www.ijarp.com ISSN 2456-9992 Page: 01-18

International Journal Advanced Research Publications

Research Article

Volume: 02
Issue: 11

FINANCIAL LITERACY AND SAVING BEHAVIOUR AMONG UNIVERSITY STUDENTS: EXAMINING THE ROLE OF FINANCIAL ATTITUDES, SELF-EFFICACY, AND FINANCIAL SOCIALIZATION

***Ruhiya Nazneen**

Lecturer, Applied College, Jazan University, Saudi Arabia.

Article Received: 08 October 2026, Article Revised: 28 October 2026, Published on: 17 November 2026

***Corresponding Author: Ruhiya Nazneen**

Lecturer, Applied College, Jazan University, Saudi Arabia.

Doi: https://doi-doi.org/101555/ijarp.6417

ABSTRACT

Financial literacy is an important capability for university students who are increasingly required to make independent financial decisions. However, financial knowledge alone may not necessarily result in consistent saving behaviour. This study empirically examines the relationship between financial literacy and saving behaviour among university students, with particular attention to financial attitudes, financial self-efficacy, and financial socialization. Drawing on the Theory of Planned Behaviour, Social Cognitive Theory, and behavioural finance perspectives, the study develops an integrated framework linking financial knowledge and behavioural factors with saving practices.A quantitative, cross-sectional research design was employed. Data were collected using a structured questionnaire, with 300 questionnaires distributed and 270 usable responses obtained, resulting in a valid response rate of 90.33%. The data were analysed using the Statistical Package for the Social Sciences (SPSS). The analysis included descriptive statistics, reliability testing, Pearson correlation analysis, multiple regression analysis, and mediation analysis. Financial literacy, financial attitudes, financial self-efficacy, financial socialization, and saving behaviour were operationalised as the principal constructs of the study. These findings demonstrate the importance of considering both cognitive and behavioural factors when explaining students' saving behaviour. The study contributes to the financial literacy literature by integrating financial knowledge with attitudes, self-efficacy, and socialization within a university-student context. The findings also provide practical implications for universities seeking to develop more effective financial education and personal financial management programmes.

KEYWORDS: Financial literacy; Saving behaviour; Financial attitudes; Financial self-efficacy; Financial socialization; University students; SPSS.

1. INTRODUCTION

1.1 Background of the Study

Financial education initiatives frequently emphasize the development of knowledge concerning budgeting, interest rates, savings products, debt, and investment. However, knowledge acquisition alone may not guarantee behavioural change(Casado Díaz & Más Ruíz, 2002). Students may understand the benefits of saving but continue to prioritize immediate consumption over future financial needs. Such differences between financial awareness and financial action raise questions about the mechanisms through which financial literacy influences saving behaviour(Ahern, 2021).

A further concern is that students operate within different economic and social environments. Family financial practices, parental guidance, peer influence, access to income, and individual confidence in managing money may produce substantial differences in saving decisions(Basse Mama, 2018). Consequently, students with similar levels of financial knowledge may demonstrate different saving patterns.The central research problem addressed by this proposed study is therefore the need to understand not only whether financial literacy is associated with saving behaviour, but also how financial attitudes, financial self-efficacy, and financial socialization contribute to this relationship. An examination of these factors may provide a more comprehensive explanation of student saving behaviour than an approach based exclusively on financial knowledge.

1.3 Research Motivation

The motivation for this research originates from three considerations.

First, university students are developing financial habits during an important stage of their personal and educational development. Their financial decisions may influence their ability to manage future income, respond to unexpected expenses, and establish long-term financial stability(Esmaeilpour Moghadam et al., 2025).

Second, financial literacy programmes are frequently designed around the assumption that improving knowledge will improve financial behaviour(Angelini, 2009). Although this assumption has a reasonable theoretical foundation, its practical effectiveness depends on the extent to which students can translate knowledge into consistent financial practices.

Third, the influence of family and social environments deserves consideration. Financial attitudes and saving habits may develop through observation, communication, and repeated

exposure to financial practices. Understanding these influences may help explain why students with comparable educational backgrounds demonstrate different financial behaviours(Dong et al., 2008).

The proposed study therefore seeks to examine financial literacy as part of a broader behavioural framework rather than treating it as an isolated determinant of saving.

1.4 Significance of the Study

The study has potential significance for several stakeholder groups.

University students: The research may improve understanding of the factors associated with effective personal financial management. It may also help students recognize the importance of financial planning, disciplined expenditure, and regular saving.

