



Research article

Understanding financial literacy and associated factors among adult population in a low-middle income country

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HIGHLIGHTS

- The level of financial literacy of Vietnamese adults is at an average level.
- Using financial management applications support higher financial literacy scores.
- People preferring uncertainty avoidance are more financially literate.
- Financial, educational programs are necessary for a sustainable financial life.

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ABSTRACT

This study aims to identify whether demographics, socio-economic factors, the usage of the internet, smartphone and bank, and cultural factor affect Vietnamese adults' financial literacy. A sample of 669 participants participated in the online survey questionnaire (response rate of 89.92%). Multivariate general linear model regression shows that adults of younger age have better skills in cash management, credit management, savings and investment, and financial management compared to older adults. The findings suggest that participants with better income could manage savings and overall finance more effectively. Furthermore, respondents with "Uncertain avoidance" in the culture had better skills in cash management, saving, and investment. Meanwhile, preferring masculinity had higher scores in credit management, insurance, and total scale compared to those preferring femininity. The significant contribution of this study is its usefulness for economic players to have assertive financial strategies and policymakers to enhance the level of financial literacy and provide trustworthy financial guidance.

1. Introduction

According to the Organization for Economic Cooperation and Development (OECD) (OECD/INFE, 2013), financial literacy is a set of awareness, knowledge, skill, attitude, and behavior needed to make suitable financial decisions and attain individual financial well-being. Being financially literate means that a person has financial skills to prepare for retired-based planning and saving (Behrman et al., 2012; Lusardi and Mitchell, 2014). Financial literacy plays a vital role for individuals who consume financial products and the national and global economy, especially in the digital era (Agarwal et al., 2009; Setiawan et al., 2020). It affects all financial affairs, including borrowing, saving, investment, and money management (Widdowson and Hailwood, 2007). Improving

financial knowledge in the general population is crucial for all governments when many financial services are delivered. In literature, good financial literacy is associated with individual financial decision making, job planning, sustainable investments with a diversity of portfolios, and more savings for retirement (Deuffhard et al., 2019; Gaudecker, 2015; Lusardi and Mitchell, 2007a; Van Rooij et al., 2011, 2012). Since making sound financial choices and preventing costly mistakes are vital in personal daily life, having financial skills is required for all stages of people's lives. Despite its noteworthiness, only 30% of adults worldwide have a fundamental understanding of financial concepts (Klapper et al., 2015), but the financial literacy situation varied remarkably across nations from Yemen (13%) to Denmark (71%). A global survey of Standard & Poor's Ratings Services in 2014 showed that more than 55% of residents in

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North America, Western Europe, and Australia could be considered financially literate. Still, the proportion of people having financial literacy in the rest of the world was less than 50% (Klapper et al., 2015).

It is essential to have a model to figure out the determinants of financial literacy and measure financial management behaviors before implementing effective financial literacy strategies. Studies worldwide identify the close connections between socioeconomic variables, including gender, age, income, employment, and one's financial literacy (Eberhardt et al., 2019; Potrich et al., 2015). Numerous studies argue that men perform better than women on financial tests (Cupák et al., 2018; Lusardi and Mitchell, 2017). Lusardi and Mitchell (2014), Klapper et al. (2015), and (Li et al., 2013) all demonstrated the influence of age on financial literacy generally. Income and wealth are positively associated with financial literacy (Behrman et al., 2012; Mauldin et al., 2016). Potrich et al. (2015) show that financial literacy is significantly connected with other characteristics, with higher education being one of them. Further studies indicated several people are vulnerable to financial illiteracy, namely those residing in rural regions or being unemployed (Klapper and Panos, 2011; Lusardi and Tufano, 2015). Other factors, such as culture or financial technology, have been proved to affect individuals' financial literacy (Cucinelli et al., 2019; Setiawan et al., 2020).

There are limited studies in Vietnam that help economic players have assertive financial strategies and policymakers enhance financial literacy. Financial literacy in general adults is not well understood in Vietnam. A study conducted in rural and urban areas in Vietnam illustrated that the financial literacy score was low, especially when compared to China or Korea (Morgan and Trinh, 2020). A high level of financial literacy was found among people of younger age, higher income, and being male (Morgan and Trinh, 2020). The findings of this study also accord with another study implemented to evaluate the level of financial literacy of urban adults (Nguyen, 2017). The author explores that higher education, financial education, and the number of family members are associated with high financial literacy levels (Nguyen, 2017). Moreover, this study confirms that participants with higher levels of financial literacy tend to have less probability of overspending, a higher likelihood of saving money, and careful spending (Nguyen, 2017). This study was tailored to fill the gap from previous studies by providing trustworthy financial guidance. This study examined the financial literacy of Vietnamese adults and explored the effects of socioeconomic and demographic variables on financial literacy. To put it differently, we decide to evaluate the impact of the internet, smartphones and banking use on the level of financial literacy as financial services and products are in digital form since the Vietnamese government focuses on non-cash payment (Son et al., 2020). Moreover, our study exploits the cultural variation of the Vietnamese population since culture may affect the financial knowledge of individuals (Davoli and Rodríguez-Planas, 2020).

Using the online survey, we rely on the response of 669 participants in Vietnam for data analysis. We first provide the general information of respondents. Then, EFA and CFA were applied to identify the factors of cultural variables and financial management behaviors scale. After that, factors associated with financial literacy were explored.

We find that individuals who avoid uncertainty and pursue masculine cultural values are more financially literate than those who engage in uncertainty and pursue feminine cultural values. Besides, the results confirm that people who are female, or have higher age, low income, and did not use applications display lower levels of financial literacy.

This study aims to enrich the existing knowledge of Vietnamese populations' financial literacy by 1) identifying factors associated with the financial literacy of Vietnamese individuals; 2) examining the association between financial literacy score and financial product usage.

The following questions were served as a guide for this study:

What is the level of financial literacy of the Vietnamese population?
What is the relationship between demographic factors and the level of financial literacy among the Vietnamese population?

What is the relationship between socio-economic factors and the level of financial literacy among the Vietnamese population?

What is the relationship between the usage of the internet, smartphone, and bank and the level of financial literacy among the Vietnamese population?

What is the relationship between the usage of cultural factors and the level of financial literacy among the Vietnamese population?

