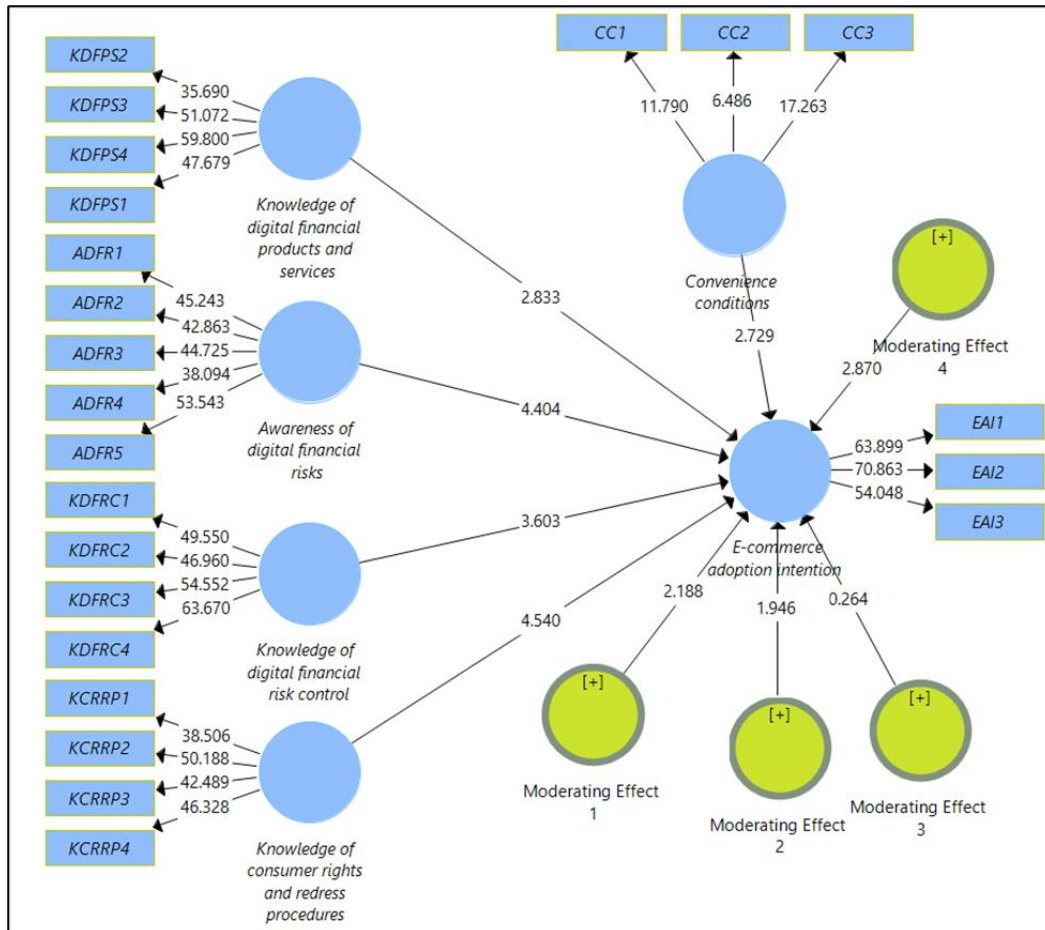


Figure 3 Structural Model Assessment.

