


Use of Digital Finance Platforms for Personal Finance Management in Rural China: Antecedents and Consequences

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ABSTRACT

This study examined the antecedents and consequences of the use of digital finance platforms to manage personal finance of rural people in China. The conceptual framework of the study was developed from the integration of Unified Theory of Acceptance and Use of Technology, DeLone and McLean Model of Information Systems Success, and perceived risk. This study employed a quantitative approach using a questionnaire survey. A total of 403 valid responses were collected using a multi-stage sampling design. Data were analyzed using the Partial Least Squares Structural Equation Modeling technique with the R plspm package. The study revealed that performance expectancy, effort expectancy, facilitating conditions, and perceived risk significantly influence the use of digital finance platforms among rural people in China, which then led to user satisfaction and net benefits. The research contributed to technology adoption literature in the context of rural people. For practice, the research findings were important to the development of a solid digital finance ecosystem.

KEYWORDS

DeLone and McLean Model of Information Systems Success, Digital Finance Platforms, Perceived Risk, Unified Theory of Acceptance and Use of Technology

INTRODUCTION

China has taken a leading position of digital finance in the world with more than 680 million online Chinese population and over twelve trillion Renminbi (RMB) digital finance market size in year 2015 (Ngai et al., 2016). The Chinese government considers digital finance as a crucial instrument for attaining inclusive finance (Zhou et al., 2015). Inclusive finance encompasses the use of formal financial services, and promotion of inclusive finance is a critical financial project and policy of the Chinese government in recent years (Chinese State Council, 2015). To achieve financial inclusion, the Chinese government pays close attention to digital finance as it enables provision of formal financial

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services to the under-served segments with an affordable and convenient way (Chen & Yuan, 2021). Rural people are one of the six target segments of China's Plan for Advancing the Development of Financial Inclusion (2016-2020) for improving the availability, satisfaction and quality of financial products and services.

Digital finance comprises the novel financial products, financial-related software and innovative forms for interaction and communication of financial customers, and enables users to make payments, investments, and savings via the Internet instead of visiting the physical facilities (Gomber et al., 2017). In China, various digital finance platforms are available for users to perform financial transactions for personal finance management such as online investment platform - Yu'e Bao, third party payment platform - Alipay, WeChat Pay, Internet-based lending and wealth management platform - Lufax, and peer-to-peer (P2P) lending platform - Renrendai, among others. These digital finance platforms allow users to perform financial transactions such as making payment, saving money, trading stock, lending and borrowing money, and purchasing funds and insurance. Some of the platforms even enable investors with very small amount of money (e.g., RMB1) to purchase funds and receive yield every day (i.e., Yu'e bao).

Despite a strong economic and household income growth in rural China, the consequential increase in the demands for personal finance management among rural people through traditional financial institutions is still underserved due to unbalanced allocation of financial resources between urban and rural China (Cao, 2016). Notable reasons include insufficient financial capital provided (Luo & Gao, 2012), difficulties in meeting credit requirement by rural people (Zhao, 2016), risk in credit assessment (Yu & Xiang, 2021), and a lack of viable market opportunities and institutional barriers (Tan et al., 2021). As such, innovative digital finance allows rural people to enjoy financial services with low-entry barrier (Claessens et al., 2002), ease of use (Abroud et al., 2015), lower unit transaction costs, improved efficiency of financial transactions (He & Li, 2020) and without the geographical restrictions (Li, 2016; Malady, 2016). The growth of digital finance in rural China is evident by the increased number of digital payments in the rural areas from RMB 160 billion in 2017 to RMB 309 billion in 2018, an amount that is approaching that of the urban areas (Chen & Yuan, 2021). Prior empirical studies on digital finance are mostly conducted in the urban areas where people have better access to digital technology and higher financial literacy (Yang et al., 2020). Despite its importance, research on determinants of digital finance in rural China is largely focused on e-commerce development (Su et al., 2021; Yu & Xiang, 2021) and personal characteristics (Ren et al., 2018). Whereas the consequence of digital finance is mainly concentrated on agricultural production (Liu et al., 2021) and household consumption (Yu et al., 2021). Previous studies examining the determinants and consequences of the use of digital finance by rural people in an integrated framework is scarce.

Drawing on the technology acceptance theories and prior research findings, this study focuses on the use of digital finance platforms among rural people in China. This study is expected to provide important contributions as it integrates two theories (i.e., UTAUT and D&M Model) and perceived risk into a single research framework to better explain the antecedents and the consequences of the use of digital finance platforms to manage personal finance among rural people in China. Besides, it potentially provides practical insights into the use of digital finance platforms to promote financial inclusion of rural people in China. The research context of this study is rural people as they are one of the under-served segments for financial inclusion in China.

The paper is structured as follows. Next section reviews the relevant literature and develops the research hypotheses. It is followed by a description of the research method adopted in this study. Then the results and the discussion are presented. The final section concludes the research by discussing the implications for theory and practice, the limitations, and the recommendations for future research.

LITERATURE REVIEW

Personal Finance Management in Rural China

Personal finance management (PFM) is about managing financial resources to meet short-term and long-term financial goals of an individual (Keown, 2013). Garman and Forgue (2011) define PFM as managing individual's and family's important resources to achieve financial success, which includes making decisions on spending, saving, protecting, and investing in financial resources. Individuals also perform financial planning and budgeting, pay income tax, repay credit cards, and perform other personal financial activities.

The Chinese government defines rural China as the areas that are not included in the cities and towns and may contain market towns and villages (National Bureau of Statistics of China, 2008). Liu (2018) indicates that even though the income for rural people is growing significantly in past decades, the financial literacy and financial awareness among the rural people are still very low. Specifically, a laggard development of rural financial market, limited credit financing channels, and defective social security system are the main issues leading to the inferior personal finance management circumstance in rural China (Zhang, 2017; Zhou et al., 2015). Yao (2013) depicts that, a comprehensive study on the demands, current status and constraints of the personal finance management in rural China, is one of the important steps to optimize the current unsatisfactory situation.

Use of Digital Finance and Digital Finance Platforms in Rural China

Digital finance refers to digitization of products and services in financial industry (Gomber et al., 2017). It can also be described as "Internet finance" (Barbesino et al., 2005) or an earlier synonym called "e-finance" (Gattenio, 2002). A digital finance platform is described as a platform that supports the functions of digital finance and provides financial products and services to the public in a digitalized form via mobile phone, the Internet, and other electronic channels and devices (Hu & Zheng, 2016). Five major business models of digital finance platforms currently exist in China are internet-based traditional financial services (e.g., online banking, stock trading and sales of financial products offered by traditional banks), third-party payment (e.g., Alipay and WeChat Pay), peer-to-peer (P2P) lending (e.g., Renrendai) and online crowdfunding (e.g., Jingdong crowdfunding), internet virtual currency (e.g., digital renminbi or e-CNY), and supply chain finance (for B2B only) (Zhu et al., 2016; Zong & Zhu, 2014).

Among the many digital finance platforms available in rural China, two giants – JD.com and Ant Group are worth mentioning. Being one of the largest fintech providers in China, JD's rural digital finance initiative is integral element to rural production, providing an integrated smart supply chain linking rural and urban areas in China. The expansion of digital finance coverage in rural China has opened new markets and logistic chains which are potentially more profitable. Being one of the three business arms of JD.com, JD Technology (formerly JD Finance and JD Digits) provides financial services including credit, payment services, insurance, wealth management, and crowd funding via the JD platform (Kong & Loubere, 2021). Ant Group (formerly Ant Financial) has capitalized on the rural digital finance, together with the widespread rural e-commerce network by Taobao, both are owned by Alibaba.com. Taobao Village or Taobao Town is a cluster of e-commerce operating in a locale. By end of 2020, there were 5,425 Taobao Villages and 1,756 Taobao Towns with an annual online transaction volume of exceeding RMB1 trillion (AliResearch, 2021), representing a vast logistical ecosystem across rural China with the ability to supply agricultural and other products to urban market. A rural finance section was established to provide comprehensive package of rural financial services – including loans, payment, insurance, and wealth management (Kong & Loubere, 2021).

