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THE MEDIATING ROLE OF DIGITAL LITERACY BETWEEN FINANCIAL LITERACY AND INVESTMENT SCAM AWARENESS

Mithila, G., Kengatharan, L., and Sinthujakanna, V
University of Jaffna, Sri Lanka

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Abstract

This study analyses whether digital literacy mediates the relationship between financial literacy and investment scam awareness. Despite the rapid expansion of digital financial services, there remains limited knowledge of whether financial and digital literacy interact to shape resistance to online investment scams. A cross-sectional survey was conducted among undergraduates who were selected through stratified random sampling in Sri Lanka. Financial literacy is measured through budgeting skills, financial attitude, financial product literacy and risk awareness. Partial least squares structural equation modelling (PLS-SEM) was applied to estimate the direct effects and mediating effects. Budgeting skills, product literacy and risk awareness enhance digital literacy, while financial attitude shows no meaningful effect. Digital literacy exhibits the strongest direct influence on investment scam awareness. Mediation analysis confirms that digital literacy transmits the effects of budgeting skills, product literacy and risk awareness to scam awareness, whereas financial attitude remains non-significant. The study conceptualizes digital literacy as a coping appraisal mechanism that enables individuals to operationalize financial knowledge in digital financial environments. Guided by Protection Motivation Theory, the study interprets financial literacy as supporting threat appraisal and digital literacy as supporting coping appraisal. The single institution, cross-sectional and self-reported design may restrict generalizability and causal inference. Future studies should use multi-site samples, longitudinal designs, fraud simulation experiments.

Keywords: Financial literacy, Digital literacy, Scam awareness, Frontier market, Protection motivation theory

Corresponding email: gmithila@univ.jfn.ac.lk

1. INTRODUCTION

Digital transformation has reshaped financial ecosystems worldwide, expanding access to financial services while simultaneously increasing exposure to online fraud. The rapid growth of digital financial platforms such as mobile banking, online investment applications and social media based financial promotions has been accompanied by escalating rates of cyber enabled scams. Globally, the International Criminal Police Organization reported a seventy percentage surge in digital investment fraud during the period from 2020 to 2023, driven by post pandemic shifts toward online financial activities (INTERPOL, 2023). According to Federal Trade Commission (FTC) (2024), consumers in the United States reported USD 5.7 billion in losses to investment scams in 2024, representing the largest fraud category. Payment channels associated with the highest aggregate losses were bank transfers and cryptocurrency, reflecting the growing use of digital and decentralized financial technologies in scam operations. These patterns indicate a gap between the rapid diffusion of digital financial activities and users' preparedness to evaluate online financial risks.

Developing economies face distinct vulnerabilities in this environment. Digitalization has progressed faster than regulatory and financial education initiatives, creating conditions in which inexperienced users are targeted. In South and Southeast Asia, almost ten percentage of individuals reported experiencing an online scam, while 84 percent expressed concern about the accelerating rise in digital fraud (GSMA, 2025). Sri Lanka reflects similar dynamics. The Central Bank of Sri Lanka (SL CBSL) and the Sri Lanka Computer Emergency Readiness Team (CERT) have issued repeated warnings regarding fraudulent investment promotions circulated through social media. SLCERT (2023) shows scam incidents increased from 7 cases in 2018 to 98 cases in 2023, while social media related incidents surged to 20, 628 in 2023, with many incidents linked to unregulated digital investment platforms, deceptive mobile applications and counterfeit online financial advisory groups. These trends suggest that young, digitally active populations are targeted in frontier markets where digital adoption outpaces digital capability development.

Recent data reveal a clear gap between digital financial engagement and financial literacy in Sri Lanka. According to the World Bank's (2022) Global Findex database, 82% of Sri Lankan adults hold a financial account, nearly half use digital payments, financial capability remains low. The S&P global financial literacy indicates 35% of Sri Lankan adults possess basic financial literacy (Central Bank of Sri Lanka, 2021). The OECD (2023) found young adults exhibit the lowest levels of financial knowledge despite heavy digital engagement. The combination of intensive digital exposure, limited financial experience and behavioural tendencies such as overconfidence and optimism increases their susceptibility to risky or ill-informed financial decisions. Behavioural finance research shows the cognitive biases can impair fraud detection even among technologically skilled youth (Engels et al., 2020; Xiao et al., 2022).