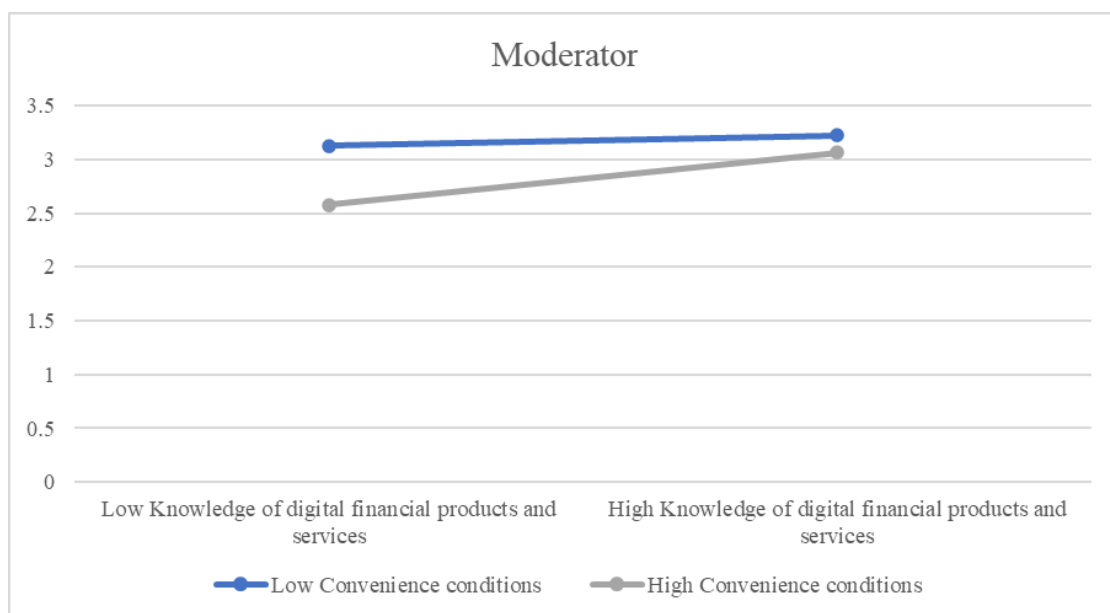


Figure 4 Moderating Effect 1.

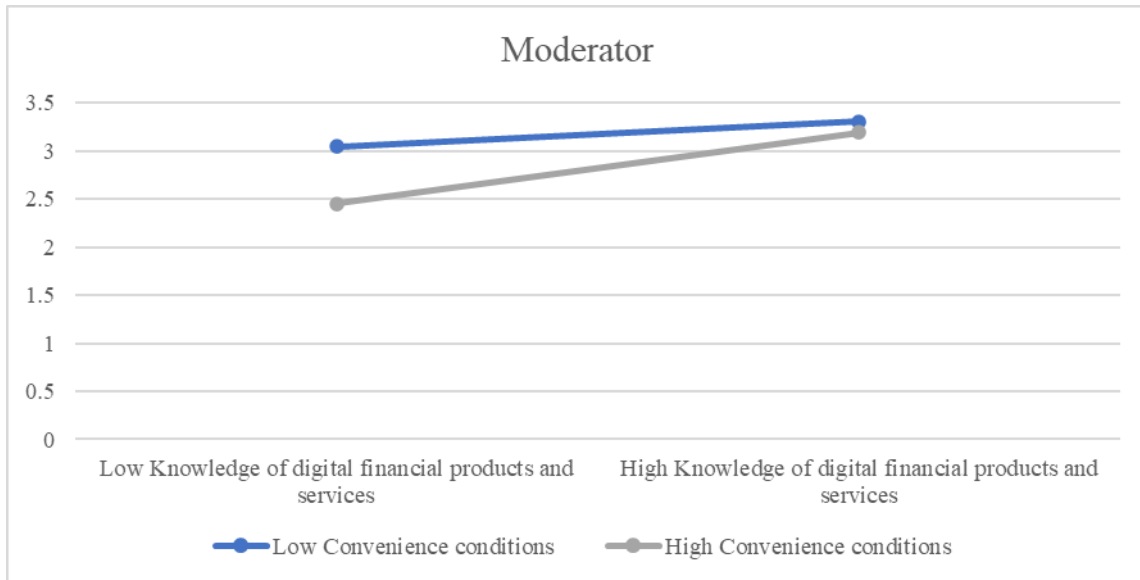


Figure 5 Moderating Effect 5.

Table 10 Moderating Relationships.

Moderating Relationships	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values	Results
Moderating Effect 1 -> E-commerce adoption intention	0.096	0.092	0.044	2.188	0.029	Accepted
Moderating Effect 2 -> E-commerce adoption intention	0.098	0.094	0.05	1.946	0.052	Rejected
Moderating Effect 3 -> E-commerce adoption intention	-0.012	-0.008	0.046	0.264	0.792	Rejected
Moderating Effect 4 -> E-commerce adoption intention	0.12	0.118	0.042	2.87	0.004	Accepted"