The rapid development of digital finance provision in rural China can be attributed by massive expansion of digital infrastructure. About 40% of population in China are rural people or 564 million in year 2018 and of which 117.4 million people have access to digital broadband (NBSC, 2021). By end of December 2020, the Internet penetration of rural areas has reached 55.9% as compared to

76.5% of the urban counterparts (Statista, 2021). Consequently, the prevalent use of digital finance platforms has helped millions of rural people to obtain financial services at affordable costs (Zhou et al., 2015). More rural people in China are now able to access financial services via digital finance platforms. According to the report by the People's Bank of China, millions of rural people in China are the users of third-party payment (e.g., Alipay) and P2P lending (e.g., Renrendai), and innovative financial products for farmers (e.g., Jinyinong) are available to meet the diverse needs of rural people in China (Bai et al., 2018). Even though digital finance platforms have the potential to bring convenience and advancement of financial services to people at large, little is known about the use of digital finance platforms among rural people in China.

Unified Theory of Acceptance and Use of Technology (UTAUT)

Several research models have been found in the literature to explain the adoption of new technology. Notably, Diffusion of Innovation Theory (DOI) by Roger (1965) and Technology Acceptance Model (TAM) by Davis (1989). Among these models, UTAUT developed by Venkatesh et al. (2003) was chosen in this study as it integrates eight prominent theories of user acceptance of technology to explain the adoption of complex technologies. The theories are Theory of Reasoned Action, TAM, TAM2, Motivational Model, Theory of Planned Behavior, Model of PC Utilization, DOI, and Social Cognitive Theory. The unified theory is developed based upon the similarities of concepts and empirical studies covered by these eight theories. The UTAUT holds four decisive constructs which influence user's acceptance and use behavior: performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2012). Existing studies empirically find that UTAUT is superior to other competing models by virtue of its high robustness of the key constructs to predict user's intention and use of system (Park et al., 2007; Venkatesh et al., 2003; Zhou, 2012). Prior digital finance studies that used UTAUT include crowdfunding platform by Sulaeman and Ninglasari (2020) and *zakat* distribution through mobile banking by Yahaya and Ahmad (2019). Whereas Cao and Niu (2019) integrated UTAUT with context-awareness and perceived risk in their research model to explain user adoption of Alipay. Prior studies adopting UTAUT conceptualize the intention to adopt the system before actual system use behavior. However, this study focuses only on the antecedents to the actual use of digital finance platforms and the consequences of the use as these digital finance platforms have already been implemented in rural China.

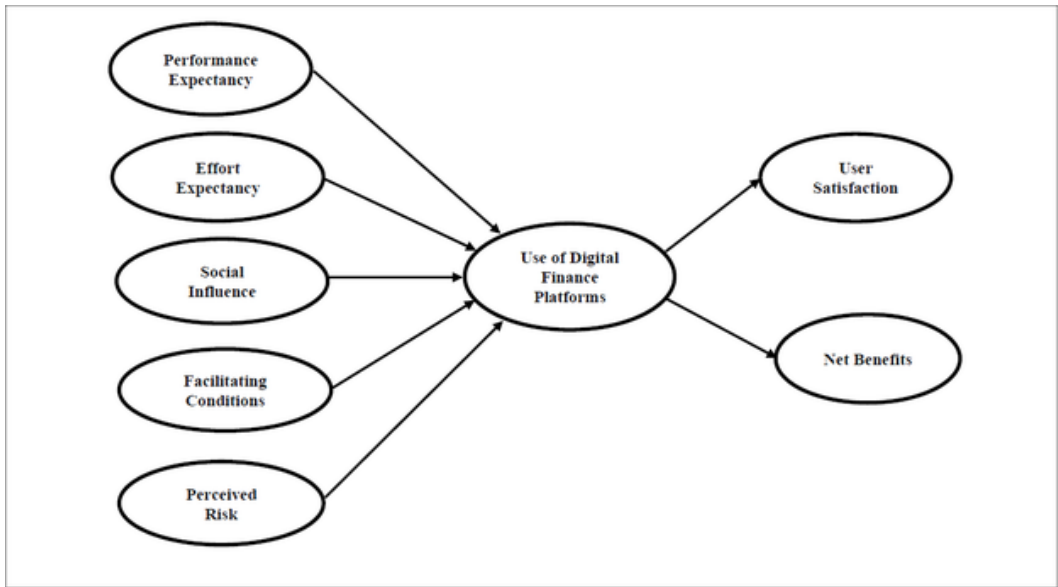
DeLone and McLean Model of Information System Success (D&M Model)

The DeLone and McLean Model of Information System Success (D&M Model) (DeLone & McLean, 2003), the updated version of Information Systems Success Model (DeLone & McLean, 1992), is used as the theoretical lens to explain the impact of the use of digital finance platforms in terms of user satisfaction and net benefits brought to rural people in China. It encompasses six constructs namely, information quality, system quality, service quality, intention to use or use, user satisfaction and net benefits. The first four constructs of D&M Model are the determinants of intention towards using technology, and the latter two constructs are used to examine the effectiveness of the system. In this study, user satisfaction refers to the extent of a user's financial needs being satisfied by using digital finance platforms while net benefits refer to the net outcome of both positive and negative a user receives from using digital finance platforms. DeLone and McLean (2003) illustrate that the constructs are interrelated, where (i) system use and user satisfaction are affected by system quality, information quality, and service quality; (ii) system use, user satisfaction and net benefits interact with one another in both positive and negative directions; (iii) The net benefits can be predicted directly by system use and user satisfaction. Several prior studies employ D&M Model as the underpinning theory in the field of digital finance (e.g., mobile banking services by Geebren et al., 2021).

In sum, the above two theories are appropriate for information systems research, including the digital finance platforms. Moreover, the study aims to investigate not only the antecedents of the use

of digital finance platforms for personal finance management but also its consequences. Figure 1 presents the conceptual framework of the study.

Figure 1. Conceptual framework



Hypotheses Development

The root constructs of performance expectancy in the UTAUT include perceived usefulness, relative advantage, and outcome expectation (Venkatesh et al., 2003). Comparing with conventional approach, the performance expectancy of digital finance platforms in managing personal finance is critical since it allows users to obtain financial information and services with higher efficiency and without the limitation of location and time (Yiu et al., 2007). Prior empirical studies on digital finance reveal that performance expectancy is an important antecedent to the use financial products similar to Yu'eobao platform (Zhai & Huang, 2016), and investment decision in P2P lending among Chinese students (Lv et al., 2018). From the rural people perspective, prior empirical studies find a significant and positive relationship between performance expectancy and the use of mobile banking in rural India (e.g., Behl & Abhinav, 2016; Kishore & Sequeira, 2016). This study argues that the higher performance expectancy of the digital finance platforms that rural people perceive, the more likely they will use the platforms to manage their personal finance. Therefore:

H_1 : Performance expectancy positively relates to the use of digital finance platforms to manage personal finance among rural people in China.

Effort expectancy comprises two important elements – perceived ease of use (or difficulty) and complexity (Venkatesh et al., 2003). Arvidsson (2014) found ease of use as the more important predictor of mobile payment in the Swedish sample. In China, people are found to prefer adopting the basic and easy-to-use technology to advanced and less friendly counterparts (Yan, 2003). Digital finance platforms, for instance, Yu'eobao enables users to perform fund investment and cash management simply and easily using mobile phone applications (Zhang, 2014). From the agricultural

technology perspective, rural people such as farmers, would prefer to use the technologies that are simple and easy to operate due to their lower educational level and limited ability to handle the technologies (Wu, 2012). In the other rural contexts, effort expectancy has been a determinant of various technology adoption studies, for instance, mobile banking (Behl & Abhinav, 2016), mobile internet banking (Deng et al., 2010), and mobile payment (Wang & Yi, 2012). This study argues that the higher effort expectancy of the digital finance platforms that rural people perceive, the more likely they will use the platforms to manage their personal finance. Therefore:

H₂: Effort expectancy positively relates to the use of digital finance platforms to manage personal finance among rural people in China.