2. Literature review

2.1. Definition

Financial literacy is necessary for a person and firm's sustainable financial and economic situation (Refera and Kolech, 2015). Although inquiry about the financial literacy field has increased over a long time, there has not been consistency in the definition of financial literacy (Potrich et al., 2015). A study by Parotta (1996) shows that personal financial management behavior includes learning to make a financial plan and putting it into practice together with adjusting it to make it suitable for individuals or families. According to Xiao (2008), any human behavior related to money management has been considered financial management behavior. Meanwhile, Holzmann (2010) confirms that a person who can manage finance has financial skills, knowledge, and the ability to recognize the value of the suggested method to increase financial well-being. Prihartono and Asandimitra (2018) reveal that good financial management behavior is the ability to prepare, execute an initial plan, improve it if unsuitable conditions have occurred, and constantly monitor the status of financial matters improvement. In this study, we based on the definition of Ameliawati and Setiyani (2018), which states that financial management includes a complex set of behaviors and decisions that could be changed and an individual's abilities and skills, and opportunities to perform those behaviors.

Demographic factors include terms of gender, age, and education.

Socio-economic factors include living location, occupation, and wealth (AIHW, 2021).

Cultural factors are based on the perspectives of Hofstede, including uncertainty engagement/avoidance; individualism/collectivism; femininity/masculinity (Hofstede, 1984).

2.2. The importance of financial literacy

Stable personal finance is essential for a household and a secure future (Munohsamy, 2015). Low financial knowledge can lead to poor financial decisions (Jacob, 2000), affecting an individual's ability to achieve long-term goals (Ergün, 2018). Besides, poor financial literacy might cause unsecured personal loans (Wang et al., 2021), financial hardship, and possibly bankruptcy (Bourova et al., 2018). Individuals with high literacy might invest in stocks, bringing a higher return on investments (Van Rooij et al., 2011). Good financial literacy would support individuals to avoid financial problems, well-managed income, and depression conditions, especially during pandemics (Yuesti et al., 2020). In general, financial literacy is not only a survival tool (Jacob, 2000) but plays a crucial role in preserving and increasing money (Lusardi, 2019). Hence, personal finance education might increase individuals' financial management ability and economic decisions (Refera and Kolech, 2015).

2.3. Financial literacy in developing countries

Enhancing financial literacy was recognized in developed countries in the 1990s and became a global concern after the US financial crisis (Damayanti et al., 2018). Meanwhile, there has been a limited study in developing countries until recently (Xu and Zia, 2012, June 12). The evidence of financial literacy from low-resource countries has remained scant, especially in Asia and African countries (Kebede and Kuar, 2015). An empirical study in Kenya concludes that children and youths' saving

Table 1. General information of participants (n = 669).

Characteristics	n	%
Age, years, mean (SD)	33.52 (9.22)	
Number of people living with, people, mean (SD)	3.39 (1.60)	
Gender		
Female	394	58.89
Male	275	41.11
Educational level		
College or above	640	95.67
Under-college	29	4.33
Living location		
Urban	615	91.93
Rural	54	8.07
Average personal income (USD/month)		
Under \$219.64	77	11.51
From \$219.64 to \$439.27	175	26.16
From \$439.27 to \$658.91	163	24.36
From \$658.91 to \$878.54	100	14.95
Higher than \$878.54	154	23.02
Working field		
Economics	220	32.88
Technology	73	10.91
Education	146	21.82
Other fields	230	34.38
Time management (hours/day)		
Time of internet use, hours/day, mean (SD)	8.18 (4.00)	
Time of social network use, hours/day, mean (SD)	3.01 (2.54)	
Type of Mobile device use		
Smartphone	639	95.52
Laptop	502	75.04
Tablet, Ipad	149	22.27
Television	184	27.50
Others	2	0.30
Using financial management application		
Yes	279	41.70
No	390	58.30
Using shopping application		
Yes	388	58.00
No	281	42.00
Bank using time		
Less than 1 year and not sure	42	6.28
From 1 to 3 years	88	13.15
From 3 to 5 years	95	14.20
Above 5 years	444	66.37

behavior is affected by children and their parents (Alex and Amos, 2014). According to Karakurum-Ozdemir et al. (2019), the financial literacy patterns of Mexico, Lebanon, Uruguay, Turkey, and Colombia are similar to those of developed countries which are of gender, and educational level, and language. Another research being processed in Indonesia shows a low level of financial literacy in populations (Damayanti et al., 2018). Besides, research in developing countries is based on narrow research subjects (e.g., students or employees) with limited geographic locations (Kebede and Kuar, 2015). For instance, a survey of 47 Vietnamese students in Hanoi reveals that participants have a moderate level of financial literacy (Anh et al., 2018). A study conducted in the countryside of the Philippines indicates poor financial management practices among 363 teachers, even though they know the importance of financial literacy (Acedillo, 2018). Financial management practices are different among countries due to socioeconomic and individuals. Thus, there is a

Table 2. Factor loadings for culture variables.

Items	Uncertainty engagement/avoidance	Individualism/Collectivism	Femininity/Masculinity
Principles and regulations are important because they inform individuals of what the collective expects of them	0.673		
Arrangement and structure are essential in a work/study environment	0.782		
Respecting tradition is important to me	0.572		
I work hard to achieve success in the future	0.799		
Organizational problems should be solved by using robust approaches	0.507		
Being accepted as a group member is more important than having autonomy and independence.		0.514	
Collective success is more important than individual success.		0.661	
Loyalty toward the collective is more important than individual interests.		0.729	
Men should have a higher position than women.			0.988
Career is more important to men than women.			0.656
Reliability			
Cronbach's alpha	0.84	0.74	0.80
KMO			0.84
Domains scores			
Mean	3.62	3.18	2.50
SD	0.73	0.81	1.03

need for a future financial literacy survey that helps identify the factors that influence financial literacy. Therefore, policymakers will have interventions on relevant variables based on scientific evidence.

2.4. Factors influencing financial literacy

Various studies have been conducted to explore variables affecting financial literacy. These factors include several groups of characters, such as demographics, socio-economic factors, online banking, and cultural factors.

Demographic factors include three main variables: gender, age, and level of education. Regarding gender, males have a higher financial knowledge level than women (Bucher-Koenen et al., 2017; Cupák et al., 2018; Lusardi and Mitchell, 2017). Women have difficulty completing financial calculations, hindering their ability to make accurate financial decisions (Potrich et al., 2015). Besides, they tend to choose “do not know” when responding to questions related to financial literacy (Hasler and Lusardi, 2017). It is important to note that there is a gap between developing and developed countries (Hasler and Lusardi, 2017). In contrast, Beckmann (2013) and Adam (2017) find no significant differences in financial literacy between men and women.