Higher education institutions: Universities may use the study's eventual findings to evaluate the need for financial literacy programmes, workshops, financial counselling, and practical personal finance education.

Educational policymakers: The proposed research may provide evidence relevant to the integration of financial education into higher education curricula and student development programmes.

Financial institutions: A better understanding of student saving behaviour may help financial institutions develop appropriate savings products and financial education initiatives for young adults.

Academic researchers: The study may contribute to behavioural finance and financial education research by examining the combined roles of financial knowledge, attitudes, self-efficacy, and socialization.

1.5 Research Objectives

The primary objective is to examine the relationship between financial literacy and saving behaviour among university students.

The specific objectives are:

1. To examine the relationship between financial literacy and saving behaviour among university students.
2. To investigate the influence of financial attitudes on students' saving behaviour.
3. To assess the relationship between financial self-efficacy and saving behaviour.
4. To examine the influence of financial socialization on saving behaviour.
5. To investigate whether financial attitudes mediate the relationship between financial literacy and saving behaviour.

6. To examine whether financial self-efficacy mediates the relationship between financial literacy and saving behaviour.

2. Literature Review

2.1 Financial Literacy: Concept and Dimensions

Financial literacy is a multidimensional concept involving the knowledge, understanding, and application of financial principles in personal financial decision-making. It extends beyond familiarity with financial terminology and requires the ability to evaluate financial alternatives and make decisions that are consistent with individual needs and financial objectives(Talha et al., 2025).

The conventional approach to measuring financial literacy frequently focuses on fundamental financial concepts such as interest rates, inflation, compound interest, and risk diversification(Khan et al., 2024; Talha et al., 2024). These concepts are important because they provide individuals with the basic knowledge required to understand financial products and evaluate the consequences of different financial choices.

However, financial literacy can also be understood through applied competencies. These include budgeting, expenditure monitoring, debt management, savings planning, and the evaluation of financial risks(Degraeve et al., 2004). An individual may possess theoretical knowledge of interest rates but lack the practical ability to prepare a budget or maintain a regular saving schedule.

For university students, the distinction between theoretical knowledge and applied financial competence is especially relevant. Students may have studied economic or business subjects without necessarily applying the concepts to their personal finances(Von Grumbkow, 2013). Similarly, students from non-business disciplines may develop effective financial management practices through family experience and personal learning(Angelini, 2009).

Researchers should therefore distinguish between objective financial knowledge and self-assessed financial understanding. Objective knowledge can be evaluated through questions with correct or incorrect answers, whereas subjective financial literacy captures individuals' perceptions of their financial competence.

The proposed study should primarily use objective financial knowledge to measure financial literacy while considering whether subjective knowledge is necessary as a separate construct. This distinction can reduce conceptual ambiguity and improve the interpretation of the relationship between knowledge and saving behaviour.

2.2 Saving Behaviour: Conceptual Understanding

Saving behaviour refers to the deliberate allocation of available financial resources towards future consumption, financial security, or specific financial objectives. It involves decisions concerning how much income to save, how frequently saving occurs, and how individuals balance present consumption against future needs(Badescu et al., 2015).

Saving behaviour is not limited to maintaining a bank account. It may include depositing money into formal savings accounts, retaining cash for future needs, maintaining emergency reserves, and allocating a proportion of available income towards predetermined financial objectives(Ben-Ameur et al., 2009).

For university students, saving behaviour may be influenced by the nature and stability of their income(Baals et al., 2024). Students receiving fixed monthly allowances may develop different saving patterns from those who depend on irregular financial support or part-time employment. Accordingly, saving behaviour should be examined in relation to students' financial circumstances.

The concept also has both behavioural and intentional dimensions. Saving intention represents an individual's willingness or plan to save, whereas actual saving behaviour concerns the extent to which the individual implements that intention. The two concepts should not be treated as interchangeable.

This study proposes measuring actual or self-reported saving practices rather than relying exclusively on intentions. Indicators may include saving frequency, consistency of saving, allocation of available income, maintenance of emergency savings, and progress towards personal financial goals.

2.3 Relationship between Financial Literacy and Saving Behaviour

Financial literacy may influence saving behaviour by improving individuals' ability to understand financial consequences and evaluate alternative uses of limited resources.

Students who understand budgeting, compound interest, inflation, and financial planning may recognize the longer-term benefits of saving(“12th International Multidisciplinary Scientific GeoConference and EXPO, SGEM 2012, Volume 4,” 2012). Financial knowledge can also improve their ability to distinguish between necessary and discretionary expenditure and to identify the financial consequences of excessive consumption(Yereshko et al., 2024).