Social influence is developed from subjective norm, social factors, and image, which reflects the influence of other important people's (e.g., family, relatives, and friends) expectation about using certain systems (Venkatesh et al., 2003). The concept of social influence theory (Kelman, 2017) also supports the notion that when important people suggest using a certain technology, individuals may comply with the suggestion. Previous empirical studies found a significant positive relationship between social influence and use of digital finance in the context of internet banking (Tarhini et al., 2016), mobile banking platform (Kishore & Sequeira, 2016), and mobile banking for distribution of *zakat* (Yahaya & Ahmad, 2019). In China, social influence was found to be a significant predictor of online P2P lending intention (Li et al., 2021) and intention to use mobile government (Liu et al., 2014). In the context of rural people, the social influence is found to be an important predictor of ICT adoption in Indonesia (Rumata & Sakinah, 2020). This study argues that the rural people's use of digital finance platforms for personal finance management is influenced by the important people around them. Therefore:

H₃: Social influence positively relates to the use of digital finance platforms to manage personal finance among rural people in China.

Facilitating conditions refer to the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system (Venkatesh et al., 2003). In the rural context, Cheng (2006) indicates that the environmental factors including facilitating conditions can improve rural user's motivation, which then influence their usage behaviors of new technologies. Pan et al. (2020) reported that facilitating conditions have a direct positive effect on the use of e-Wallets in Vietnam. In the China context, the expanding ICT infrastructure increases the accessibility of digital finance platforms in rural areas (Mu, 2017). This study argues that the better facilitating conditions in terms of improved Internet penetration rate and ubiquity of smartphones lead to a higher use of digital finance platforms among the rural people in China. Therefore:

H₄: Facilitating conditions positively relate to the use of digital finance platforms to manage personal finance among rural people in China.

Perceived risk towards the digital finance platforms in managing personal finance includes the risks of financial loss and account security. In the rural areas, Behl and Abhinav (2016) report that the use of online banking platforms is driven by low-risk perception towards the platforms. The digital finance risk is also a concern in the financial system in China due to lack of clarity in regulatory frameworks to govern the newly developed financial technology services in China especially concerning P2P lending (An et al., 2015). Other studies find that perceived risk negatively affects the acceptance and usage of innovative services (Martins et al., 2014) and continuance use intention of P2P lending platform in China (Yang et al., 2017). Therefore:

H₅: Perceived risk negatively relates to the use of digital finance platforms to manage personal finance among rural people in China.

User satisfaction measures the extent of satisfaction toward using an information system (Urbach & Müller, 2012). Users of traditional financial services may switch to digital finance to improve satisfaction by enjoying faster, more convenient, and highly flexible services (Evanschitzky et al., 2004). This study argues that the use of digital finance platforms will result in higher satisfaction in managing personal finance among rural people in China. Therefore:

H₆: The use of digital finance platforms positively relates to user satisfaction in personal finance management among rural people in China.

Net benefits refer to the balance between positive and negative outcomes that rural people receive from using the digital finance platforms. These benefits may include the improved quality of personal finance management in terms of effectiveness, efficiency, and financial goal attainment. Wang and Zhang (2017) report that the physical financial institutions are still very limited especially in rural China. If rural people do not adopt digital finance platforms, they would need to spend relatively longer time and incur higher transportation cost to reach the financial institutions for conducting financial transactions. With the growing accessibility of the Internet and ubiquity of smartphones, rural Chinese can access financial products and services via digital finance platforms, which reduce the cost and time and enhance the net benefits from using these platforms. Therefore:

H₇: The use of digital finance platforms positively relates to net benefits of personal finance management among rural people in China.

METHOD

Research Design

This study involves a cross-sectional online survey in rural China. A questionnaire survey is adopted to collect primary data. The respondents are rural people who are 18 years old and above and currently using digital finance platforms for personal finance management. The survey instruments are adapted from prior literature and translated into Chinese to provide a clear and understandable illustration of the questions to respondents. Partial Least Squares Structural Equation Modelling (PLS-SEM) is used as the data analysis technique for hypotheses testing.

Sample and Sampling Procedures

This study uses a multistage sampling method to select target provinces, villages, and respondents. Firstly, China is divided into six geographical regions. All regions are listed in alphabetical order and labeled numerically. By using Research Randomizer, which is available online, a province is randomly drawn from each of the regions, a total of six provinces are selected. Secondly, the villages of each selected provinces are listed alphabetically order and labeled numerically. The same selection process is used to randomly select three villages from each province, a total of 18 villages are selected. Thirdly, based on the selected villages, questionnaire forms are distributed to the rural people via WeChat Group of the respective villages. Ultimately, a total of 403 self-selected rural people return the survey questionnaire with complete responses for further analysis. Table 1 presents the demographic information of the respondents.

Table 1. Demographic Information of the Respondents (n=403)

Variable		Frequency	Percentage (%)
Gender	Male	194	48.14
	Female	209	51.86
Age	18-19	55	13.65
	20-29	253	62.78
	30-39	73	18.11
	40 and above	22	5.46
Educational Level	Primary school and below	1	0.25
	Junior high school	47	11.66
	Senior high school/ technical school/ secondary vocational school	103	25.56
	College	83	20.60
	University degree and above	169	41.94
Occupation	Student	139	34.49
	Freelancer	128	31.76
	Agriculture and farming labor	42	10.42
	Enterprise/ corporation employee	30	7.44
	Rural migrant	16	3.97
	Commercial/ service industry employee	11	2.73
	Manufacturing/ production enterprise employee	10	2.48
	Technology professional	8	1.99
	Enterprise/corporation mid-level manager	6	1.49
	Enterprise/corporation top-level manager	3	0.74
	Others	10	2.49
Monthly Income	No income	69	17.12
	Below 500 RMB	24	5.96
	501-1,000 RMB	27	6.70
	1,001-1,500 RMB	33	8.19
	1,501-2,000 RMB	32	7.94
	2,001-3,000 RMB	90	22.33
	3,001-5,000 RMB	91	22.58
	5,001-8,000 RMB	28	6.95
	Above 8,000 RMB	9	2.23

Variables and Measurements

All the measurement items of the constructs are adapted from previous studies and are measured by 7-point Likert scale ranging from 1 – ‘strongly disagree’ to 7 – ‘strongly agree’. The measurement items of each construct are presented below:

Performance expectancy is defined as the degree to which an individual believes that using the digital finance platforms will help him or her to attain gains in personal finance management (modified from Venkatesh et al. 2003). It is measured by the extent to which digital finance platforms improve the convenience, efficiency, effectiveness, and usefulness on personal finance management. Five items are adapted from Tai and Ku (2013) and Yu (2012) to measure the performance expectancy in this study.

Effort Expectancy is defined as the degree of ease associated with the use of digital finance platforms to perform personal finance management (modified from Venkatesh et al., 2003). It is

measured by ease of use, ease of being skillful at and ease of interacting with digital finance platforms on managing personal finance. Five items are adapted from Tai and Ku (2013) and Yu (2012) in this study.

Social influence refers to the degree to which an individual believes that important others (e.g., family, relatives, and friends) believe he or she should use digital finance platform for personal finance management (modified from Venkatesh et al., 2003). Specifically, this study operationalizes social influence as the extent to which other people influence rural residents' decision on using digital finance platforms to manage personal finance. Five items are adapted from Yu (2012) to measure social influence in this study.

Facilitating conditions are defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of digital finance platforms for personal finance management (modified from Venkatesh et al., 2003). It is assessed by the assistance availability of digital finance platforms. Four items are adapted from Yu (2012) to measure facilitating conditions in this study.

Perceived risk refers to the risk that is perceived by an individual towards the use of digital finance platforms for personal finance management (modified from Martins et al., 2014). It is measured by the extent of concern on the risk arising from managing personal finance on digital finance platforms by the rural people. Four items are adapted from Xia and Hou (2016) and Martins et al. (2014) to measure perceived risk.

Use of digital finance platforms is defined the extent of executing personal financial transactions using the digital finance platforms. Adapting the measurement of system use in the relevant literature (e.g., Shen & Huang, 2016; Zhou & Wang, 2010), this study measures the use of digital finance platforms in terms of performing overall use of five types of personal financial transactions – payment, securities, funds, P2P lending, and insurance.

User satisfaction is defined as the extent to which the digital finance platforms help an individual creates value in personal finance management (modified from DeLone & McLean, 2003). In this study, user satisfaction is measured by customer's needs achievement, effectiveness, efficiency and overall satisfaction with the use of the digital finance platforms for personal finance management. Four items of the user satisfaction are adapted from Tam and Oliveira (2016).