Regarding age, several studies have confirmed that the lowest level of financial literacy was among the youngest and the oldest (Klapper et al., 2015; Lusardi and Mitchell, 2014), which formed an inverted U-shaped pattern (Agarwal et al., 2009; Lusardi and Mitchell, 2014). National research in the US focused on senior citizens (above age 60). It concluded

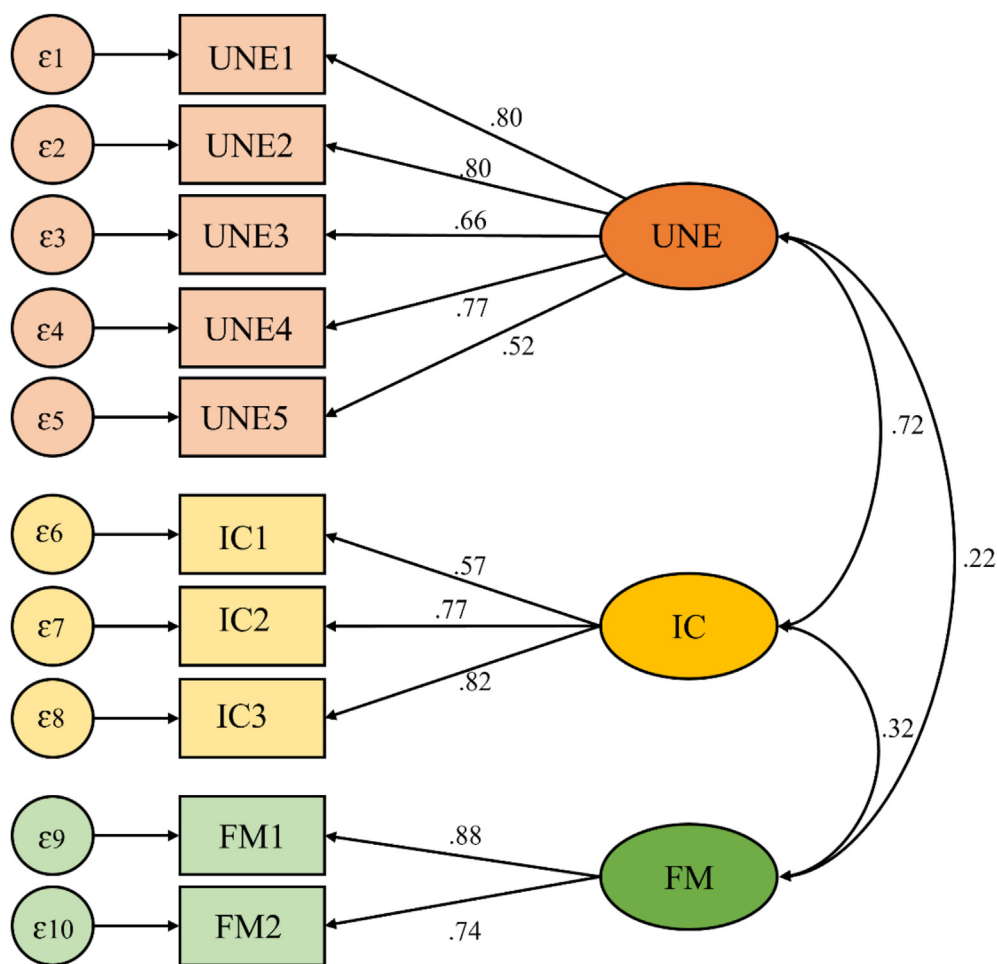


Figure 1. CFA model of cultural variables. The loading of items is displayed above the left-hand arrow. The correlation coefficients among three factors are shown next to the lines that connect them. UNE: Uncertainty engagement/avoidance; IC: Individualism/Collectivism; FM: Femininity/Masculinity

that a negative relationship between age and financial literacy existed, with low levels of financial literacy among older adults (Finke et al., 2017). In contrast to prior works, Li et al. (2013) find that greater age is associated with higher financial literacy. Their study tests the complementary capabilities hypothesis and confirms that the crystallized intelligence of older adults offsets their lower level of fluid intelligence for economic decision-making in financial literacy (Li et al., 2013). Similar to that finding, Eberhardt et al. (2019) also find that greater experienced-based knowledge leads to better decision-making among older adults.

By analyzing the level of education, individuals with higher educational levels would have greater financial literacy (Potrich et al., 2015). Tóth et al. (2015) point out that higher education levels and the economic focus of education result in better financial literacy. Corroborating such evidence, Morris and Koffi (2015) find that education on financial topics increased financial literacy. Furthermore, research on a national sample of 1,486 employees of an insurance company supports the hypothesis that employees with financial education more fully understand personal finance and its impact on their future financial expectations (Hira and Loibl, 2005).

Lower-income individuals are less likely to be financially literate (Mauldin et al., 2016). Besides, a lack of financial knowledge could prevent saving behaviors (Mauldin et al., 2016). A previous study has proved that low-income individuals are less likely to hold a bank account (Birkenmaier, 2012) or less likely to participate in retirement saving plans (Neuberger et al., 2006). Besides, they are more susceptible to using high-cost lenders and at risk of poor borrowing behaviors and over-indebtedness (Davies et al., 2019). Therefore, increasing the

financial literacy of low-income adults could positively impact the global economy (Neuberger et al., 2006; Schaffer and Mohs, 2016).

The development of the Internet, smartphone, and computers supports financial literacy in digital financial technology (Setiawan et al., 2020). Setiawan et al. (2020) indicate that the impact of digital financial literacy on saving and spending behavior is expected to be comparable to the effects of financial literacy on saving and spending behavior. Furthermore, Tony and Desai (2020) discover that digitization in finance can promote financial inclusion by allowing people to keep and spend money through digital platforms. A study by Setiawan et al. (2020) was conducted on 527 participants in Indonesia and proved that digital financial literacy positively affects the current saving and spending behavior.

Research mentioning cultural factors as a determinant of financial literacy has been rare and only noticeable in recent years. Cucinelli et al. (2019) examine whether the level of financial literacy of adults in 14 different regions of Italy is related to regional contextual factors. They conclude that individuals' socioeconomic background influences financial literacy. Ahunov and Van Hove (2020) combine Standard & Poor's Global Financial Literacy survey 2014 with the Cultural aspects of Hofstede for 92 countries. Their results suggest that cultural elements such as individualism and uncertainty avoidance help explain differences in financial literacy across countries. Martin Brown et al. also indicate that cultural background was related to the systematic differences in financial literacy among different groups of language (Brown et al., 2018). Kenneth De Beckker et al. (2020) applied Hofstede's cultural framework and found that uncertainty avoidance was positively correlated with financial literacy while individualism negatively impacted financial literacy (De Beckker et al., 2020).

