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The impact of financial literacy on saving behavior of the elderly people: The mediating role of digital financial literacy

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ABSTRACT

This study examines how financial literacy affects the saving habits of older people in Hanoi, Vietnam and the impact of digital financial literacy in mediating this relationship. The research is based on data collected from 250 participants aged 55 and above, surveyed in April 2024. The Partial Least Squares Structural Equation Modeling (PLS-SEM) method with SmartPLS 4 software estimates the relationship among variables. The study confirms a positive correlation between financial literacy and the saving behavior of elderly people. Additionally, digital financial literacy plays a positive mediating role in enhancing the effect of financial literacy on saving behavior by facilitating elderly people's utilization of digital tools for financial management and the pursuit of more effective saving strategies. However, traditional financial literacy maintains a more significant and direct impact on the saving behavior of this demographic group. These findings have practical implications for developing policies and interventions to enhance financial literacy and digital skills among the elderly, ensuring financial security and fostering saving behavior. The results underscore the importance of targeted educational initiatives that address both traditional financial literacy and digital financial competencies for elderly people, potentially leading to improved financial outcomes in this demographic group.

Contribution/Originality: The study sheds light on the relationship between financial literacy and the saving behavior of elderly people in Hanoi, Vietnam. The study contributes to existing literature by constructing digital financial literacy and evaluates whether the impact of financial literacy on elderly saving behavior is direct or indirect through digital financial literacy.

1. INTRODUCTION

Savings are considered to play a crucial role in the economic development of a country. According to the World Health Organization (WHO), the world's population has been aging rapidly over the years. The proportion of elderly people (aged 60 and above) is projected to double from approximately 12% to 22% of the global population between 2015 and 2050. This demographic shift underscores the critical need to study elderly people's saving behavior, given its impact on personal, family and societal financial stability. Financial literacy helps people make

effective use of financial services for their financial goals. In recent years, the financial environment has become more dynamic and complex which directly and indirectly affects people's saving behavior. Financial literacy significantly influences elderly people's saving behavior, as consumers apply various strategies including financial awareness, knowledge, skills and attitudes when making financial decisions (Brucks, 1985). Financial literacy is expected to lead people to manage their finances better. Furthermore, higher-value transactions typically require greater financial literacy (Vigneron & Johnson, 1999).

Digital financial services are known as the most promising mechanism to convey financial services to customers with the application of digital technology (Lyons, Kass-Hanna, & Greenlee, 2020). Nowadays, the number of people using digital devices such as mobile phones, smartphones, and tablets has increased very quickly. They need to have sufficient skills and knowledge to operate digital devices to perform financial transactions. Thus, there is a growing need to enhance financial literacy to adapt to the rapidly changing digital economy. Digital financial literacy is considered a mediation factor encouraging people to make the best use of their financial literacy when making financial decisions and enhancing the effectiveness of both financial literacy and financial matters.

In Vietnam, digital financial literacy is increasingly relevant as the banking industry undergoes rapid digitalization with modern digital banking channels transforming financial interactions (Shaikh, Alamoudi, Alharthi, & Glavee-Geo, 2022). Vietnam ranks second globally in financial exclusion with 69% of the population lacking bank accounts despite these advancements (Merchant Machine, 2021). Consequently, elderly people are facing particular challenges in accessing digital banking services further exacerbating the financial literacy gap in this demographic.

Earlier studies on the topic merely focused on the influence of financial literacy on saving behavior. This study further extends this relationship by examining the mediating role of digital financial literacy. This study contributes to current research on financial literacy by asserting the positive impact of financial literacy on the saving behavior of elderly people and also confirms the positive mediating role of digital financial literacy in that relationship. The authors propose recommendations to enhance financial literacy and digital financial literacy, thereby strengthening personal savings behavior and generating positive effects on Vietnam's economic and social development based on the findings.

The remaining research is structured as follows: Section 2 introduces the previous studies on financial literacy, digital financial literacy, and their impacts on the saving behavior of elderly people. Section 3 focuses on the research methodology used in the study. Section 4 presents the results of the model (presumably the research model or statistical analysis) and section 5 provides a conclusion based on these findings.