Knowledge of inflation may help students understand the importance of preserving purchasing power. Understanding compound interest may encourage earlier saving, while knowledge of budgeting may support the development of regular saving practices.

Nevertheless, the relationship may be influenced by individual circumstances. A financially knowledgeable student with insufficient income may be unable to save consistently. Similarly, knowledge may not translate into action when individuals experience impulsive consumption tendencies or weak financial discipline(Premaratne & Balasubramanyan, 2005). Financial literacy should therefore be considered an important potential determinant rather than a sufficient condition for saving behaviour.

The proposed research will examine whether students with greater financial knowledge demonstrate stronger saving practices while recognizing that the relationship may operate through additional psychological and social mechanisms.

2.4 Financial Attitudes and Saving Behaviour

Financial attitudes refer to individuals' positive or negative evaluations of financial management practices and financial decisions. In the context of saving, attitudes concern the perceived importance of saving, willingness to delay consumption, preference for financial security, and general orientation towards future financial needs(Kumaran, 2022).

Attitudes may influence financial behaviour because individuals are more likely to engage in practices they consider beneficial and consistent with their personal priorities.

A student who considers saving essential for financial independence may be more willing to allocate part of an allowance towards future needs. In contrast, a student who prioritizes immediate consumption may consider saving less attractive, particularly when financial resources are limited(Talan et al., 2024).

Financial attitudes may also explain why financial knowledge does not always translate into behaviour(Armah et al., 2025). Students may understand the importance of saving without developing a sufficiently positive orientation towards it(Al-Banna et al., 2024).

The relationship between knowledge and attitudes may be reciprocal or sequential. Financial knowledge may improve attitudes by increasing awareness of the benefits of saving. Positive attitudes may subsequently strengthen saving intentions and encourage actual saving practices(Yousaf et al., 2022).

The proposed study considers financial attitudes both as a direct determinant of saving behaviour and as a potential mediator between financial literacy and saving behaviour.

Researchers should distinguish saving attitudes from general attitudes towards money to ensure that the measurement instrument captures the construct relevant to the research model.

2.5 Financial Self-Efficacy

Financial self-efficacy refers to an individual's confidence in their ability to perform financial management activities and achieve personal financial objectives.

It includes confidence in preparing budgets, controlling expenditure, maintaining savings, managing unexpected expenses, and making informed financial decisions.

(Kalashnikova et al., 2016) state that self-efficacy is important because individuals may possess relevant knowledge but lack confidence in applying it. Students who believe they can control their expenditure and maintain a saving plan may be more likely to implement consistent financial practices.

Financial self-efficacy may also influence how students respond to financial challenges. Students with stronger confidence in their financial management abilities may be more willing to establish saving goals and adjust expenditure when financial circumstances change(Ramdas et al., 2013).

Conversely, students with low financial self-efficacy may perceive financial management as difficult and avoid setting financial goals, even when they understand the importance of saving.

The proposed study therefore examines financial self-efficacy as a behavioural mechanism that may connect financial literacy with saving behaviour.

2.6 Financial Socialization

Financial socialization refers to the process through which individuals acquire financial knowledge, attitudes, values, and behaviours through interaction with family members, peers, educational institutions, and other social influences(Ramdas et al., 2013).

Family environments may represent an important source of early financial learning. Parents and guardians can influence financial behaviour through direct financial education, discussions about expenditure, the provision of allowances, and demonstrations of saving practices(Diana Rusu & Roman, 2017).

Peer groups may also influence students' financial decisions. Social interaction can encourage responsible financial practices, but it may also create pressure to spend on entertainment, clothing, technology, and social activities.

Educational institutions can contribute to financial socialization through formal courses, seminars, financial awareness campaigns, and practical financial management activities.

The relative influence of these sources may differ according to students' age, socioeconomic circumstances, family background, and educational experience.

In the proposed framework, financial socialization is treated as an independent explanatory construct. Its influence on saving behaviour will be examined separately from financial literacy and financial attitudes(Aiello et al., 2020).

This distinction is important because financial socialization concerns the sources and processes through which financial practices are learned, whereas financial literacy concerns the knowledge acquired.

2.7 Theoretical Perspectives on Financial Behaviour

2.7.1 Theory of Planned Behaviour

The Theory of Planned Behaviour provides a useful foundation for explaining how individual attitudes, perceived social expectations, and perceived behavioural control influence intentions and behaviour.