Net benefits are defined as the balance between positive and negative outcomes that an individual receives from using the digital finance platforms for personal finance management (modified from DeLone & McLean, 2003). It is measured by the improvement of decision-making, cost reduction and earning improvement. In this study, net benefits are measured by five items, adapted from DeLone and McLean (2003).

In this study, performance expectancy, effort expectancy, social influence, facilitating conditions, user satisfaction, and net benefits are reflective measures, while perceived risk and the use of digital finance platforms are formative measures. All the constructs are first-order.

RESULTS

In this study, variance-based Partial Least Squares Structural Equation Modelling (PLS-SEM) is used to evaluate the research model using SmartPLS version 3.0. PLS-SEM is preferred to covariance-based SEM as this study is exploratory in nature and a new conceptual framework involving both formative and reflective measures is developed. In addition, the data in this study are non-normally distributed. PLS-SEM involves two stages of analysis – assessment of measurement model and structural model. Assessment of the reflective measurement model involves checking of internal consistency, convergent validity and discriminant validity at both item and construct levels. Assessment of the formative measurement model involves analysis of multicollinearity, significance, and relevance of outer weights. Assessment of the structural model involves evaluation of path estimates in terms of significance, direction, and effect size of each hypothesized relationship in the research model.

Assessment of the Reflective Measurement Model

On reflective measurement model, the internal consistency is achieved when the composite reliability value of each construct surpasses the satisfactory threshold value of 0.7 (Hair et al., 2017). Table 2 shows that the composite reliability value of all reflective constructs ranges from 0.803 to 0.875 which exceeds the recommended threshold value of 0.7, indicating satisfactory internal consistency.

The purpose of evaluating convergent validity at the item level is to examine the degree to which the items are consistent with what these items attempt to measure (Urbach & Ahlemann, 2010). The recommended factor loading for each item is above 0.708. However, if the loading of an item is lower than 0.708 but exceeds 0.4, the item can be retained if other items under the same construct have high loadings to complement the composite reliability and average variance extracted (Hair et al., 2016). According to the above requirements, the items PE5 and SI2 are removed as the factor loadings are below 0.4, while item EE5 with a factor loading of 0.515 is retained.

Complementarily, according to Urbach and Ahlemann (2010), convergent validity is demonstrated as the extent to which individual items reflecting a construct converge in comparison with items measuring different constructs. The convergent validity of the measurement model is assessed by the average variance extracted (AVE). An AVE value of 0.5 or higher indicates that the construct explains at least half of the variance of its items, indicating an adequate convergent validity at the construct level (Hair et al., 2017). Two items, namely FC4 and FC5 are eliminated from the model to achieve of a minimum AVE value of 0.5 in addition to having a factor loading of below 0.7. Table 2 shows the AVE value of each construct ranges from 0.565 to 0.639 after model modification, which achieve the minimum AVE value of 0.5, indicating adequate convergent validity.

Discriminant validity of a reflective measurement model can be assessed by two methods – cross-loadings for the item level and heterotrait-monotrait ratio (HTMT) of correlations for the construct level. The factor loading of each item with respect to its own construct is above 0.50, ranging from 0.515 to 0.836 and higher than the cross-loadings in other constructs. Therefore, the results confirm that the discriminant validity of the reflective measurement model at the item level is satisfied by the cross-loading criterion.

The second method to examine the discriminant validity of this study is HTMT of the correlations, the average of the correlations of items across constructs measuring different phenomena, relative to the average of the correlations of items within the same construct (Henseler et al, 2015). The value of HTMT between 0.491 and 0.874 illustrates an appropriate discriminant validity of the model. Further, HTMT inference is assessed as it is used as statistical test (Henseler et al., 2015). It is calculated using bootstrapping technique with two tailed, 0.1 significant level and 90% confidence interval by SmartPLS. When the confidence interval of HTMT includes the value of 1, the problem of discriminant validity may arise. As the value of 1 is not evident in the confidence interval, we conclude that the model has adequate discriminant validity at the construct level. Taken together, the results of HTMT correlation and HTMT inference indicate that the discriminant validity is established for the reflective measurement model of this study. In sum, the reflective measurement model of this study meets the requirements of internal consistency, convergent validity, and discriminant validity at both item and construct levels.

Assessment of the Formative Measurement Model

Perceived risk and the use of digital finance platforms are modeled as the formative constructs in this study. There are two steps for assessing the formative measurement model. The first step is to check multicollinearity among items using variance inflation factor (VIF). The second step is to assess the significance and relevance of outer weights of the formative items.

In the formative measurement model, the items are not interchangeable. Therefore, high correlations should not exist between the items. If two formatives are highly correlated, it is known as multicollinearity (Hair et al., 2017). The high multicollinearity among formative items may have negative impact on the evaluation of weights and their significance as it increases standard error and

Table 2. Correlation Matrix of Latent Constructs

Construct	M	SD	CR	AVE	1.	2.	3.	4.	5.	6.	7.
1. PE	5.228	0.091	0.838	0.565	0.752						
2. EE	5.192	1.005	0.867	0.572	0.503	0.756					
3. FC	4.730	0.966	0.803	0.577	0.606	0.551	0.760				
4. SI	4.666	1.321	0.875	0.636	0.583	0.406	0.558	0.797			
5. PR	4.623	1.290	-	-	0.223	0.169	0.259	0.369	-		
6. US	5.361	0.888	0.803	0.576	0.540	0.493	0.526	0.507	0.276	0.759	
7. NB	4.997	1.098	0.841	0.639	0.577	0.481	0.612	0.665	0.362	0.579	0.799
8. DF	4.452	0.782	-	-	0.573	0.451	0.490	0.466	0.326	0.443	0.482

Note. PE=Performance Expectancy; EE=Effort Expectancy; FC=Facilitating Conditions; SI=Social Influence; PR=Perceived Risk; US=User Satisfaction; NB=Net Benefits; DF=Use of Digital Finance Platform; PR and DF are formative measures; M=Mean; SD=Standard Deviation; CR=Composite Reliability; AVE=Average Variance Extracted; bolded values on the diagonal line are square root of AVE.

reduces the accuracy of the results (Henseler et al., 2015). The rules of thumbs depict that a potential multicollinearity problem may exist when VIF value is 3.3 and above (Diamantopoulos & Siguaw, 2006) or 5.0 (Hair et al., 2017). Table 3 shows the VIF value ranges from 1.095 to 1.736, which are lower than the more stringent threshold of 3.3, indicating that multicollinearity is not a serious concern for the evaluation of the formative measurement model.

The significance and relevance of the formative items are evaluated based on the contribution of each formative item to the respective construct. Petter et al. (2007) indicate that the items with insignificant item weights may be removed from the model. However, the insignificant items can be retained to preserve the content validity, a term referred to as relative contribution (Hair et al., 2017; Nunnally & Bernstein, 1994). Therefore, any decision to eliminate the items for formative constructs should be made with caution (Diamantopoulos & Winklhofer, 2001). Table 3 exhibits the results of outer weights of each formative item calculated by bootstrapping. The *p*-value shows that PR1, PR3, DF2, and DF5 are not significant at *p* > 0.05 but are retained for the analysis based on the recommendation by Hair et al. (2017). The retained items are considered as absolutely important but not as relatively important. To sum up, none of the formative items are removed. Table 3 presents the values of each measurement item for the formative constructs.

Assessment of the Structural Model

Assessment of the structural model involves the test for the strength and the significance of path coefficient, as well as the direction of the hypothesized relationship. All data are run using a path weighting scheme, a bootstrapping of 500 sub-samples, and a one-tailed type of test with 95% of confidence level. The details of the analysis are presented below.