2. LITERATURE REVIEW

2.1. Financial Literacy

Over the past few decades, financial markets have experienced a period of extensive development with products and financial services made easily accessible to all citizens. In the meantime, people need to have awareness, skills, and the right attitudes towards financial matters. Financial literacy refers to the ability to use an understanding of finance to deal with financial issues. Michael, Hill, and Perdue (2010) emphasized the importance of financial literacy in modern society. Financial literacy enables individuals to use financial information to understand financial matters and make appropriate financial decisions. Remund (2010) defined financial literacy as a person's competency to manage his money which involves the ability to understand and communicate financial concepts, manage his financial matters, confidently make financial decisions and make future financial plans.

The financial literacy of elderly people is of great interest as when people grow old, they seem to have more resources to manage than at their earlier age. Sound financial decision-making becomes very important as it ensures the financial security of old people. According to Annamaria Lusardi and Mitchell (2011) financial planning is considered an important factor in retirement planning.

Harahap, Thoyib, Sumiati, and Djazuli (2022) researched the causal effect between financial literacy and retirement planning with the mediating role of financial risk tolerance and saving behavior in Indonesia. The research sample consisted of 388 medium-scale entrepreneurs who contributed about 61.07% to Indonesia's gross domestic product. The results showed an average score of 4.04 for financial literacy and 4.05 for saving behavior. The research revealed that financial retirement planning is not indirectly impacted by financial literacy through the mediation of saving behavior. Entrepreneurs with high financial literacy scores tend to optimize their cash flow, such as investing their company's profit in working capital and new projects rather than putting money in saving accounts. However, this research also confirmed the positive relationship between financial risk tolerance and saving behavior of medium-scale entrepreneurs. They are oriented to prepare emergency funds in the form of capital reserves to suffer from unexpected loss or urgent needs of cash.

Fong, Koh, Mitchell, and Rohwedder (2021) used data from the 2015-2017 Singapore Life Panel, an internet-based survey with respondents aged 50-70. The financial literacy of respondents is measured at individual levels by answering three financial literacy questions known as the big three questions testing the capacity to understand and do calculations on interest rates, inflations and diversifications of risk. The study finds that the higher their financial literacy scores, the better old people manage their financial matters as on-time credit card payments, stock investments and risk diversifications.

2.2. Digital Financial Literacy

The rapid expansion of digital products and services in recent years has changed the way financial products and services are delivered to customers. Many financial services are now offered on digital platforms such as mobile phones, iPads and tablets besides traditional banking. People can easily access financial services in a relatively short time to satisfy their financial needs, withdraw money, borrow money, and make their investments. It is necessary to increase public literacy in digital finance. Prasad, Meghwal, and Dayama (2018) defined digital financial literacy as the level to which people understand how to operate financial transactions on digital platforms. Digital financial literacy is a combination of financial literacy and digital literacy which includes different aspects such as learning about digital financial products, the inherent hazards of digital financial goods, how to control these risks and redress procedures (Lyons & Kass-Hanna, 2021; Rahayu, Ali, Aulia, & Hidayah, 2022).

Digital financial literacy is strongly impacted by an individual's socioeconomic characteristics such as age, income, occupation, and education. Setiawan, Effendi, Santoso, Dewi, and Sapulette (2022) confirmed education level and income as determinant factors of an individual's digital financial literacy. Prasad et al. (2018) in their study of households in Udaipur concluded that education level is the main factor determining awareness about the digital platform and how to use it.

Personal income also impacts the level of digital financial literacy. Rahayu et al. (2022) conducted a survey of 741 respondents aged 25-40 to evaluate digital financial literacy in Indonesia. The results showed a relatively low score of digital financial literacy (3.32/5); the highest component score was the skill of the respondents in managing their digital financial activities with an average of 3.48. The research also confirmed the significant relationship between income and the level of digital financial literacy and digital financial literacy significantly influences the financial behavior of the Indonesian millennial generation (spending behavior, saving behavior, and investment behavior). This indicates that people with a better level of digital financial literacy tend to have better decision-making related to their financial matters.

Ouma, Odongo, and Were (2017) studied the relationship between the popular use of mobile financial services and saving behavior in sub-Saharan African countries. The research revealed that when people could access financial services on their mobile phones, both the likelihood of saving and the amounts saved increased. The research suggested encouraging the widespread use of mobile financial services to promote savings mobilization.

According to Abdallah, Tfaily, and Harraf (2024) digital financial literacy includes financial knowledge, digital knowledge, practical know-how, awareness, decision-making and self-protection. The authors surveyed with 385 respondents who are bank account customers to evaluate how digital financial literacy influences financial behavior (saving behavior, shopping behavior, and long- and short-terms planning). The study affirmed the positive relationship between digital financial literacy and saving behavior.