4. Discussion

The findings were analyzed using Smart PLS 3. Empirical results showed that six hypotheses were supported, while two were not. These findings were also contextualized within prior research. H1 was accepted, revealing a significant relationship between knowledge of digital financial products and services and e-commerce adoption intention. However, these findings were tested in the context of previous studies. According to Xiao et al. (2022), utilizing digital services is crucial for enhancing business stability in the realm of e-commerce. The progress in digital products is beneficial for attaining organizational objectives. According to Yan and Liu (2022), ensuring stability and progress is essential for a firm's effective market development. Financial literacy is beneficial for anyone seeking to comprehend transactions and assess the profitability of digital platforms. According to Septiani et al. (2020), digital platforms are utilized to generate profits when store owners possess adequate financial management skills. The dependability of e-commerce is further enhanced when the financial transactions occur seamlessly on the company platforms. According to Yap et al. (2023), acquiring knowledge about digital financial stability and management enhances the understanding of e-commerce business.

H2 was accepted, demonstrating a significant relationship between knowledge of digital financial risks and e-commerce adoption intention. However, these findings were tested in the context of previous studies. Financial risks are inherent in all businesses, including e-commerce sites. According to Song et al. (2023), while e-commerce platforms are designed to expand market reach, assessing business risks in advance is crucial. Enhancing financial control and fostering corporate growth can be achieved through the implementation of digital business development. According to Han et al. (2022), digital financial risks are critical when there is working to adopt e-commerce. Whereas the study Akudugu et al. (2023) concluded that financial risks are associated with e-commerce business when there is financial literacy.

The third hypothesis (H3) was based on the relationship between knowledge of digital financial control and e-commerce adoption intention and accepted. The findings were aligned with previous studies. The study Han and Li (2020) discussed that for any business prosperity, the financial control is necessary particularly in online business. Another research by Li et al. (2023) also have same findings discussing the importance of digital financial control practices for influencing the intention of public to use e-commerce platforms. Whereas, another study Xie et al. (2020) concluded that there is need to positively improve e-commerce platforms adoption which helps in business adoption intention.



The findings of H4 confirmed a positive relationship between knowledge of consumer rights, redress procedures, and e-commerce adoption intention. The findings of previous studies also support this relationship. The study by Xiaojing Li et al. (2021) discussed that the rights of the customers have significant value for adoption of e-commerce. While the study Chen et al. (2023) also provide same conclusion by reporting that customer engagement is improved by providing them rights which are necessary for the business performance. Meanwhile, the study Yang et al. (2021) discussed that advancing the consumer rights are necessary to develop effective strategies and reliable way of working for significant performance.

Furthermore, H5 was confirmed, revealing a significant moderating role of convenience conditions on the relationship between knowledge of digital financial products and services and e-commerce adoption intention. These findings were also evaluated against previous studies. The convenience factor is recognized as a crucial determinant of corporate growth. According to Liu et al. (2021), with accurate and trustworthy information about digital financial products and services, it becomes possible to design an effective method to enhance e-commerce establishments. According to Wei and Ruan (2022), the reliability of financial data and the enhancement of operational processes benefit digital financial oversight and awareness. Steadiness in business development, coupled with a robust understanding of digital finances, contributes to a positive image of online business growth. According to Omega et al. (2022), the conditions necessary for the development of internet businesses are crucial as they strategically contribute to enhancing the business more effectively.

H6 was rejected, demonstrating no significant moderating role of convenience conditions on the relationship between knowledge of digital financial risks and e-commerce adoption intention. However, these findings were tested in the context of previous studies. According to Yu and Xiang (2021), the ease of managing digital financial risks benefits the narrative shaping of online businesses. According to Bontsa et al. (2023), ensuring the viability of an online business necessitates the use of suitable measures to establish financial control. According to Su et al. (2021), a favorable environment for company management facilitates the effective achievement of organizational objectives. According to Xiaokang Li et al. (2021), the favorable environment for company management facilitates the effective attainment of organizational objectives. To sum up, it is found that even when conditions are convenient, the awareness of potential digital financial risks remains a deterrent to e-commerce adoption.

H7 was rejected, indicating no significant moderating role of convenience conditions on the relationship between knowledge of digital financial control and e-commerce adoption intention. These findings were also evaluated against previous studies. According to Wang and Yang (2021), the reliability of digital financial control is crucial because it influences the behavior of digital companies. According to Li et al. (2022), enhancing understanding of business processes is crucial for achieving organizational goals. According to Bratha et al. (2022), comprehensive knowledge of financial control benefits the implementation of optimal strategies in online businesses. The rejection of H7 implies that convenience conditions do not significantly alter the impact of knowledge of digital financial control on e-commerce adoption intention. This indicates that regardless of how convenient the conditions are, knowledge about controlling digital financial transactions does not necessarily increase the intention to adopt e-commerce.