Within the context of saving, favourable attitudes towards saving may strengthen an individual's willingness to allocate resources towards future needs. Subjective norms may reflect the influence of family members and peers, while perceived behavioural control may represent confidence in the ability to maintain a saving plan.

The theory is particularly relevant because saving decisions involve both individual evaluations and perceptions of control over financial circumstances.

For the present research, the Theory of Planned Behaviour supports the inclusion of financial attitudes as a determinant of saving behaviour. Its perceived-control dimension also provides a conceptual connection to financial self-efficacy(Sun et al., 2021).

However, the proposed model does not attempt to reproduce every component of the original theory. Researchers should clearly explain the selected theoretical dimensions and avoid claiming that the complete theory has been tested if its full constructs have not been measured.

2.7.2 Social Cognitive Theory

Social Cognitive Theory explains human behaviour through the interaction of personal factors, environmental influences, and behavioural experiences.

Financial self-efficacy is particularly relevant within this perspective. Individuals who believe they can successfully manage their finances may be more likely to establish financial goals, monitor expenditure, and maintain saving practices(Burylina et al., 2016).

Financial socialization is also consistent with the theory because individuals may develop financial behaviours through observation, interaction, and learning within their social environments(Von Grumbkow, 2013).

The theory therefore provides a foundation for understanding why financial behaviour depends not only on individual knowledge but also on confidence and environmental experiences.

2.7.3 Behavioural Finance Perspective

Behavioural finance recognizes that financial decisions are influenced by psychological factors and behavioural tendencies rather than exclusively by rational calculations.

Individuals may prioritize immediate consumption, underestimate future financial needs, or experience difficulties maintaining long-term financial commitments.

These tendencies may be particularly relevant among students who have limited financial resources and face competing consumption demands.

The behavioural finance perspective helps explain why financial literacy alone may not fully determine saving behaviour. Financial attitudes and self-efficacy may influence how individuals translate financial information into actual decisions(Yan et al., 2016).

The proposed study uses this perspective to justify an integrated model of financial knowledge and behavioural characteristics.

3. Synthesis of the Literature

The reviewed concepts suggest that saving behaviour is a multidimensional outcome influenced by financial knowledge, personal attitudes, perceived capabilities, and social learning.

Financial literacy provides the cognitive foundation for understanding financial choices. Financial attitudes reflect individuals' evaluations of saving, while financial self-efficacy concerns confidence in implementing financial decisions(Yoon & Hansen, 2007). Financial socialization captures the environmental processes through which financial knowledge and habits are acquired(Varde et al., 2018).

These constructs provide complementary explanations of student saving behaviour. Their integration may provide a more complete analytical framework than examining financial literacy as the sole explanatory variable.

The proposed empirical model will therefore examine the direct relationships between the four explanatory constructs and saving behaviour, alongside the potential mediating roles of financial attitudes and financial self-efficacy.

4. Research Questions and Objectives

4.1 Research Questions

The study proposes the following research questions:

RQ1: What is the relationship between financial literacy and saving behaviour among university students?

RQ2: How do financial attitudes influence university students' saving behaviour?

RQ3: What is the relationship between financial self-efficacy and saving behaviour?

RQ4: How does financial socialization influence saving behaviour among university students?

4.2 Research Objectives

The objectives correspond directly to the research questions:

1. To assess the relationship between financial literacy and saving behaviour.
2. To examine the influence of financial attitudes on saving behaviour.
3. To investigate the effect of financial self-efficacy on saving behaviour.
4. To evaluate the influence of financial socialization on saving behaviour.

5. Theoretical Framework

5.1 Integration of Theoretical Perspectives

The proposed framework draws on three complementary perspectives to explain saving behaviour.

The Theory of Planned Behaviour provides the foundation for understanding the influence of financial attitudes on individual decisions. It suggests that favourable evaluations of saving can contribute to stronger saving intentions and corresponding behaviour.

Social Cognitive Theory provides the foundation for examining financial self-efficacy. It explains how personal confidence, environmental learning, and behavioural experiences interact in the development of individual practices.

Behavioural finance provides an additional perspective by recognizing that financial decisions may be influenced by psychological tendencies, present-oriented preferences, and limitations in the application of financial knowledge.

The integration of these perspectives is intended to provide a coherent explanation of the relationship between knowledge, psychological characteristics, social influences, and saving practices.

5.2 Financial Literacy as a Cognitive Determinant

Financial literacy is positioned as the principal cognitive explanatory variable.