2.3. Saving Behavior of the Elderly People

The definition of saving is understood as the rational use of material resources, time, and labor by oneself and others. Saving can be understood as the income left after consumption (Lee & Hanna, 2015). Individuals are likely to set aside money for one of the following reasons: save for precautionary needs, save for retirement, save to buy a new house, and save for future education. Lee and Hanna (2015) shed light on the positive relationship between saving goals and saving behavior of households in which saving goals are categorized into six levels according to Maslow's hierarchy of needs.

Sarah et al. (2019) investigated the influence of personality on the saving behavior of elderly people aged 50-70. Saving behavior is indirectly impacted by psychological characteristics such as conscientiousness, extroversion, and openness to experiences.

The study by Peiris (2021) demonstrates that financial literacy positively influences individual saving behaviors with saving intention serving as a significant mediator in this relationship. The findings suggest that better financial literacy leads to more effective saving behavior and promotes greater saving intentions contributing to economic growth and welfare. This positive relationship between financial literacy and saving behavior is also found in Kamarudin (2018) and Lusardi's (2019) studies.

Kass-Hanna, Lyons, and Liu (2022) examined the effects of financial and digital literacy on financial resilience in South Asia and Sub-Saharan Africa analyzing survey data from seven countries. The study found both financial literacy and digital literacy significantly influenced saving, borrowing, risk management, and emergency preparedness behaviors. Digital literacy had a stronger impact on saving and borrowing while financial literacy was more crucial for emergency preparedness. For risk management, digital literacy was more important for insurance purchases and financial literacy for emergency planning. Effects varied across regions and demographics but were consistently positive. The authors propose redefining financial literacy to include digital capabilities, suggesting implications for enhancing household financial resilience.

The authors proposed the following hypotheses based on previous research:

H_1: Financial literacy positively influences the saving behavior of elderly people.

H_2: Financial literacy positively impacts the digital financial literacy of elderly people.

H_3: Digital financial literacy positively impacts the saving behavior of elderly people.

H_4: Digital financial literacy mediates the relationship between financial literacy and saving behavior of elderly people.

3. RESEARCH MODEL

The study aims to examine the influences of financial literacy on the saving behavior of elderly people with digital financial literacy as a mediation factor. Based on previous studies, a research model was proposed as follows: The study employs a descriptive quantitative method through hypothesis testing and data analysis. The study differs from other previous studies in that the research sheds light on the relationship between financial literacy and the saving behavior of elderly people in Hanoi, Vietnam with the mediation role of digital financial literacy.

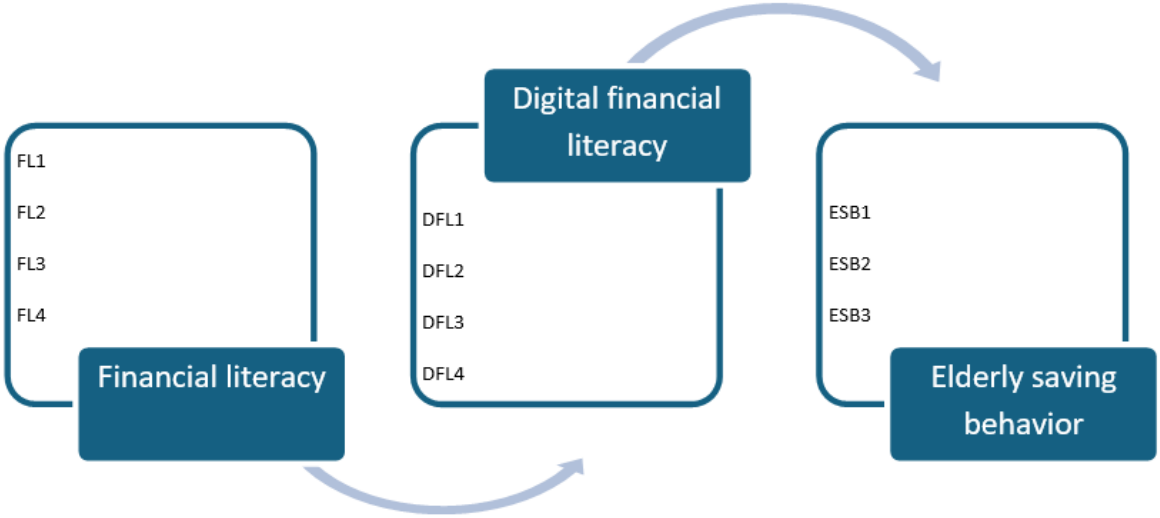

Figure 1. Proposed research model.