Performance expectancy positively relates to the use of digital finance platforms to manage personal finance ($\beta = 0.341$, $t = 5.237$, $p < 0.001$, and 95% confidence interval bias = [0.235;0.442]). Hence, H_1 is supported by the data. Effort expectancy positively relates to the use of digital finance platforms to manage personal finance ($\beta = 0.155$, $t = 3.116$, $p = 0.001$, and 95% confidence interval bias = [0.067;0.229]). Hence, H_2 is supported by the data. Social influence positively does not significantly relate to the use of digital finance platforms to manage personal finance ($\beta = 0.087$, $t = 1.416$, $p = 0.079$, and 95% confidence interval bias = [-0.005;0.192]). Hence, H_3 is not supported by the data. Facilitating conditions positively relate to the use of digital finance platforms to manage personal finance ($\beta = 0.099$, $t = 1.803$, $p = 0.036$, and 95% confidence interval bias = [0.008;0.188]). Hence, H_4 is supported by the data. Perceived risk is found to be positively related to the use of digital finance platforms to manage personal finance ($\beta = 0.176$, $t = 3.717$, $p < 0.001$, and 95%

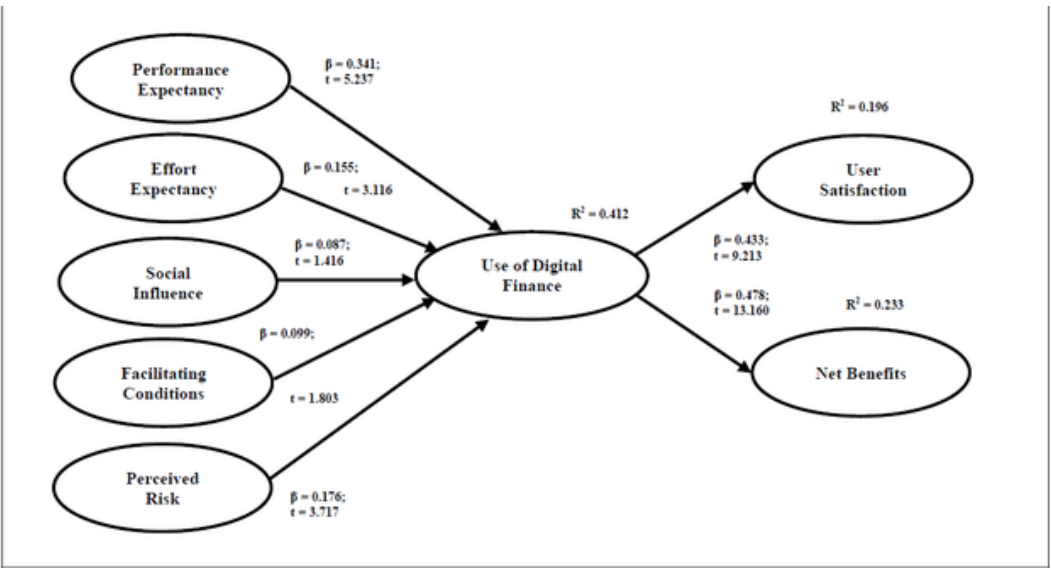
Table 3. Measurement Properties for Formative Constructs

Construct	Item	Weight	VIF	t value	p value
Perceived Risk	PR1	-0.024	1.736	0.122	0.903
	PR2	0.500	1.581	3.066	0.002
	PR3	0.145	1.580	0.768	0.443
	PR4	0.566	1.697	3.153	0.002
Use of Digital Finance Platforms	DF1	0.702	1.095	11.181	<0.001
	DF2	0.116	1.175	1.410	0.156
	DF3	0.403	1.166	4.830	<0.001
	DF4	0.242	1.110	3.690	<0.001
	DF5	0.048	1.644	0.592	0.579

confidence interval bias = [0.089;0.246]). As the direction of the relationship is reversed, H_5 is not supported by the data. The use of digital finance platforms positively relates to user satisfaction in personal finance management ($\beta = 0.433$, $t = 9.213$, $p < 0.001$, and 95% confidence interval bias = [0.338;0.499]). Hence, H_6 is supported by the data. The use of digital finance platforms positively relates to net benefits of personal finance management ($\beta = 0.478$, $t = 13.160$, $p < 0.001$, and 95% confidence interval bias = [0.412;0.530]). Hence, H_7 is also supported by the data.

In sum, of the seven hypotheses developed, five are supported by the data. Figure 2 shows the five antecedents collectively explain 41.2% of the variance in the use of digital finance platforms. Furthermore, the use of digital finance platforms explains 19.6% of the variance in user satisfaction, and 23.3% in net benefits. Among all the antecedents, performance expectancy is relatively the most important, followed by effort expectancy and facilitating conditions.

Figure 2. Structural model



DISCUSSION

The discussion of the research findings is based on the relevant theoretical and practical literature as follows.

- (1) Performance expectancy is found to have a positive influence on the use of digital finance platforms to manage personal finance among rural people in China. This finding is consistent with UTAUT and prior empirical studies that examined the performance expectancy on the intention and actual use of digital finance (Martins et al., 2014; Park et al. 2007; Yu, 2012). Besides, performance expectancy is the relatively strongest predictor of the use of digital finance platforms. In other words, if the benefits of using digital finance platforms were conveyed to the rural people in an informed manner, the use of digital finance platforms would most likely be increased.
- (2) The use of digital finance platforms to manage personal finance among rural people in China is influenced by their belief of effort expectancy of the platforms. This finding is consistent with UTAUT and similar to the empirical evidence of prior related studies (Deng et al., 2010; Wang & Yi, 2012; Yu, 2012). When rural people in China believe that using the digital finance platforms to manage personal finance is easy, clear, understandable, and flexible, they will be more willing to use digital finance platforms to manage their personal finance.
- (3) Social influence does not affect rural people to use digital finance platforms to manage personal finance. One possible explanation is that user's self-confidence, personal ability, and self-esteem instead of other people's beliefs and suggestions are the elements influencing the use of digital finance platforms to manage personal finance (Alshehri, 2012; Lv et al., 2018). This finding contradicts UTAUT and implies that the use of digital finance platforms is a personal and individual matter among the rural people in China, which is not affected by the important people around them.
- (4) Facilitating conditions have a significant positive effect on the use of the digital finance platforms for managing personal finance by rural people in China. This finding concurs with UTAUT and the results of prior empirical studies (Zhou, 2012; Zhou et al., 2015). Even though the result is statistically significant, it may not be practically significant as the beta is merely 0.1, relatively weak. The possible explanation is that the elements of facilitating conditions such as Internet accessibility and mobile devices have become more ubiquitous, thus, it may not be a concern for the rural people to use the digital finance platforms for personal finance management (Behl & Abhinav, 2016).
- (5) The finding reveals a significant but positive relationship between the perceived risk and the use of digital finance platforms for personal finance management, which is not consistent with the hypothesized relationship in this study. This contradicting finding could be due to the gain-oriented focus among rural people in China. Even though the rural people may be aware of the possible risks of using digital finance platforms, they may choose to ignore the risks and pay more attention to the higher gains that could be earned from using the digital finance platforms. For instance, Martins et al. (2014) report that users can obtain higher profits from purchasing financial products on Internet-based platforms than on conventional channels of financial institutions. Lv et al. (2018) report that users may ignore the risks when it is perceived to be low, and the appreciation of P2P lending may generate higher returns that result in a positive relationship between perceived risk and investment in P2P lending. Besides, the rural people in China may not be well informed of the risks of using digital finance platforms (Ding, 2016), meaning that the rural people may use the digital finance platforms to manage personal finance without having the awareness of the potential risks.
- (6) The significant influence of the use of digital finance platforms on user satisfaction in this study is consistent with DeLone and McLean (2003). This finding indicates that using digital finance

platforms perform personal financial transactions can improve the satisfaction of the rural people in China. They are satisfied with the use of digital finance platforms to achieve their financial needs, and effectiveness and efficiency in managing their personal finance.

- (7) The use of digital finance platforms to manage personal finance has a positive impact on the user's net benefits. This finding aligns with D&M Model (DeLone & McLean, 2003) and prior empirical studies (e.g., Chen & Jin, 2017). The finding reveals that the use of digital finance platforms to manage personal finance can positively influence the net benefits of rural people in China in terms of improved personal financial decision making, reduced financial transaction cost, and higher earning attainment of personal finance management.

CONTRIBUTIONS, IMPLICATIONS AND CONCLUSION

Contributions

Specifically, this study contributes to the IT literature as follows.

- (1) This study integrated the antecedents – performance expectancy, effort expectancy, social influence, facilitation conditions, and perceived risk, and the consequences of user satisfaction and net benefits into a single research model that offers a more expansive view of the adoption of digital finance platforms.
- (2) This study chose digital finance platforms – innovative digital systems as the tools to reduce the income gap and enhance financial inclusion in a developing country.
- (3) This study selected the sample based on rural people who are underserved in terms of accessing financial products and services as compared to their urban counterparts.