Table 3. Factor loadings for FMBS variables.

Items	Cash management subscale	Credit management subscale	Savings and investment subscale	Insurance subscale
Price comparison when using a service or product	0.450			
Keep personal monthly budgets	0.534			
Staying on track with budget	0.485			
Max out credit card(s)		0.650		
Pay the minimum on loan.		0.614		
Maintain or create savings for emergency purposes			0.645	
Paycheck savings			0.749	
Saving plan for a long-term goal (car/house purchase, educational purpose, etc.)			0.739	
Payment for social insurance				0.561
Buy or maintain adequate health insurance.				0.510
Buy or maintain adequate property insurance (i.e., car/house)				0.502
Buy or maintain adequate life insurance.				0.556
Reliability				
Cronbach's alpha	0.62	0.64	0.72	0.635
KMO	0.80			
Domains scores				
Mean	3.40	2.80	3.32	3.17
SD	0.64	0.97	0.78	0.97

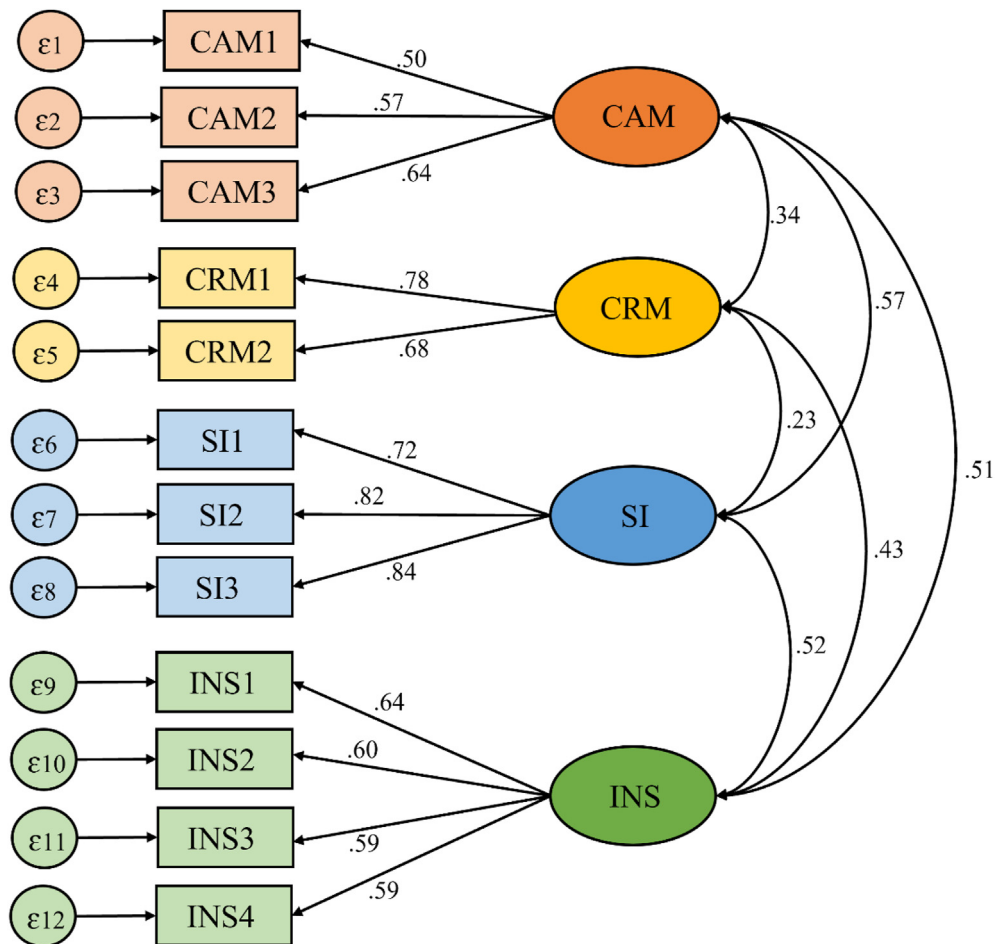


Figure 2. CFA model of FMBS. The loading of items is displayed above the left-hand arrow. The correlation coefficients among four factors are shown next to the lines that connect them. CAM: Cash management subscale; CRM: Credit management subscale; SI: Savings and investment subscale; INS: Insurance subscale.

Previous studies have mentioned the variables that affect financial literacy, including gender, age, level of education, the development of the Internet, smartphone, computers, and cultural factors. Hence, through this study, we want to identify and confirm their effects on financial literacy among Vietnamese adults to provide a deeper understanding and assessment of this issue.

3. Materials and methods

3.1. Study design

To explore the factors associated with the financial literacy of Vietnamese adults, a cross-sectional study was processed from July to September 2021. An online form of questionnaire was used to collect data from Vietnamese people. A descriptive analysis and multivariate general linear model were applied. Demographics, socio-economic factors, the usage of the internet, smartphone and bank, and cultural factors are independent variables; meanwhile, financial literacy with four subscale is the dependent variable.

3.2. Data collection and sampling technique

An online survey designed based on the Google form platform was delivered through the network of the research team members using email and other social networks channels (such as Facebook or Zalo) from July to September 2021.

Due to the “social distancing” restrictions in Vietnam being implemented in this period, snowball sampling was applied. Those who responded to the survey continued to conveniently spread the survey to their network. Each person was asked to answer the survey only once to assure data accuracy.

Participants were adults who met the following criteria: (1) Vietnamese at least 18 years old, (2) living in Vietnam for at least six months at the time of the survey, (3) agreeing to participate in the survey by providing an online informed consent and (4) having ability to read and respond the questions. This study on digital transactions through mobile devices in Vietnam received 744 observations. However, some responses have been excluded because of their invalidity, and 669 responses have been used since (a response rate of 89.92%).

3.3. Segment of questionnaire and measurement

The questionnaire contains two sections, including 1) demographic information and 2) financial management behavior scale (FMBS) and cultural factors.

All participants provided their socio-economic characteristics, including gender, the number of people living in the household, age, educational level, working fields, living areas, and personal income. Besides, their behaviors in mobile device use, network site, online shopping application, and bank-using time were reported.