It is expected to contribute to saving behaviour by improving students' understanding of financial concepts and their ability to evaluate the consequences of expenditure and saving decisions.

Financial literacy may also influence saving behaviour indirectly by strengthening financial attitudes and financial self-efficacy.

5.3 Financial Attitudes as a Behavioural Mechanism

Financial attitudes are positioned as both an independent predictor and a mediating variable. Students who possess greater financial knowledge may develop more favourable evaluations of saving. These attitudes may encourage regular saving and improve the likelihood that financial knowledge will be translated into action.

5.4 Financial Self-Efficacy as a Psychological Mechanism

Financial self-efficacy represents the confidence required to implement financial decisions. The proposed framework suggests that financial knowledge may strengthen students' confidence in managing their resources. Greater confidence may subsequently encourage more consistent saving practices.

5.5 Financial Socialization as an Environmental Determinant

Financial socialization represents the environmental dimension of the framework. Exposure to financial discussions, parental guidance, peer interaction, and financial education may contribute to the development of saving habits.

It is treated as an independent determinant rather than a mediator in the principal research model.

6.0 Data Analysis

Table:1 Frequency.

Statistics					
		Gender V1	Age V2	Marital Status V3	Education V4
N	Valid	270	270	270	270
	Missing	0	0	0	0

Table:2 Gender.

V1					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	148	54.8	54.8	54.8
	Gender	1	.4	.4	55.2
	Male	121	44.8	44.8	100.0
	Total	270	100.0	100.0	

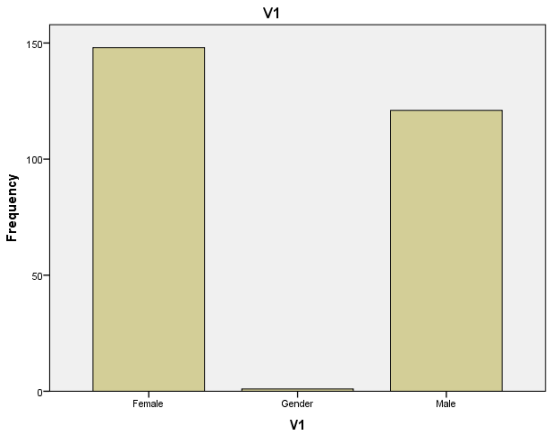

Fig:1 Gender.

Table 3: Age.

V2					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	21-30	7	2.6	2.6	2.6
	31-40	97	35.9	35.9	38.5
	41-50	67	24.8	24.8	63.3
	51-60	70	25.9	25.9	89.3
	61-70	28	10.4	10.4	99.6
	Age	1	.4	.4	100.0
	Total	270	100.0	100.0	

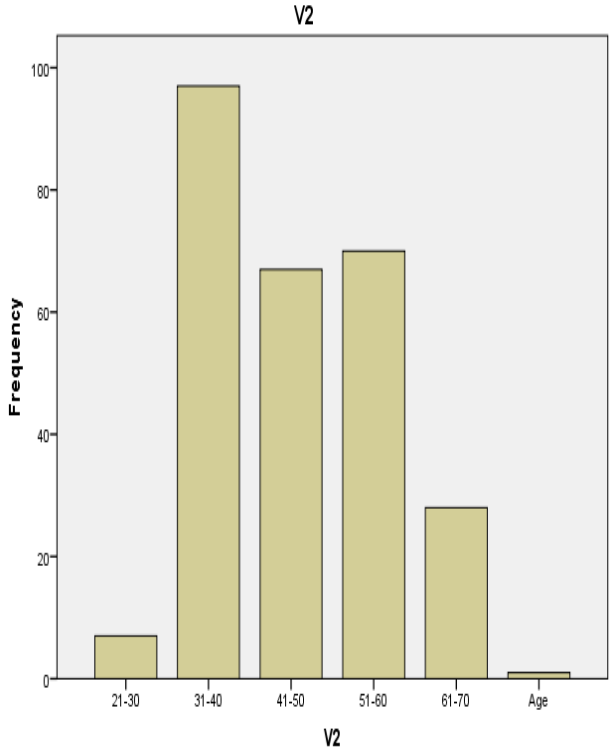

Fig:2 Age.

Table: 4 Marital Status.

V3					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Marital Status	1	.4	.4	.4
	Married	208	77.0	77.0	77.4
	Unmarried	61	22.6	22.6	100.0
	Total	270	100.0	100.0	

Table:5 Education.