Implications

The findings of this study provide important practical implications for the stakeholders in the digital finance ecosystem that offer financial products and services via the digital finance platforms to rural people.

Firstly, the digital finance platform developers could focus on boosting the platform capabilities in terms of: (1) *Performance expectancy*. It is the strongest influencing factor on the use of digital finance platforms in this research. Therefore, it is critical for the digital finance platform developers to design a platform that can enhance the usefulness, effectiveness, and convenience of personal finance management on the platform. For instance, Yu'eobao is designed to earning yield from saving even small amount of cash (e.g., RMB1) online. Therefore, it can attract the users with any amount of capital for initiating an investment even the poor who never made investment before; (2) *Effort expectancy*. The findings show that, if the users believe the digital finance platform is easy for use, and for being skillful, and clear and understandable, more users will choose to use the platform for personal finance management. Thus, the platform developer should try to simplify the function and avoid the complexity on developing the platform. Alipay is a platform contains numerous financial functions such as online investments and online payment, however, users are able to access each of the function easily, which creates friendly experience to the user and positively impacts the use of the platform; and (3) *Facilitating conditions*. Digital finance platform developers also can provide necessary financial knowledge or training for using the digital finance platform to the users. When rural people perceived more support are available to them, the higher likelihood they would use the digital finance platforms for personal finance management.

Secondly, the digital finance platform developers can pay attention in the following areas contributing to the enhancement of user satisfaction: (1) *Needs satisfaction*. The platform should be created to satisfy the various needs from rural Chinese on personal finance management. For instance, Renrendai is a platform created for online lending purpose, which satisfies the demands of the users

who intend to lend or borrow money online; (2) *Efficiency satisfaction*. It is important to ensure the platforms enable users to perform personal financial transactions in an efficient manner by reducing the time and cost of using them. For instance, Lufax allows borrowers and lenders to perform lending transactions at lower cost and in shorter time compared with offline channels; (3) *Effectiveness satisfaction*. The developers of the platforms need to ensure the users can perform effective personal finance management on the platform. For instance, if a user intends to purchase funds and earn stable interest, Yu'eobao can be the option; and (4) *Overall User satisfaction*. To improve users' satisfaction, providers of financial products and services should have good knowledge about the characteristics of rural people such as income level and educational level to offer financial products that are affordable and easy to purchase by the rural people. In this research, Yu'eobao is found to be able to satisfy the financial needs of rural people by providing them low-price funds and easy-to-use applications.

Thirdly, *net benefits*. The providers should offer the digital financial products and services that enable rural people to obtain net benefits by means of reducing time, saving money and improving investment quality. For example, JD Finance provides a specific online lending service called "Jingnongdai", which is only offered to rural people with the features of non-mortgage, low interest and fast speed. This service facilitates rural people to obtain loan with a lower barrier, less cost and faster basis compared with the services provided by traditional banks.

Fourthly, the Chinese government can enhance user satisfaction and net benefits of rural people by focusing on the following aspects: (1) Increasing the accessibilities of the Internet in rural areas and make preferential policy on boosting the use of digital devices and digital finance platforms (i.e., smartphone and laptop) for rural people. When the accessibility to the Internet and mobile devices increases in rural areas, the use of digital finance platforms among rural people will increase as well; (2) Promoting financial literacy and risk management education for rural people in China. Rural people usually have less financial knowledge, and low awareness of financial risks when they manage their personal finance online; thereby rural people tend to be the victims of online financial fraud. Therefore, improving the financial literacy among rural people will increase their awareness of financial risks and abilities to detect the potential financial frauds; and (3) Reinforcing the regulatory policy on digital financial crimes. A strong regulation on governance of digital financial fraud can play a critical role in reducing the financial crime rate and in preventing rural people from reaping the benefits. In sum, the Chinese government should continue to put in concerted effort to achieve financial inclusion in rural China.

Limitations and Recommendations for Future Research

Firstly, understanding the effects on how the antecedents change over time is critical as these constructs tend to vary with time and have effect on the use behaviors (Bhattacharjee & Premkumar, 2004). Moreover, cross-sectional research has limitation on the ability to establish a causality between the antecedents and outcomes as a cross-sectional study measures data only at one point of time of the research. Therefore, longitudinal studies are considered for future research.

Secondly, a high proportion of the sample in this study consists of students (34%) and aged between 20 to 29 years old (63%), which may not represent the rural population in China. To increase the generalizability of the research findings, future researchers should collect data from sample that resembles the characteristics of rural population in China.

Thirdly, there is a possibility that perceived risk is measured incompletely or insufficiently. There may be other alternative measurement items for perceived risk on the use of digital finance platforms but has yet to be explored in the literature. This may be one of the reasons contributing to the reverse relationship between perceived risk and the use of digital finance platforms, which is not consistent with the literature. Therefore, future studies could identify other possible measures apart from the perception of security, potential financial losses, perceived privacy invasion, and system error to measure perceived risk.

Fourthly, this study acknowledges that the use of digital finance platforms may be attributed to other antecedents such as number of merchants available, product innovativeness, service quality, perceived cost, among others and thus it is important to investigate other factors affecting the use of these platforms among rural people.

CONCLUSION

This study identifies and examines the antecedents and consequences of the use of digital finance platforms to manage personal finance by rural people in China. The research model explains 41.2% of variance in the use of digital finance platforms to manage personal finance, 19.6% of variance in user satisfaction and 23.3% of variance in net benefits. Furthermore, five of seven paths in the research model are found to be statistically significant and consistent with the proposed direction of the relationships. The use of digital finance platforms is influenced by performance expectancy, effort expectancy, and facilitating conditions, and positively influences user satisfaction and net benefits. Therefore, developers of digital finance platforms, providers of financial products and services, and the Chinese government should continue to support the development of personal finance management using digital finance platforms that are reliable and affordable by focusing on the identified factors and subsequently enhance the user satisfaction and net benefits of rural people at large and accelerate financial inclusion in rural China.

REFERENCES

- AliResearch. (2021). *China Taobao Village Report 2020*. <http://www.aliresearch.com/en/Reports/Reportsdetails?articleCode=167153834769125376>
- Alshehri, M. A. (2012). *Using the Utaut model to determine factors affecting acceptance and use of e-government service in the Kingdom of Saudi Arabia* (Doctoral dissertation). Griffith University, Brisbane, Australia.
- An, J., Zhao, B., Li, J., & Wang, W. (2015). The Internet finance in China: The living space and the regulations. *Indian Journal of Science and Technology*, 8(S4), 106–114. doi:10.17485/ijst/2015/v8iS4/60377
- Arvidsson, N. (2014). Consumer attitudes on mobile payment services—results from a proof of concept test. *International Journal of Bank Marketing*, 32(2), 150–170. doi:10.1108/IJBM-05-2013-0048
- Bai, D., Jiang, R., Wang, T., Chien, J., & Randall, D. (2018). *Toward universal financial inclusion in China: Models, challenges, and global lessons*. Retrieved from <https://openknowledge.worldbank.org/bitstream/handle/10986/29336/FinancialInclusionChinaP158554.pdf?sequence=9&isAllowed=y>
- Barbesino, P., Camerani, R., & Gaudino, A. (2005). Digital finance in Europe: Competitive dynamics and online behaviour. *Journal of Financial Services Marketing*, 9(4), 329–343. doi:10.1057/palgrave.fsm.4770164
- Behl, A., & Abhinav, P. (2016). Analysing the barriers towards sustainable financial inclusion using mobile banking in rural India. *Indian Journal of Science and Technology*, 9(15), 1–7. doi:10.17485/ijst/2016/v9i15/92100
- Bhattacharjee, A., & Premkumar, G. (2004). Understanding changes in belief and attitude toward information technology usage: A theoretical model and longitudinal test. *Management Information Systems Quarterly*, 28(2), 229–254. doi:10.2307/25148634
- Cao, Z. (2016). The research of the development difficulty of internet financial management in rural China. *Rural Economy and Science-Technology*, 22, 87–88.
- Chen, W., & Yuan, X. (2021). Financial inclusion in China: An overview. *Frontier of Business Research in China*, 15(4), 1–21. doi:10.1186/s11782-021-00098-6
- Chen, Z., & Jin, M. (2017). Financial inclusion in China: Use of credit. *Journal of Family and Economic Issues*, 38(4), 528–540. doi:10.1007/s10834-017-9531-x
- Cheng, Y. (2006). Agricultural information across the “last mile” of the path analysis. *China Agricultural Bulletin*, 22(9), 462–465.
- Claessens, S., Glaessner, T., & Klingebiel, D. (2002). Electronic finance: Reshaping the financial landscape around the world. *Journal of Financial Services Research*, 22(1), 29–61. doi:10.1023/A:1016023528211
- DeLone, W. H., & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information Systems Research*, 3(1), 60–95. doi:10.1287/isre.3.1.60
- DeLone, W. H., & McLean, E. R. (2003). The Delone and Mclean model of information systems success: A ten-year update. *Journal of Management Information Systems*, 19(4), 9–30. doi:10.1080/07421222.2003.11045748
- Deng, Z., Lu, Y., Deng, S., & Zhang, J. (2010). Exploring user adoption of mobile banking: An empirical study in China. *International Journal of Information Technology and Management*, 9(3), 289–301. doi:10.1504/IJITM.2010.030945
- Diamantopoulos, A., & Siguaw, J. A. (2006). Formative versus reflective indicators in organizational measure development: A comparison and empirical illustration. *British Journal of Management*, 17(4), 263–282. doi:10.1111/j.1467-8551.2006.00500.x
- Ding, Q. (2016). Enhancement on the education of rural financial consumption under Internet finance. *Economic and Trade*, 12(102).
- Evanschitzky, H., Gopalkrishnan, R. I., Hesse, J., & Ahlert, D. (2004). E-satisfaction: A re-examination. *Journal of Retailing*, 80(3), 239–247. doi:10.1016/j.jretai.2004.08.002
- Garman, E. T., & Fogue, R. (2011). *Personal finance* (11th ed.). Cengage Learning.