The revised Financial Management Behavior Scale (FMBS) constructed in a publication of Dew and Xiao (Dew and Xiao, 2011) was used to examine participants' financial literacy. The scale includes four subscales: cash management, credit card management, savings and investment, and insurance. It is important to note that the number of items in every subscale is at least three, in which credit card management subscale and insurance subscale have three items. Cash management and savings and investment subscales have 4 and 5 items, respectively. Each item had five options for response including 1 = never, 2 = seldom, 3 = sometimes, 4 = often, and 5 = always. Scores of every subscale and the total score were calculated by summing all contained items and dividing them by the number of items. The score ranged from 1 to 5, with a higher score revealing a higher literacy regarding the subscale. The Cronbach's alpha coefficients of scale and four subscales were 0.82, 0.62, 0.64, 0.72, 0.635, respectively, which were well accepted. In addition, participants

were asked to report whether they had smartphone devices and whether they downloaded and used any financial management applications.

From the cultural perspective, this study adopted the view of Hofstede in the use of cultural dimensions as determinants of financial literacy (Hofstede, 1984). Hofstede mentioned four aspects, including 1) uncertainty engagement/avoidance – indicating how a society perceives the uncertainty of specific conditions and attempts to prevent this issue; 2) individualism/collectivism – indicating how individuals perceive the importance of becoming a member of a group in comparison with taking care only themselves; 3) masculinity/femininity – reflecting how masculine values or feminine values are more important than each other, and 4) power distance – indicating that power is allocated unequally within organizations (Hofstede, 1984). According to the literature review, given that dimension (4) “power distance” might not be related to financial literacy because financial literacy is the concept that is related to each individual, we focused on the three remaining dimensions. We employed ten items to measure these aspects. Each item had five options for response from 1 = Totally disagree; 2 = Disagree; 3 = Neutral; 4 = Agree and 5 = Totally agree.

The detail of the items used in this study is shown in [Appendix 1](#).

3.4. Data analysis

STATA software version 15 (StataCorp LLC) was applied to analyze the final data. We used two different methods depending on the variable properties to produce general statistical results. We calculated mean and SD values of continuous variables such as age and time. We classified and calculated each group's corresponding number and percentage with the remaining variables. In the exploratory factor analysis (EFA), we performed the Kaiser - Meyer - Olkin measure – KMO test and Bartlett's test, with eigenvalues that were more significant than 1 (applied eigenvalues-greater-than-one rule), and the factor loading was greater than 0.4 (Cliff, 1988). Afterward, we executed confirmation factor analysis (CFA) to evaluate the construct items by assessing the Goodness of Fit through a specific set of indexes, including root mean square error of approximation (RMSEA) and standardized root mean square residual (SRMR) index, Tucker-Lewis Indexes (TLI) and Comparative Fit Indexes (CFI), and Chi-Square/degrees of freedom. Multivariate General Linear Model (GLM) regression was employed to determine associated factors with the total score of the financial management behavior scale and its four subscales: cash management, credit management, savings and investment, and insurance. A p-value lower than 0.05 was considered statistically significant.

3.5. Ethical approval

All procedures performed in this study were by the ethical standards, approved by the Institutional Review Board of the Institute of Theoretical and Applied Research committee (study protocol No. 2705QD/HDKH-DHDT).

4. Results

Table 1 presents general information 669 valid responses with a mean age was 33.40 years old (SD = 9.52), and more than half of the respondents were female (59.19%). The average number of people living in the household was 3.39 (SD = 1.60). Most respondents lived in urban and had already graduated from college or higher education with 92.23% and 95.67%, respectively. Regarding personal income, the group has income from \$219.64 to \$439.27, occupying the most prominent part with 26.16% (n = 175), followed by the group having payments from \$439.27 to \$658.91 with 24.36% (n = 163). The mean time of internet use was 8.18 h/day (SD = 4.00), while the meantime of social network use was 3.01 h/day (SD = 2.54). Two hundred seventy-nine respondents, accounted for 41.70%, used financial management applications, while the rate of those who used shopping applications was 58% (n = 388).

Table 4. Associated factors with FMBS and its subscales.