Figure 1 illustrates the proposed model to test the relationship between financial literacy and elderly saving behavior. Financial literacy is measured by FL1, FL2, FL3, and FL4 while ESB1, ESB2 and ESB3 are constructed to capture the saving behavior of elderly people. The model is also proposed to examine if there is a mediating role of digital financial literacy while digital financial literacy shows the understanding of digital platforms to make financial decisions and perform financial services (DFL1, DFL2, DFL3 and DFL4).

3.1. Development of Questionnaires and Research Scale Selection

The author has developed a questionnaire based on a review of previous studies on the impact of financial literacy on the saving behavior of elderly people (see Table 1). The survey is conducted from 1st April to 30th April 2024. The authors use a 5-point Likert scale to measure observed variables. In the questionnaire, there are additional questions to collect respondents' information such as gender, age, education level, income, etc. besides questions measuring observed variables for the main purpose.

Table 1. Questionnaire.

Code	Description	References
FL	Financial literacy	
FL1	Financial literacy test score	Bayar, Sezgin, Öztürk, and Şaşmaz (2017) and Atkinson and Messy (2012)
FL2	I am prepared to risk some of my own money when saving or making an investment.	
FL3	I keep a close personal watch on my financial affairs.	
FL4	I always set long -term financial goals and strive to achieve them.	
DFL	Digital financial literacy	
DFL1	I have a clear understanding of online banking.	Morgan and Trinh (2020) and Prasad et al. (2018)
DFL2	I have previously deposited savings and made investments such as buying and selling stocks or cryptocurrencies on digital platforms.	
DFL3	I am confident in analyzing digital financial information to make financial decisions.	
DFL4	I keep myself updated on developments and trends in the field of digital financial literacy.	
ESB	Saving behavior of elderly people	
ESB1	Grade themselves in saving money area.	Lee and Hanna (2015) and Peiris (2021)
ESB2	I set money aside for savings.	
ESB3	Over the last year, how would they describe their saving habits?	

3.2. Sample and Data Collection

This study conducted a survey of individuals aged 55 and above in Hanoi with a random sampling method to collect data. Data collection was carried out in residential areas, parks and streets across Hanoi. The direct survey method will be prioritized given that the survey subjects are elderly people who do not regularly access or use digital technology devices. The majority of the data collection process will be conducted through face-to-face meetings and interviews with the elderly participants rather than using online surveys or other digital tools. This choice of traditional survey method aims to minimize technological barriers and ensure accurate data collection from a group unfamiliar with the digital environment.

The survey was conducted from April 1st to April 30th, 2024. In total, from 300 surveys distributed, there were 250 valid answer sheets accounting for an 83.3 % response rate.

4. RESULTS AND DISCUSSION

4.1. Results

4.1.1. Demographics of Respondents

Table 2 provides a summary of demographics. Out of 250 valid survey respondents, 99 were male (39.6%) and 151 were female (60.4%). Participants were predominantly aged over 55 comprising 97.2% of the sample (68% aged 55-65 and 29.2% aged over 65). Regarding previous occupations, respondents were evenly distributed across business (28.8%), civil service (24%), self-employment (36.4%) and other fields (10.8%). Educational attainment varied with a majority having completed secondary education (35.7%) followed by university education (27.5%), and primary to middle school education (26%). Postgraduate education constituted 6.2% and other qualifications accounted for 4.7%. Monthly income levels showed that most respondents earned less than 5 million VND (35.6%) or between 5-10 million VND (39.6%) which aligns with the retired status of the surveyed population. Income levels of 10-20 million VND and over 20 million VND comprised 14.8% and 10% of respondents, respectively.

Table 2. Demographic statistics of respondents.

Characteristics		Percentage %
Age	Under 55 years	2.80%
	55-65 years	68%
Occupation before retirement	Business	28.80%
	Self-employed	36.40%
	Civil servant	24%
	Others	10.80%
Highest education level	University	27.50%
	Primary to middle school	26%
	Postgraduate	6.20%
	Secondary school	35.70%
Monthly income	Below 5 million VND	35.60%
	5-10 million VND	39.60%
	10-20 million VND	14.80%
	Over 20 million VND	10%

4.1.2. The Examination of the Measurement Model

The authors employed the Partial Least Squares Structural Equation Modeling (PLS-SEM) method using SmartPLS 4 software to evaluate the characteristics of the measurement scales and test the hypotheses. The main reason for selecting the PLS-SEM model is that this method does not make any assumptions about the normal distribution characteristics of the data and is not overly sensitive to small sample sizes (Arnett, Laverie, & Meiers, 2003).