- Gattenio, C. A. (2002). Digitizing finance: Views from the leading edge (Special Section: Digitizing Finance). *Financial Executive*, 18(2), 49–52.
- Geebren, A., Jabbar, A., & Luo, M. (2021). Examining the role of consumer satisfaction within mobile eco-systems: Evidence from mobile banking services. *Computers in Human Behavior*, 114, 106584. doi:10.1016/j.chb.2020.106584
- Gomber, P., Koch, J.-A., & Siering, M. (2017). Digital finance and FinTech: Current research and future research directions. *Journal of Business Economics*, 87(5), 537–580. doi:10.1007/s11573-017-0852-x
- Hair, J., Hollingsworth, C. L., Randolph, A. B., & Chong, A. Y. L. (2017). An updated and expanded assessment of PLS-SEM in information systems research. *Industrial Management & Data Systems*, 117(3), 442–458. doi:10.1108/IMDS-04-2016-0130
- Hair, J. F. Jr, Hult, G. T. M., Ringle, C., & Sarstedt, M. (2016). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). Sage Publications.
- He, J., & Li, Q. (2020). Can online social interaction improve the digital finance participation of rural households? *China Agricultural Economic Review*, 12(2), 295–313. doi:10.1108/CAER-11-2019-0213
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135. doi:10.1007/s11747-014-0403-8
- Hu, B., & Zheng, L. (2016). Digital finance: Definition, models, risk, and regulation. In B. Hu, Z. Yin, & L. Zheng (Eds.), *Development of China's financial supervision and regulation* (pp. 31–58)., doi:10.1057/978-1-137-52225-2_2
- Keown, A. J. (2013). *Personal finance: Turning money into wealth* (6th ed.). Pearson.
- Kishore, S. V. K., & Sequeira, A. H. (2016). An empirical investigation on mobile banking service adoption in rural Karnataka. *SAGE Open*, 6(1), 1–21. doi:10.1177/2158244016633731
- Kong, S. T., & Loubere, N. (2021). Digitally down to the countryside: Fintech and rural development in China. *The Journal of Development Studies*, 57(10), 1739–1754. doi:10.1080/00220388.2021.1919631
- Li, H. S., Khan, H. U., & Hammami, H. (2021). An empirical study of lenders' perception of Chinese online peer-to-peer (P2P) lending platforms. *Journal of Alternative Investments*, 23(4), 152–175. doi:10.3905/jai.2021.1.128
- Li, L. (2016). *Research on P2P mode under rural Internet finance – Case study on Elong China* (Doctoral dissertation). Jiangxi University of Finance and Economics, China.
- Liu, L. (2018). The research on the feasibility of developing rural financial products. *Economic Research Journal*, 13, 50.
- Liu, Y., Ji, D., Zhang, L., An, J., & Sun, W. (2021). Rural financial development impacts on agricultural technology innovation: Evidence from China. *International Journal of Environmental Research and Public Health*, 18(3), 1110. doi:10.3390/ijerph18031110 PMID:33513778
- Liu, Y., Li, H., Kostakos, V., Goncalves, J., Hosio, S., & Hu, F. (2014). An empirical investigation of mobile government adoption in rural China: A case study in Zhejiang province. *Government Information Quarterly*, 31(3), 432–442. doi:10.1016/j.giq.2014.02.008
- Luo, D., & Gao, C. (2012). An empirical study of China's rural formal financial development and rural income inequality. In H. Tan (Ed.), *Technology for education and learning* (pp. 459–464). doi:10.1007/978-3-642-27711-5_61
- Lv, Y. Z., Dong, J. C., & Shi, X. H. (2018, August). An empirical study on the influencing factors of the P2P lending investment behavior of Chinese college students. In *2018 International Conference on Management Science and Engineering (ICMSE)* (pp. 289-295). Academic Press.
- Malady, L. (2016). Consumer protection issues for digital financial services in emerging markets. *Banking & Finance Law Review*, 31(2), 389–401. doi:10.2139/ssrn.3028371

- Martins, C., Oliveira, T., & Popović, A. (2014). Understanding the Internet banking adoption: A unified theory of acceptance and use of technology and perceived risk application. *International Journal of Information Management*, 34(1), 1–13. doi:10.1016/j.ijinfomgt.2013.06.002
- Mu, N. (2017). *Research on the factors influencing the purchase behavior of internet financial products based on UTAUT* (Master's thesis). Zhejiang Gongshang University, China.
- National Bureau of Statistics of China (NBSC). (2021). *1-2 Principal aggregate indicators on national economic and social development and growth rates*. <http://www.stats.gov.cn/tjsj/ndsj/2019/indexeh.htm>
- Ngai, J.L., Qu, J., Zhou, N., Liu, X., Lan, J., Fang, X., Han, F., & Chen, V. (2016). *Disruption and connection: Cracking the myths of China Internet finance innovation*. Academic Press.
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory*. McGraw-Hill.
- Ozili, P. K. (2018). Impact of digital finance on financial inclusion and stability. *Borsa Istanbul Review*, 18(4), 329–340. doi:10.1016/j.bir.2017.12.003
- Park, J., Yang, S., & Lehto, X. (2007). Adoption of mobile technologies for Chinese consumers. *Journal of Electronic Commerce Research*, 8(3), 196–206.
- Petter, S., Straub, D., & Rai, A. (2007). Specifying formative constructs in information systems research. *Management Information Systems Quarterly*, 31(4), 623–656. doi:10.2307/25148814
- Ren, B., Li, L., Zhao, H., & Zhou, Y. (2018). The financial exclusion in the development of digital finance – A study based on survey data in the Jingjinji rural area. *The Singapore Economic Review*, 63(1), 65–82. doi:10.1142/S0217590818500017
- Rumata, V. M., & Sakinah, A. M. (2020). The impact of internet information and communication literacy and overload, as well as social influence, on ict adoption by rural communities. *Asia-Pacific Journal of Rural Development*, 30(1-2), 155–174. doi:10.1177/1018529120977250
- Shen, Y., & Huang, Y. (2016). Introduction to the special issue: Internet finance in China. *China Economic Journal*, 9(3), 221–224. doi:10.1080/17538963.2016.1215058
- Statista. (2020). *Penetration rate of internet in the rural areas of China from 2014 to December 2020*. <https://www.statista.com/statistics/1062706/china-internet-penetration-rate-rural-areas/>
- Su, L., Peng, Y., Kong, R., & Chen, Q. (2021). Impact of e-commerce adoption on farmers' participation in the digital financial market: Evidence from rural China. *Journal of Theoretical and Applied Electronic Commerce Research*, 16(5), 1434–1457. doi:10.3390/jtaer16050081
- Sulaeman, S., & Ninglasari, S. Y. (2020). Analyzing the behavioral intention factors in using zakat-based crowdfunding platform in Indonesia. *International Journal of Zakat*, 5(3), 1–19. doi:10.37706/ijaz.v5i3.267
- Tai, Y.-M., & Ku, Y.-C. (2013). Will stock investors use mobile stock trading? A benefit-risk assessment based on a modified UTAUT model. *Journal of Electronic Commerce Research*, 14(1), 67–84.
- Tam, C., & Oliveira, T. (2016). Understanding the impact of m-banking on individual performance: Delone & Mclean and Ttf perspective. *Computers in Human Behavior*, 61, 233–244. doi:10.1016/j.chb.2016.03.016
- Tan, D. S. Y., Tan, T. T. T., Ling, S. T., & Donaldson, J. A. (2021). Obstacles to accessing pro-poor microcredit programs in China: Evidence from Penggan Village, Guizhou. *Modern China*, 47(2), 127–153. doi:10.1177/0097700419878800
- Tarhini, A., El-Masri, M., Ali, M., & Serrano, A. (2016). Extending the UTAUT model to understand the customers' acceptance and use of internet banking in Lebanon: A structural equation modeling approach. *Information Technology & People*, 29(4), 830–849. doi:10.1108/ITP-02-2014-0034
- Urbach, N., & Ahlemann, F. (2010). Structural equation modeling in information systems research using partial least squares. *Journal of Information Technology Theory and Application*, 11(2), 5–40.
- Urbach, N., & Müller, B. (2012). The updated DeLone and McLean model of information systems success. In Y. K. Dwivedi, M. R. Wade, & S. L. Schneberger (Eds.), *Information systems theory: Explaining and predicting our digital society* (pp. 1–18). doi:10.1007/978-1-4419-6108-2_1

- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *Management Information Systems Quarterly*, 27(3), 425–478. doi:10.2307/30036540
- Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *Management Information Systems Quarterly*, 30(1), 157–178. doi:10.2307/41410412
- Wang, L., & Yi, Y. (2012). The impact of use context on mobile payment acceptance: An empirical study in China. In A. Xie & X. Huang (Eds.), *Advances in computer science and education* (pp. 293–299)., doi:10.1007/978-3-642-27945-4_47
- Wang, L., & Zhang, L. (2017). Empirical analysis on the influencing factors of the use of online financial services in rural area-based on survey data from parts of Fujian province. *Rural Finance Research*, 4.
- Wu, L. (2012). An empirical research on poor rural agricultural information technology services to adopt. *Procedia Engineering*, 29, 1578–1583. doi:10.1016/j.proeng.2012.01.176
- Xia, H., & Hou, Z. (2016). Consumer use intention of online financial products: The Yuebao example. *Financial Innovation*, 2(18), 1–12. doi:10.1186/s40854-016-0041-x
- Yahaya, M. H., & Ahmad, K. (2019). Factors affecting the acceptance of financial technology among asnaf for the distribution of zakat in Selangor-A study using UTAUT. *Journal of Islamic Finance*, 8, 35–46.
- Yan, X. (2003). Mobile data communications in China. *Communications of the ACM*, 46(12), 80–85. doi:10.1145/953460.953463
- Yang, J., Wu, Y., & Huang, B. (2020). *Digital finance and financial literacy: An empirical investigation of Chinese households*. ADBI Working Paper Series. <https://think-asia.org/bitstream/handle/11540/12984/adbi-wp1209.pdf?sequence=1>
- Yang, M., Li, H., Shao, Z., & Shang, W. (2017). Influencing lenders' repeat investment intention in P2P lending platforms in China through signaling. In *Pacific Asia Conference on Information Systems (PACIS)*. Association for Information Systems.
- Yao, L. (2013). The measures and policy suggestions on facilitating rational financial management of rural residents in China. *Review of Economic Research*, 60, 20–21.
- Yiu, C. S., Grant, K., & Edgar, D. (2007). Factors affecting the adoption of internet banking in Hong Kong – Implications for the banking sector. *International Journal of Information Management*, 27(5), 336–351. doi:10.1016/j.ijinfomgt.2007.03.002
- Yu, C., Jia, N., Li, W., & Wu, R. (2021). Digital inclusive finance and rural consumption structure—evidence from Peking University digital inclusive financial index and China household finance survey. *China Agricultural Economic Review*. Advance online publication. doi:10.1108/CAER-10-2020-0255
- Yu, C.-S. (2012). Factors affecting individuals to adopt mobile banking: Empirical evidence from the UTAUT Model. *Journal of Electronic Commerce Research*, 13(2), 104–121.
- Yu, G., & Xiang, H. (2021). Rural E-commerce development and farmers' digital credit behavior: Evidence from China family panel studies. *PLoS One*, 16(10), e0258162. doi:10.1371/journal.pone.0258162 PMID:34653212
- Zhai, C., & Huang, Y. (2016, June). Exploring consumers' use behavior on internet finance in China: From the perspective of the financial products similar to Yu'e Bao. In *2016 13th International Conference on Service Systems and Service Management (ICSSSM)* (pp. 1-6). Academic Press.
- Zhang, X. (2014). Analysis of the Yu Ebao and its impact on the financial sector. *World Journal of Social Science*, 1(2), 78–85. doi:10.5430/wjss.v1n2p78
- Zhang, Y. (2017). The research of investment and financial management of rural household in China. *Henan Nongye*, 5, 9–11.
- Zhao, X. (2016). *The research on rural finance under the background of Internet +* (Doctoral dissertation). Central China Normal University, China.

- Zhou, T. (2012). Examining location-based services usage from the perspectives of unified theory of acceptance and use of technology and privacy risk. *Journal of Electronic Commerce Research*, 13(2), 135–144.
- Zhou, T., Lu, Y., & Wang, B. (2010). Integrating Ttf and UTAUT to explain mobile banking user adoption. *Computers in Human Behavior*, 26(4), 760–767. doi:10.1016/j.chb.2010.01.013
- Zhou, W., Arner, D. W., & Buckley, R. P. (2015). Regulation of digital financial services in China: Last mover advantage. *Tsinghua China Law Review*, 8(25), 25–62.
- Zhu, X., Song, B., Ni, Y., Ren, Y., & Li, R. (2016). Digital finance – From traditional finance to digital and internet finance. In Z. Zhu, B. Song, Y. Ni, & R. Li (Eds.), *Business trends in the digital era* (pp. 161–190). doi:10.1007/978-981-10-1079-8_9
- Zong, Z., & Zhu, L. (2014). Hot spots tracing on Internet finance in China. *Applied Mechanics and Materials*, 602-605, 3540–3543. doi:10.4028/www.scientific.net/AMM.602-605.3540

APPENDIX A - SUMMARY OF PRIOR EMPIRICAL STUDIES ON DIGITAL FINANCE IN RURAL CHINA

Table 4. Summary of prior empirical studies on digital finance in rural China

Authors (Year)	Data Source	Sample	Major Findings
Yu & Xiang (2021)	China Family Panel Studies (CFPS) 2017–2020	Rural farmers households	Farmers utilizing e-commerce have higher digital credit and total credit scale.
Tan et al. (2021)	Face-to-face semi-structured interviews	Pro-poor farmers in Penggan Village	Structural and institutional failures are the main obstacles to applying for microcredit.
He & Li (2020)	Rural Inclusive Finance Survey 2017	Rural households	Online social interaction promotes digital finance participation.
Liu et al. (2021)	Chinese Family Database (CFD) and China Household Finance Survey (CHFS)	Rural households	Digital inclusive finance development reduces agricultural production of rural household.
Yu et al. (2021)	Digital Inclusive Financial Index (DIFI) and Chinese Household Financial Survey (CHFS)	Rural households	Digital inclusive finance promotes households' developmental consumption.
Ren et al. (2018)	Questionnaire survey	Rural residents of Jingjinji	Individual characteristics such as age, education, and income affect financial exclusion in terms of mobile payment and internet lending among rural people.
Su et al. (2021)	Questionnaire survey	Rural entrepreneurial households	Online purchase and sales have positive impacts on digital financial participation among farmers.

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