Variables	Cash management subscale		Credit management subscale		Savings and investment subscale		Insurance subscale		Total FMBS		
	Coef.	95% CI	Coef.	95% CI	Coef.	95% CI	Coef.	95% CI	Coef.	95% CI	
Demographics											
Age (vs. Young adults - from 18 to 35 years old)											
Middle-aged adults - from 36 to 55 years old	-0.15***	-0.25; -0.04	0.09	-0.08; 0.27	-0.13*	-0.27; 0.01	0.17**	0.00; 0.34	-0.03	-0.13; 0.07	
Older adults - older than 55 years old	-0.65***	-1.05; -0.26	-0.68**	-1.31; -0.04	-0.84***	-1.33; -0.34	-0.52	-1.14; 0.10	-0.69***	-1.07; -0.31	
Number of people living together	-0.01	-0.04; 0.02	0.00	-0.04; 0.05	-0.01	-0.05; 0.02	-0.01	-0.05; 0.04	-0.01	-0.03; 0.02	
Gender (vs. Male)											
Female	0.00	-0.10; 0.10	-0.23***	-0.39; -0.07	0.07	-0.06; 0.19	-0.05	-0.21; 0.10	-0.03	-0.13; 0.06	
Education (vs. under college)											
College or above	0.04	-0.18; 0.27	0.18	-0.18; 0.54	0.28**	0.00; 0.56	0.13	-0.22; 0.49	0.17	-0.05; 0.38	
Living location (vs. urban)											
Rural	-0.06	-0.24; 0.11	-0.21	-0.49; 0.07	-0.20*	-0.42; 0.02	-0.18	-0.45; 0.10	-0.16*	-0.33; 0.01	
Area of work (vs. Economics)											
Technology	0.13	-0.04; 0.29	-0.17	-0.43; 0.09	-0.10	-0.31; 0.10	-0.13	-0.39; 0.12	-0.06	-0.21; 0.09	
Education	0.10	-0.02; 0.23	-0.02	-0.23; 0.18	-0.08	-0.24; 0.08	0.00	-0.20; 0.20	-0.00	-0.12; 0.12	
Other fields	-0.00	-0.11; 0.11	-0.29***	-0.47; -0.11	-0.16**	-0.30; -0.02	-0.19**	-0.36; -0.01	-0.15***	-0.26; -0.04	
The income per month (USD/month)											
Average personal income (vs. Under \$219.64)											
From \$219.64 to \$439.27	0.03	-0.14; 0.19	0.03	-0.24; 0.30	0.37***	0.16; 0.58	0.35***	0.09; 0.61	0.21**	0.05; 0.37	
From \$439.27 to \$658.91	0.03	-0.15; 0.21	0.19	-0.10; 0.48	0.36***	0.13; 0.59	0.30**	0.02; 0.59	0.23**	0.05; 0.40	
From \$658.91 to \$878.54	0.04	-0.16; 0.24	0.15	-0.17; 0.48	0.44***	0.19; 0.70	0.18	-0.14; 0.50	0.23**	0.03; 0.42	
Higher than \$878.54	0.13	-0.07; 0.32	0.06	-0.26; 0.37	0.48***	0.23; 0.72	0.44***	0.13; 0.74	0.29***	0.11; 0.48	
Time management											
Time of internet use (vs. Less than 3 h/day)											
From 3 to 5 h/day	0.13	-0.03; 0.30	0.17	-0.10; 0.43	0.09	-0.12; 0.30	0.30**	0.04; 0.56	0.16*	-0.00; 0.32	
Higher than 5 h/day	0.09	-0.06; 0.23	0.06	-0.18; 0.30	0.06	-0.12; 0.25	0.12	-0.11; 0.35	0.08	-0.06; 0.22	
Time of social network use (vs. Less than 1 h/day)											
From 1 to 3 h/day	-0.01	-0.13; 0.10	0.05	-0.13; 0.23	0.07	-0.07; 0.21	-0.16*	-0.34; 0.02	-0.00	-0.11; 0.10	
Higher than 3 h/day	-0.04	-0.17; 0.10	0.16	-0.05; 0.37	0.03	-0.14; 0.20	-0.10	-0.31; 0.11	0.01	-0.12; 0.14	
Application and bank account											
Using financial management application (vs. No)											
Yes	0.11**	0.01; 0.20	0.01	-0.14; 0.16	0.14**	0.02; 0.26	0.25***	0.10; 0.40	0.13***	0.04; 0.22	
Using shopping management application (vs. No)											
Yes	0.02	-0.07; 0.12	-0.12	-0.27; 0.04	-0.01	-0.13; 0.11	0.01	-0.14; 0.16	-0.02	-0.11; 0.07	
Using bank time (less than 1 year/not sure)											
1–3 years	-0.03	-0.26; 0.19	0.32*	-0.04; 0.68	0.08	-0.20; 0.37	-0.08	-0.44; 0.27	0.07	-0.15; 0.28	
3–5 years	-0.01	-0.22; 0.21	0.01	-0.33; 0.36	0.11	-0.16; 0.38	-0.18	-0.52; 0.16	0.00	-0.21; 0.21	
>5 years	0.04	-0.15; 0.22	0.08	-0.22; 0.39	0.26**	0.02; 0.49	0.00	-0.30; 0.30	0.11	-0.07; 0.29	
Culture											
Uncertainty engagement/avoidance	0.24***	0.16; 0.32	0.08	-0.04; 0.20	0.17***	0.07; 0.26	0.14**	0.02; 0.26	0.16***	0.09; 0.24	
Individualism/Collectivism	0.05	-0.02; 0.12	0.07	-0.04; 0.18	0.04	-0.05; 0.12	0.02	-0.08; 0.12	0.04	-0.02; 0.11	
Femininity/Masculinity	0.01	-0.04; 0.05	0.13***	0.05; 0.20	0.04	-0.02; 0.10	0.09**	0.01; 0.16	0.06**	0.01; 0.10	

***p < 0.01, **p < 0.05, *p < 0.1.

About bank using time, 66.37% of respondents (n = 444) have had a bank account for more than five years.

Table 2 shows the construct validity and ratability of “Uncertainty engagement/avoidance” (UNE), “Individualism/Collectivism” (IC), and “Masculinity/Femininity” (FM) of the culture's participants. Cronbach's alpha coefficients were 0.84, 0.74, and 0.80. The overall KMO for our data was 0.84.

The CFA results of cultural variables are shown in Figure 1. All the loadings of items in the factors are greater than 0.50. The correlation between UNE and IC is relatively high. A cutoff value for a good model fit for root means square error of approximation (RMSEA) and standardized

root mean square residual (SRMR) index is <0.08 (Hu & Bentler, 1998, 1999). Cutoffs for a good model fit of Tucker-Lewis Indexes (TLI) and Comparative Fit Indexes (CFI) are ≤0.95 and ≥0.95, respectively. The model includes 32 degrees of freedom with Chi-square = 148.222, Chi-Square/df = 4.625 (<5), The RMSEA, TLI, CFI, and SRMR of this study are 0.074; 0.937; 0.955; and 0.049, respectively (see Appendix 3).

Table 3 shows the construct validity and ratability of the FMBS subscale, including “Cash management” (CAM), “Credit management” (CRM), “Savings and investment” (SI), and “Insurance” (INS) of participants. Cronbach's alpha coefficients were 0.62, 0.64, 0.72, and 0.635. The overall KMO for our data was 0.80.

Five categories: FMBS, cash management subscale, credit management subscale, savings and investment subscale, and insurance subscale range from 1.00 to 5.00. The means and SDs of these 5 categories were respectively 3.21 (SD = 0.61), 3.40 (SD = 0.64), 2.80 (SD = 0.97), 3.32 (SD = 0.78) and 3.17 (SD = 0.97) (see [Appendix 2](#)).

[Figure 2](#) presents the CFA model of FMBS. The model includes 48 degrees of freedom with Chi-square = 216.703, Chi-Square/df = 4.515 (<5), RMSEA = 0.073 (<0.08). Indicators TLI = 0.891 (slightly <0.9), CFI = 0.921 (>0.9) (see [Appendix 3](#)). This shows that the model after the CFA test is suitable.

[Table 4](#) shows factors associated with the financial literacy of participants. People in higher age groups such as middle age or older had significantly lower scores in cash management, credit management, saving and investment, and total financial literacy. Female individuals had a lower score on the credit management scale (Coef. = -0.23, 95%CI = -0.39; -0.07, $p < 0.01$) than their male counterparts. Regarding income, compared with those having under \$219.64 per month, participants with higher income had significantly higher scores in the saving and investment subscale, insurance subscale, and total scale.

Participants using the Internet from 3 to 5 h per day had a higher score in the insurance subscale (Coef. = 0.30, 95%CI = 0.04; 0.56, $p < 0.05$). Notably, people using financial management applications had higher cash management, saving and investment, insurance, and full-scale scores than those not using these tools ($p < 0.05$). Meanwhile, people with more than five years of bank service usage had a higher score in the saving and investment subscale compared to those using bank service for less than one year.