V4				
	Frequency	Percent	Valid Percent	Cumulative Percent
Bachelors	84	31.1	31.1	31.1
Diploma	98	36.3	36.3	67.4
Doctorate	1	.4	.4	67.8
Masters	87	32.2	32.2	100.0
Total	270	100.0	100.0	

Table:6 Cross Tabs.

Crosstab					
Count					
		11.000000			Total
		4	5	FSE2	
1.000000	3	59	24	0	83
	4	44	13	0	57
	5	92	37	0	129
	FL1	0	0	1	1
Total		195	74	1	270

Table:7 Symmetric Measures.

Symmetric Measures			
		Value	Approx. Sig.
Nominal by Nominal	Phi	1.001	.000
	Cramer's V	.708	.000
N of Valid Cases		270	
a. Not assuming the null hypothesis.			
b. Using the asymptotic standard error assuming the null hypothesis.			

The collected data were analysed using descriptive and inferential statistical techniques to examine the demographic characteristics of respondents and the relationships among the major study constructs. The analysis was conducted using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics, including frequencies and percentages, were used to summarize the demographic profile of the respondents.

The final respondent profile consisted of 371 university students. In terms of gender, 218 respondents (58.76%) were male and 153 (41.24%) were female. The largest age group was

20–22 years, representing 52.83% of the sample, followed by respondents aged 23–25 years (27.76%). Undergraduate students constituted the majority of the sample (78.71%), while master's and doctoral students represented 17.79% and 3.50%, respectively. Most respondents were not employed (65.77%), and 60.65% reported parents or family support as their primary source of income.

The analysis also examined the association between selected financial literacy and self-efficacy responses using cross-tabulation and symmetric measures. The reported Cramer's V value of 0.708, with a significance level of 0.000, indicates a statistically significant association between the variables included in the cross-tabulation.

Overall, the analysis provides an empirical basis for examining financial literacy and the behavioural factors associated with students' saving practices.

7.0 DISCUSSION

The findings provide useful evidence for understanding financial behaviour among university students. The demographic profile indicates that the sample was predominantly composed of undergraduate students and respondents aged 20–22 years. A substantial proportion of respondents were not employed and depended primarily on parents or family members for financial support. These characteristics are important because students' saving behaviour may be influenced not only by their financial knowledge but also by their level of financial independence and access to regular income.

The study's conceptual framework proposes that financial literacy can contribute to saving behaviour by improving students' understanding of budgeting, financial planning, interest, inflation, and other fundamental financial concepts. However, the framework also recognizes that knowledge alone may not be sufficient to produce consistent saving practices. Financial attitudes and financial self-efficacy provide important behavioural mechanisms through which knowledge may be translated into action. The study therefore adopts a broader perspective in which saving behaviour is influenced by cognitive, psychological, and social factors.

The cross-tabulation analysis also provides evidence of a statistically significant association between the variables examined. The reported Cramer's V of 0.708 suggests a relatively strong association, while the significance value of 0.000 indicates that the observed relationship is statistically significant. However, this result should be interpreted specifically as an association and should not be presented as proof of causality.

Financial socialization further strengthens the behavioural explanation because students may develop financial habits through family discussions, parental practices, peer interactions, and educational experiences. Positive financial environments may encourage responsible saving, whereas social pressure and consumption-oriented influences may have the opposite effect.

8.0 CONCLUSION

The study concludes that students' saving behaviour should be understood through an integrated financial and behavioural perspective. Financial literacy provides the knowledge required to understand financial choices, while financial attitudes and self-efficacy may help students convert that knowledge into practical saving behaviour. Financial socialization provides an additional environmental influence through which financial values and practices are learned.

The study therefore highlights the importance of moving beyond knowledge-based financial education towards practical programmes that develop positive financial attitudes, confidence in financial management, budgeting skills, and regular saving practices. Universities can support students through financial literacy workshops, counselling, budgeting activities, and practical personal-finance education.

Overall, the study contributes to the understanding of university students' financial behaviour by bringing together financial literacy, financial attitudes, financial self-efficacy, and financial socialization within a single framework.