The results of examining construct reliability are displayed in Table 3. For the construct reliability, both Cronbach's alpha and composite reliability are greater than 0.7 ranging from 0.762 to 0.910, and 0.846 to 0.940, respectively. Hence, all constructs are qualified for both convergent validity and construct reliability.

Table 3. Reliability validity test.

Variables	Cronbach's alpha	Composite reliability (rho_c)	Average variance extracted (AVE)
Digital financial literacy (DFL)	0.910	0.937	0.788
Financial literacy (FL)	0.762	0.846	0.580
Elderly saving behavior (ESB)	0.904	0.940	0.839

The Fornell and Larckers and HTMT scores are assessed for discriminant validity (see Table 4). The results express that scores of financial literacy, digital financial literacy, and elderly saving behavior are greater than any correlation coefficient between them and others. Thus, all the items and constructs in the outer model are suitable for the research model.

Table 4. Results of the discriminant validity.

Variables	Fornell-Larcker			Heterotrait-Monotrait (HTMT)		
	DFL	FL	ESB	DFL	FL	ESB
DFL	0.888			1		
FL	0.597	0.762		0.715	1	
ESB	0.472	0.639	0.916	0.518	0.733	1

4.1.3. Examination of the Structural Model

Examining the inner model is conducted to test the research hypotheses. First, assess the multi-collinearity by testing the inner variance inflation factor (VIF) (see Table 5). The VIF scores between two pairs of constructs are much less than 5 and the model has no multi-collinearity.

Table 5. Multi-collinearity test.

Variables	VIF	Variables	VIF
DFL1	2.881	FL1	1.989
DFL2	2.396	FL2	1.835
DFL3	3.215	FL3	1.979
DFL4	2.745	FL4	1.915
		ESB1	2.719
		ESB2	3.512
		ESB3	2.805

The results of R^2, R^2 adjusted and f^2 are displayed in Table 6. In Smart-PLS4, the software provides an adjusted R^2 coefficient (R-square adjusted) which more accurately reflects the explanatory power of the independent variables in addition to R^2 (R-square). The adjusted R^2 coefficient of the structural model shows that the digital financial literacy variable is explained at 35.4% by the model, while the Saving Behavior variable is explained at 42.1% by the model. Chin (1998) introduced a formula for calculating the f^2 coefficient (f square) to examine the importance of an independent variable on the dependent variable. When evaluating the f^2 value for the independent variables, the results show that digital financial literacy has a small effect on the saving behaviour of elderly people while financial literacy has a great effect on digital financial literacy, and financial literacy has a greater effect on saving behaviour than digital financial literacy.

Table 6. R^2, R^2 adjusted and f^2.

Variables	R^2	R^2 adjusted	f^2 (Digital financial literacy)	f^2 (Elderly saving behavior)
Digital financial literacy (DFL)	0.356	0.354		0.022
Financial literacy (FL)			0.553 (Big)	0.342
Elderly saving behavior (ESB)	0.421	0.416		

Investigation of the direct relationships through bootstrapping is displayed in Table 7.

Table 7. Research hypotheses testing.

Hypotheses	Std. beta	Std. deviation	T-value	P values	Results
H1: FL -> ESB	0.639	0.045	14.209	0.000	Supported
H2: FL -> DFL	0.597	0.042	14.269	0.000	Supported
H3: DFL -> ESB	0.141	0.058	2.428	0.015	Supported
H4: FL -> DFL -> ESB	0.084	0.035	2.418	0.016	Supported

According to Table 7, the research hypotheses of the positive effect of financial literacy and digital financial literacy on elderly saving behavior (H1 and H3), financial literacy on digital financial literacy (H2), and the mediating role of digital financial literacy (H4) are all supported. This finding aligns with the research results of many other scholars in the same field. The positive impact of these relationships indicates that higher financial literacy among elderly people leads to better saving behavior and particularly promotes greater saving intentions. Digital financial literacy plays an important mediating role as both direct and indirect relationships are statistically significant regarding the relationship between financial literacy and the saving behavior of elderly people. Thus, digital financial literacy enhances the overall impact of financial literacy on the saving behavior of elderly people. This result also suggests that banks should aim to improve the digital financial literacy of elderly people to encourage their saving behavior.