In terms of cultural perspective, people who tended to avoid uncertainty also had significantly higher scores in cash management (Coef. = 0.24, 95%CI = 0.16; 0.32, $p < 0.01$), saving and investment (Coef. = 0.17, 95%CI = 0.07; 0.26, $p < 0.01$), insurance (Coef. = 0.14, 95%CI = 0.02; 0.26, $p < 0.05$) and total scale (Coef. = 0.16, 95%CI = 0.09; 0.24, $p < 0.01$) compared to those tending to engage in uncertainty. In addition, people who preferred masculinity had higher scores in credit management, insurance, and total scale than those who preferred femininity.

5. Discussion

This study evaluated financial literacy in Vietnamese adults and identified factors related to these behaviors and skills. Findings showed the average levels of financial literacy in terms of cash, credit, saving, and insurance management. The study also found that the main drivers of financial literacy include age, gender, income, Internet access and financial management applications on smart devices, and cultural factors such as uncertainty avoidance or masculinity/femininity. These results help to provide suggestions to promote and improve the financial management ability of the Vietnamese people to ensure a sustainable financial life.

In this study, the results revealed that Vietnamese adults' level of financial literacy was at an average level. The results of this study are consistent with studies around the world that show that people in low- and middle-income countries have moderate to low levels of financial literacy ([Davoli and Rodríguez-Planas, 2020](#); [De Beckker et al., 2020](#); [Klapper et al., 2015](#)). Meanwhile, in high-income countries like European countries, people were trained in personal financial management from an early age; hence, the financial literacy of people in these countries was higher ([Davoli and Rodríguez-Planas, 2020](#); [Klapper et al., 2015](#)). We found that credit management and insurance aspects scored lower than other aspects. This may be because using credit and insurance is still not widespread in Vietnam, especially for people in the low-income class. [Dew and Xiao \(2011\)](#) also stated a similar finding when developing this scale. However, the results in this study show that the participants are employed, and most of them have an income level that can afford credit and insurance. Thus, this finding shows the lack of personal financial management knowledge among Vietnamese adults, especially in these two dimensions, and the need for education and communication

programs to improve their understanding and skills in credit and insurance management.

Findings in our study echoed previous research when showing that being female, having a higher age, and having lower income was associated with lower financial literacy ([Bucher-Koenen et al., 2017](#); [Cupák et al., 2018](#); [Finke et al., 2017](#); [Lusardi and Mitchell, 2017](#); [Mauldin et al., 2016](#)). Our study also found that people using financial management applications in intelligent devices had higher financial literacy than those not using these tools. The advancement and popularity of smart devices and financial management technology created good foundations for improving the ability of each individual to manage their finances ([Aoun, 2017](#)). Using these financial management tools simplifies the financial management process and promotes learning about financial aspects, thereby enhancing financial literacy. Although some studies show that using these financial management tools can lead users to have unnecessary purchasing behaviors and potentially take on more debt or loans ([Panos and Wilson, 2020](#)), its advantages are undeniable. Recently, [French et al. \(2020\)](#), in their randomized trial, demonstrated that offering financial smartphone apps could significantly enhance financial knowledge and skills and establish their financial habits such as tracking income/expenditure and becoming resilient before the financial shock ([French et al., 2020](#)). [Carlin et al. \(2019\)](#) found that smartphone applications could be served as an external financial information source, and utilizing these apps could decrease the financial penalties among participants ([Carlin et al., 2019](#)).

The results of the multivariate regression model also show the role of cultural factors in financial literacy. Specifically, people with uncertainty avoidance had higher financial literacy scores than those with engaging uncertainty. These results are consistent with some previous studies showing racial and religious differences in financial literacy and financial attitudes ([Brown et al., 2018](#); [Grable et al., 2009](#); [Marks et al., 2009](#)). [Davoli and Rodríguez-Planas \(2020\)](#) argued that in the United States, people who come from countries that emphasized their values of patience, orientation in the long run, and risk aversion had significantly higher financial literacy ([Davoli and Rodríguez-Planas, 2020](#)). Kenneth De Beckker et al. applied Hofstede's cultural framework and found that uncertainty avoidance was positively correlated with financial literacy while individualism negatively impacted financial literacy (2020). This finding could be explained by the fact that these individuals are believed to be less inclined to put themselves at risk. Thus, improving financial literacy and personal financial management were manners to help ensure their lives less of unexpected financial events ([De Beckker et al., 2020](#); [Hofstede and Bond, 1988](#)). In addition, masculinity/femininity was associated with financial literacy. In Vietnamese culture, this may explain that financial decision-making is often assigned to men, especially with decisions related to credit and insurance, because these financial products are relatively complex. This issue is similar to the finding in the research of Chui and Kwok, which shows that in communities with a feminine culture, women often have a higher role in deciding to buy and use financial products ([Chui, 2008](#)). On the other hand, our research shows no association between individualism/collectivism and financial literacy. This is different from previous studies. The authors showed that individualistic people are prone to be overconfident and do not rely on financial advice or financial initiatives such as fintech ([De Beckker et al., 2020](#); [García, 2013](#); [Mihaylov et al., 2015](#)).

Study results suggest some implications. Firstly, to ensure a sustainable financial life, each person needs to learn more about financial management skills and financial literacy. To do so, financial education should start at an early age ([Lusardi and Mitchell, 2007b](#)). The Vietnamese government needs to develop educational programs that improve people's financial management skills. Currently, training programs on personal financial management in Vietnam are mainly implemented through workshops or seminars organized by independent organizations. In contrast, these programs have not received much attention at the undergraduate and graduate levels. Therefore, it is essential to develop personal financial management education programs from the high school

and university levels. This will help promote independence and self-determination in an individual's life. Second, due to the effects of cultural factors (uncertainty engagement/avoidance and femininity/masculinity), intervention programs need to consider individual and cultural factors to optimize their effectiveness in improving people's financial literacy. Third, females and people with higher ages had lower total financial literacy scores. Therefore, financial advice should be given to the least financially literate. In Vietnam, financial advice should be provided through government agencies such as the Women's Union. Finally, in the context of digital transformation, it is necessary to encourage people to use financial management applications on smart devices, helping to provide valuable tools and essential sources of financial information for citizens. However, using applications and smart electronic devices has also been challenging for older people. It should be better to provide training programs using such devices to young adults while they are in universities or colleges.