REFERENCES

1. 12th International Multidisciplinary Scientific GeoConference and EXPO, SGEM 2012, Volume 4. (2012). *12th International Multidisciplinary Scientific GeoConference and EXPO - Modern Management of Mine Producing, Geology and Environmental Protection, SGEM 2012*, *4*. https://www.scopus.com/inward/record.uri?eid=2-s2.0-84890711207&partnerID=40&md5=c8f5e4f9b05d492e26e02bb4b331ea20
2. Ahern, D. (2021). Regulatory Lag, Regulatory Friction and Regulatory Transition as FinTech Disenablers: Calibrating an EU Response to the Regulatory Sandbox Phenomenon. *European Business Organization Law Review*, *22*(3), 395–432. https://doi.org/10.1007/s40804-021-00217-z
3. Aiello, F., Bonanno, G., & Rossi, S. P. S. (2020). How firms finance innovation. Further empirics from European SMEs. *Metroeconomica*, *71*(4), 689–714. https://doi.org/10.1111/meca.12298
4. Al-Banna, A., Yaqot, M., & Menezes, B. C. (2024). Investment strategies in Industry 4.0 for

enhanced supply chain resilience: an empirical analysis. *Cogent Business and Management*, *11*(1). https://doi.org/10.1080/23311975.2023.2298187

5. Angelini, E. (2009). Notice of Retraction: The "Quantitative Etf": The new frontier of the investment between innovation and dynamism. *Proceedings - International Conference on Management and Service Science, MASS 2009*.https://doi.org/10.1109/ICMSS.2009.5301156
6. Armah, M., Anarfo, E. B., Numapau Gyamfi, E. N., & Amewu, G. (2025). Does financial market stress matter in renewable energy investment? Empirical evidence from BRICS economies. *Energy Strategy Reviews*, *60*. https://doi.org/10.1016/j.esr.2025.101786
7. Baals, L. J., Osterrieder, J. R., Hadji-Misheva, B., & Liu, Y. (2024). Towards a new PhD Curriculum for Digital Finance. *Open Research Europe*, *4*. https://doi.org/10.12688/openreseurope.16513.1
8. Badescu, A., Elliott, R. J., & Ortega, J.-P. (2015). Non-Gaussian GARCH option pricing models and their diffusion limits. *European Journal of Operational Research*, *247*(3), 820–830. https://doi.org/10.1016/j.ejor.2015.06.046
9. Basse Mama, H. (2018). Nonlinear capital market payoffs to science-led innovation. *Research Policy*, *47*(6), 1084–1095. https://doi.org/10.1016/j.respol.2018.03.013
10. Ben-Ameur, H., Breton, M., & Martinez, J.-M. (2009). Dynamic programming approach for valuing options In the GARCH model. *Management Science*, *55*(2), 252–266. https://doi.org/10.1287/mnsc.1080.0925
11. Burylina, G., Sanger, P. A., Ziyatdinova, J., & Sultanova, D. (2016). Approaches to entrepreneurship and leadership development at an Engineering University. *ASEE Annual Conference and Exposition, Conference Proceedings*, *2016-June*. https://www.scopus.com/inward/record.uri?eid=2-s2.0-84983252766&partnerID=40&md5=f760fe888da941b060019ba6e5f7962e
12. Casado Díaz, A. B., & Más Ruíz, F. J. (2002). The consumer's reaction to delays in service. *International Journal of Service Industry Management*, *13*(2), 118–140. https://doi.org/10.1108/09564230210425331
13. Degraeve, Z., Labro, E., & Roodhooft, F. (2004). Total cost of ownership purchasing of a service: The case of airline selection at Alcatel Bell. *European Journal of Operational Research*, *156*(1), 23–40. https://doi.org/10.1016/j.ejor.2003.08.002
14. Diana Rusu, V., & Roman, A. (2017). Entrepreneurial activity in the EU: An empirical evaluation of its determinants. *Sustainability (Switzerland)*, *9*(10). https://doi.org/10.3390/su9101679
15. Dong, X., Chen, J., Zeng, S., & Zhao, D. (2008). Integrated assessment of urban drainage system under the framework of uncertainty analysis. *Water Science and Technology*, *57*(8),