4.2. Discussion

The primary objective of this study is to evaluate the impact of financial literacy on the saving behavior of elderly people through the mediating role of digital financial literacy. The research findings confirm the following:

Firstly, financial literacy positively impacts the digital financial literacy of elderly people. This means that elderly people with higher financial literacy find it easier to access and use digital financial products and services such as mobile banking and e-wallets. They feel more confident in adopting new financial technologies, thereby enhancing their digital financial literacy. This result is also found in the study by Morgan and Trinh (2020) and Hijir (2022).

Secondly, digital financial literacy positively influences the saving behavior of elderly people. This relationship is also found in research conducted by Ouma et al. (2017) who stated that people with access to digital devices are more likely to open savings accounts than those who do not. Rahayu et al. (2022) with the research findings show people with a higher level of digital financial literacy will have better saving behavior. Nowadays, the use of mobile banking applications, e-wallets or online investment platforms enables elderly people to easily monitor and manage accounts and expenditures, and conduct financial transactions anytime, anywhere with just a few operations on their phones. Moreover, current digital financial platforms often integrate risk management tools and provide alerts for market fluctuations. This allows elderly people to proactively monitor and control investment risks, ensuring the safety of their investment portfolios and income. However, the results in Table 6 also suggest that the impact of digital financial literacy on saving behavior is less than that of financial literacy. This could be understood as digital

platforms for financial services in Vietnam have just developed for a few years. People know about digital financial products but they are sometimes reluctant to use them; they tend to use traditional services for their savings.

Thirdly, there is a significant relationship between financial literacy and saving behavior in elderly people. This result is consistent with previous studies conducted by Peiris (2021) and Harahap et al. (2022). Higher financial literacy helps elderly people better understand the importance of saving and its long-term benefits. They recognize that saving is necessary to ensure financial security in old age, encouraging more regular saving habits. Furthermore, elderly people with good financial literacy know how to plan finances, monitor expenditures, and spend more efficiently. Tight control of spending helps them accumulate more money for saving. Additionally, good financial literacy also helps individuals make more appropriate investment decisions. They better understand various investment products, their risk levels and potential returns. Consequently, they can choose investment channels that align with their objectives and risk appetite ensuring future asset and income growth.

In a nutshell, this study has provided empirical evidence on the importance of financial literacy and digital financial literacy for the saving behavior of elderly people. These findings have practical implications for developing policies and interventions aimed at enhancing financial literacy and digital skills for elderly people, thereby motivating saving behavior and ensuring their financial security.

4.3. Limitations and Further Research Directions

Although this study provides considerable theoretical and practical contributions, certain limitations are inevitable. Data collection was conducted over only a single month, potentially failing to fully reflect the long-term situation of the survey and instead offering merely a snapshot during the research period due to the research's time constraints. Secondly, the sample size of this study is relatively small and restricted to Hanoi, Vietnam resulting in limited sample diversity. The findings may not adequately capture the differences in perspectives and responses of participants from various regions. These limitations raise questions about the generalizability of the research findings in a broader context. Future research might extend the scope of the research to better examine the relationship between financial literacy, digital financial literacy, and the saving behavior of elderly people in Vietnam. Moreover, financial literacy and digital financial literacy are measured by subjective questionnaires; biases might arise during the process of designing and responding to questionnaires which could potentially impact the research outcomes. In the future, researchers might design an index to capture financial literacy and digital financial literacy to address this limitation.

5. CONCLUSION

This study investigates the impact of financial literacy on saving behavior examining the mediating role of digital financial literacy among individuals over 55 years old. Key findings reveal that financial literacy has a direct and positive effect on saving behavior. Moreover, digital financial literacy serves as a significant positive mediator in this relationship indicating that digital financial literacy not only directly impacts but also enhances the impact of financial literacy on the saving behavior of elderly people. People with financial knowledge tend to save more, and digital financial understanding increases savings behavior and emphasizes the relationship between financial literacy and savings behavior. Therefore, improving individuals' financial awareness is an effective strategy to increase saving rates within an economy. Consequently, the government and state agencies could collaborate with commercial banks to implement strategies to improve financial literacy and digital financial literacy among the elderly leading to improved saving behavior in this demographic.

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