6. Conclusions

This study aims to explore associated factors to the financial literacy of Vietnamese adults. Multivariate regression analysis was applied to identify whether demographics, socio-economic factors, the usage of the internet, smartphone and bank, and cultural factors affect financial literacy. This study highlighted the huge gaps in financial literacy of general Vietnamese adults. Expressly, our study results indicated that females and people of higher age, low income, and did not use financial management applications had a lower financial literacy. Moreover, people who preferred uncertainty avoidance and masculinity were more financially literate than those with uncertainty engagement and femininity. Findings contributed to the current literature about the effects of different socioeconomic characteristics and cultural factors in examining the variation of financial literacy.

Study results suggest some implications. Firstly, the Vietnamese government needs to develop educational programs that improve people's financial management skills. Second, it is necessary to encourage people to use financial management applications on smart devices, helping to provide valuable tools and essential sources of financial information for citizens. Third, intervention programs need to consider individual and cultural factors to optimize their effectiveness in improving people's financial literacy.

This study has some limitations. First, this study was conducted through an online survey; hence, the results may not represent all adults in Vietnam. Other studies with a larger sample and on a representative sample of Vietnamese people should be undertaken to provide a complete picture of financial literacy among Vietnamese. Survey fraud is a severe problem in online surveys that must be considered. However, participants did not give incentives when they agreed to complete the questionnaire; hence, we might eliminate the issue. Second, this study uses international scales; thus, the content of the scale may not be entirely adequate for Vietnamese people. A follow-up study that builds the financial literacy assessment scales of Vietnamese people should be warranted. Third, although Hofstede's cultural framework is widely accepted as a framework for national values (Hofstede, 1984, 1988), this

framework may not be comprehensive given the lack of cultural aspects related to financial management. Cultural values might differ significantly within countries and provinces. For example, in Vietnam, people in the Southern region may be more open to financial issues than those in the Northern region. Moreover, this study could not investigate the effect of cultural value change on financial literacy.

With the mentioned limitations, several suggestions can be applied to future research. First, other studies with a larger sample and a representative sample of Vietnamese people should be undertaken to provide a complete picture of financial literacy among Vietnamese. Second, the financial literacy assessment scales of Vietnamese people should be validated and developed to be applied to the Vietnam context. Third, future research could focus on different socio-ecological factors (such as policy, community, or family) in financial literacy. Longitudinal studies should be performed to explore how the change in cultural values could impact financial literacy and the use of financial management applications.

Declarations

Author contribution statement

Ha Van Nguyen & Hai Thanh Phan: Conceived and designed the experiments; Performed the experiments.

Giang Hai Ha & Diep Ngoc Diep: Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Anh Hai Doan: Performed the experiments; Contributed reagents, materials, analysis tools or data.

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Data availability statement

Data will be made available on request.

Declaration of interest's statement

The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

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Appendix 1

Table A1. Constructs, indicators, questionnaire items.

Constructs	Items	#	Source
Uncertainty engagement/avoidance (UNE)	Principles and regulations are important because they inform individuals of what the collective expects of them.	UNE1	Srite and Karahanna (2006)
	Arrangement and structure are essential in a work/study environment	UNE2	
	Respecting tradition is important to me.	UNE3	
	I work hard to achieve success in the future	UNE4	
	Organizational problems should be solved by using robust approaches	UNE5	
Individualism/Collectivism (IC)	Being accepted as a group member is more important than having autonomy and independence.	IC1	Srite and Karahanna (2006)
	Collective success is more important than individual success	IC2	
	Loyalty toward the collective is more important than individual interests	IC3	
Femininity/Masculinity (FM)	Men should have a higher position than women	FM1	Suite and Karahanna (2006)
	Career is more important to men than women	FM2	
Cash management subscale (CAM)	Price comparison when using a service or product	CAM1	Dew and Xiao (2011)
	Keep personal monthly budgets.	CAM2	
	Staying on track with budget	CAM3	
Credit management subscale (CRM)	Max out credit card(s)	CRM1	Dew and Xiao (2011)
	Pay the minimum on a loan.	CRM2	
Savings and investment subscale (SI)	Maintain or create savings for emergency purposes	SI1	Dew and Xiao (2011)
	Paycheck savings	SI2	
	Saving plan for a long-term goal (car/house purchase, educational purpose, etc.)	SI3	
Insurance subscale (INS)	Payment for social insurance	INS1	Dew and Xiao (2011)
	Buy or maintain adequate health insurance.	INS2	
	Buy or maintain adequate property insurance (i.e., car/house)	INS3	
	Buy or maintain adequate life insurance	INS4	

Appendix 2

Table A2. FMBS scale and subscale descriptive statistics (n = 669).

	Mean	SD	% Often or Always	Cronbach's Alpha
Cash management subscale (1–5 points)	3.40	0.64	23.14	0.623
Price comparison when using a service or product (1–5 points)	3.38	0.89	46.19	
Keep personal monthly budgets (1–5 points)	2.81	1.09	26.91	
Staying on track with budget (1–5 points)	3.33	0.91	46.79	
Credit management subscale (1–5 points)	2.80	0.97	14.13	0.637
Max out credit card(s) (1–5 points)	2.37	1.19	20.18	
Pay minimum on a loan (1–5 points)	2.67	1.30	29.90	
Savings and investment subscale (1–5 points)	3.32	0.78	22.26	0.723
Maintain or create savings for emergency purposes (1–5 points)	3.59	1.05	62.33	
Paycheck savings (1–5 points)	3.57	1.02	59.94	
Saving plan for a long-term goal (car/house purchase, educational purpose, etc.) (1–5 points)	3.59	1.02	61.29	
Insurance subscale (1–5 points)	3.17	0.97	28.45	0.635
Payment for social insurance (1–5 points)	3.53	1.21	63.23	
Buy or maintain adequate health insurance (1–5 points)	3.99	1.02	79.37	
Buy or maintain adequate property insurance (i.e. car/house) (1–5 points)	2.76	1.36	35.28	
Buy or maintain adequate life insurance (1–5 points)	2.84	1.42	41.41	
FMBS (1–5 points)	3.21	0.61	10.42	0.820

Appendix 3

Table A3. Goodness-of-Fit Indices of CFA models.

Domain	Cultural variables	FMBS
χ^2 (df)	148.222 (32)	216.703 (48)
χ^2/df	4.625	4.515
RMSEA	0.074	0.073
CFI	0.955	0.921
TLI	0.937	0.891
SRMR	0.049	0.054

df = degree of freedom; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; SRMR = Standardized Root Mean Square Residual.

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