H8 was confirmed, demonstrating a significant moderating role of convenience conditions on the relationship between knowledge of consumer rights, redress procedures, and e-commerce adoption intention. However, these findings were tested in the context of previous studies. According to Jabbouri et al. (2023), awareness of customer rights is crucial for a firm's effective growth. Standardized enhancement of company processes can be achieved through readily available information on business sustainability. According to Wang et al. (2022), it is vital to cultivate dependable opportunities to enhance comprehension of online commerce. According to Bai et al. (2023), upholding customer rights is advantageous for cultivating a strong brand presence in the online marketplace.

5. Conclusion

5.1. Theoretical Implications

This research have remarkable theoretical contributions. Firstly, the study contributes a significant correlation between understanding of digital financial products and services and the propensity to adopt e-commerce. Secondly, the study discussed a significant correlation between awareness of digital financial risks and the intention to pursue e-commerce. A substantial correlation between understanding of digital financial management and the intention to use e-commerce was also found and contributed to literature by this research. Furthermore, a notable correlation between understanding consumer rights and redress procedures and the propensity to adopt e-commerce is also supported by this research. However, the previous studies in literature have inconsistencies in findings which are therefore addressed by the current research. The understanding regarding how convenience conditions influence the relationship between e-commerce adoption intentions and their actual use is also supported in this research. Previous studies paid little attention to this variable. The study found that convenience conditions significantly influences the relationship between awareness of digital financial products and services and the intention to use e-commerce. On the other hand, the study also contributes to knowledge that there is no moderating role of convenience conditions between knowledge of digital financial risks and the intent to use e-commerce. Furthermore, no moderation of convenience condition was found between the relationship of awareness of digital financial control and the

intention to use e-commerce. Whereas it emerged that convenience conditions play a crucial role in moderating the relationship between consumer understanding of rights and redress processes and their propensity to use e-commerce.

5.2. Practical Implications

The report offers practical solutions to enhance farmers' e-commerce objectives. The study revealed that farmers' intentions to use e-commerce are enhanced by actively pursuing financial literacy. Enhancing farmers' financial literacy is crucial for increasing their willingness to engage in e-commerce. The study emphasizes the need to develop a digital financial literacy program to enhance farmers' awareness and intentions to engage in e-commerce. This approach is beneficial for enhancing farmers' understanding of e-commerce. The government is obligated and accountable for educating farmers about their e-commerce ventures through digital literacy programs. Advancements in digital financial literacy would help farmers comprehend the intricacies of financial management. Similarly, it is important to create favorable conditions that enhance farmers' strategic thinking and promote progress in their work. Digital literacy is crucial in enabling farmers to reliably and effectively embrace e-commerce. The Chinese government is obligated to conduct seminars aimed at enhancing digital literacy among farmers.

5.3. Future Directions

In summary, the study established that knowledge of digital financial products, financial risks, financial control, and consumers' rights significantly influence farmers' intentions to adopt e-commerce in China. The study also uncovered novel findings regarding the moderating role of convenience conditions. However, this research has limitations that future studies need to address. The study's measurement of relationships between variables was based on recommendations from previous studies. Future studies should explore the moderating role of product market value as a potential replacement for convenience conditions to enrich the literature. Such studies would significantly contribute to the literature. The study's geographical limitation, with samples collected from only one region in China, restricts its generalizability. Therefore, future studies should collect data from various regions to enhance the generalizability of the findings. The moderating role of convenience conditions was confirmed in the relationships between two variables. However, this role was not confirmed in another variable relationship. Consequently, data from diverse regions should be collected to test the consistency of the moderating role of convenience conditions. Another limitation is the use of self-reported data, which can compromise the reliability of the findings. Therefore, future studies are encouraged to further analyze these relationships to contribute new insights to the research.

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Ethical considerations

This study collected data from farmers where no cell or medical related data was collected.

Conflict of Interest

It is stated that there is no conflict of interest between the authors.

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