1227–1234. https://doi.org/10.2166/wst.2008.265

16. Esmaeilpour Moghadam, H., Sharifbagheri, E., Qiao, S., Chang, Y., Yang, M., Dang, Y. J., Su, X., Zhao, S., Li, W., Fan, W., Günay, S., Kurtishi-Kastrati, S., Sraieb, M., Rexhepi, G., Deng, J., Wang, S., Hou, H., Zheng, J., Yin, S., … Akhtar, M. S. (2025). Do global supply chain pressures affect energy demand: The moderating role of climate risk exposure. *Sustainable Futures*, *10*(11), 1–387. https://doi.org/10.1016/j.jenvman.2025.127545
17. Kalashnikova, T. V, Selevich, T. S., Danilova, N. E., & Sorokin, M. A. (2016). Financial risk management by means of financial options. *Proceedings of the 27th International Business Information Management Association Conference - Innovation Management and Education Excellence Vision 2020: From Regional Development Sustainability to Global Economic Growth, IBIMA 2016*, 189–193. https://www.scopus.com/inward/record.uri?eid=2-s2.0-84984655378&partnerID=40&md5=c75552f930b9f2293e96b9eca0206e7a
18. Khan, S. A., Faisal, M., Alharbe, N., Kumar, R., & Khan, R. A. (2024). Computational intelligence applications in cyber security. In *Computational Intelligence Applications in Cyber Security*. https://doi.org/10.1201/9781003514312
19. Kumaran, S. (2022). Financial performance index of IPO firms using VIKOR-CRITIC techniques. *Finance Research Letters*, *47*. https://doi.org/10.1016/j.frl.2021.102542
20. Premaratne, G., & Balasubramanyan, L. (2005). Stock Market Volatility: Examining North America, Europe and Asia. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.375380
21. Ramdas, K., Williams, J., & Lipson, M. (2013). Can financial markets inform operational improvement efforts? Evidence from the airline industry. *Manufacturing and Service Operations Management*, *15*(3), 405–422. https://doi.org/10.1287/msom.2013.0448
22. Sun, S., Gao, Y., & Rui, H. (2021). Chronic complainers or increased awareness? The dynamics of social media customer service. In B. T.X. (Ed.), *Proceedings of the Annual Hawaii International Conference on System Sciences* (Vols. 2020-Janua, pp. 6525–6534). IEEE Computer Society. https://www.scopus.com/inward/record.uri?eid=2-s2.0-85108344772&partnerID=40&md5=6c890dbf3fceb09b697db727168ed381
23. Talan, G., Sharma, G. D., Pereira, V., & Muschert, G. W. (2024). From ESG to holistic value addition: Rethinking sustainable investment from the lens of stakeholder theory. *International Review of Economics & Finance*, *96*, 103530. https://doi.org/https://doi.org/10.1016/j.iref.2024.103530
24. Talha, M., Khan, A. K., & Faisal, S. M. (2024). Corporate Financial Reporting: Forensic Accounting Techniques for Detecting Financial Fraud and Boosting Profitability. In *Studies in Systems, Decision and Control* (Vol. 545, pp. 427–440). https://doi.org/10.1007/978-3-031-65203-5_38

25. Talha, M., Malhotra, G., Tabassum, S., & Faisal, S. (2025). Dynamic Return and Volatility Forecasts for Selected Economies: An Analysis of the Covid-19 Pandemic and the Russo-Ukraine Saga. *SAGE Open*, *15*(4). https://doi.org/10.1177/21582440251369158
26. Varde, P. V, Prakash, R. V, & Joshi, N. S. (2018). Risk based technologies. In *Risk Based Technologies*. https://doi.org/10.1007/978-981-13-5796-1
27. Von Grumbkow, M. (2013). Successful asset management in the paper industry from an OEM point of view: Second to the owner, the OEM has the strongest interest in maintaining and improving the profitability of existing assets. *Paper360*, *8*(3), 16–21. https://www.scopus.com/inward/record.uri?eid=2-s2.0-84878086587&partnerID=40&md5=4e514f3655b96e499614188f1c9a696f
28. Yan, J., Fu, X., Oum, T. H., & Wang, K. (2016). The effects of mergers on airline performance and social welfare. In *Advances in Airline Economics* (Vol. 5, pp. 131–159). Emerald Group Publishing Ltd. https://doi.org/10.1108/S2212-160920160000005006
29. Yereshko, J., Kreidych, I., Kravchenko, M., Kazak, O., & Kharchenko, O. (2024). ACTUALIZING THE VENTURING MODEL IN UKRAINE. *Business: Theory and Practice*, *25*(1), 223–230. https://doi.org/10.3846/btp.2024.16558
30. Yoon, J., & Hansen, M. (2007). The impact of advanced technology on next generation air transportation: A case study of Required Navigation Performance (RNP). *Collection of Technical Papers - 2007 AIAA Modeling and Simulation Technologies Conference*, *2*, 708–718. https://www.scopus.com/inward/record.uri?eid=2-s2.0-40549132206&partnerID=40&md5=8aa40383d17f4e3221c80ea6e70e2f23
31. Yousaf, I., Suleman, M. T., & Demirer, R. (2022). Green investments: A luxury good or a financial necessity? *Energy Economics*, *105*. https://doi.org/10.1016/j.eneco.2021.105745