Financial literacy is recognized as a foundational element of prudent financial behaviour. Higher levels of financial knowledge are associated with stronger ability to avoid fraudulent schemes. Engels et al. (2020) revealed one standard deviation increase in financial literacy raises the likelihood of identifying investment fraud by three percentage points. However, contemporary fraud mechanisms are digital in nature, raising questions about whether financial literacy alone is sufficient. Digital literacy is the ability to navigate, evaluate and verify online information, has emerged as an important factor in reducing susceptibility to online fraud (Pennycook & Rand, 2021). Study from China shows individuals with stronger digital literacy experience lower financial losses from digitally mediated investment scams (Li et al., 2024). Other studies also find that digital cognitive skills enhance the ability to identify deceptive online content (Guess et al., 2020; Pennycook & Rand, 2021).

Research highlights the importance of both financial and digital literacy for safer financial behavior, yet evidence on how these competencies interact is limited. Few studies examine whether digital literacy enables financially literate individuals to apply their knowledge in online environments, despite the rise of digital investment scams. This gap is relevant in South Asia, where university students are heavy digital users but have limited access to formal financial literacy.

This study addresses this gap by examining whether digital literacy mediates the relationship between financial literacy and investment scam awareness among undergraduates in Sri Lanka. Financial literacy is conceptualized through four behavioural and cognitive dimensions namely budgeting skills, financial attitude, financial product literacy and risk awareness. Each dimension may influence scam awareness directly and indirectly through the development of digital competence. Guided by Protection Motivation Theory (PMT), the study treats financial literacy as a capability that may support threat appraisal, namely the recognition of risky or deceptive financial offers, while digital literacy is treated as a coping capability that may help students verify, evaluate and respond to online financial information. Since the study does not directly measure the full PMT dimensions, the theory is used as a guiding explanatory framework rather than as a complete empirical test of PMT.

This study is guided by two main objectives. First, it examines the relationship between financial literacy dimensions and awareness of investment scams among undergraduate students. Second, it examines whether digital literacy statistically mediates the relationship between financial literacy dimensions and investment scam awareness. The study contributes to behavioural finance by integrating financial literacy and digital literacy within a single framework and by offering evidence from a frontier-market educational context where digital financial adoption is expanding while literacy gaps remain persistent. However, the contribution is interpreted cautiously because the sample is limited to one university and the design does not establish causality.

The next section reviews the literature, followed by the methodology, and data collection procedures. The PLS-SEM measurement and structural model results are then presented. Then findings are discussed and paper concludes with implications, limitations and future research directions.

2. LITERATURE REVIEW

Financial Literacy and Resistance to Fraud

Financial literacy can be conceptualized as human capital, enables individuals to understand, evaluate and act on financial information. Lusardi and Mitchell (2014) shows understanding core financial concepts such as interest compounding, inflation, diversification and budgeting improves individuals' saving, borrowing and investment decisions. Further, financial literacy is linked to stronger financial behaviour, market participation and resilience shocks (Mitchell & Lusardi, 2015).

Recent research links financial literacy to fraud detection and victimisation. Higher financial literacy improves the ability to identify fraudulent investment schemes and reduces engagement with suspicious offers (Ibrushi et al., 2026; Wei et al., 2021; Engels et al., 2020). Conversely, low literacy is associated with poorer screening of risky products and greater products and greater risk of victimization (DeLiema et al., 2018). However, financial literacy is not uniformly protective. Xiao et al. (2022) show overconfidence in one's financial knowledge increases susceptibility to high return scams while Du and Chen (2023) provide evidence of a non linear relationship between literacy and fraud victimization in

China, indicating beyond a certain point, miscalibrated confidence may offset the benefits of knowledge. This shows quality and calibration of financial literacy is important, where practical abilities in budgeting and risk evaluation may protect against scams and overconfidence and heuristic driven judgements can undermine fraud resistence.

Ruiz (2026), showed that traditional financial literacy alone did not significantly reduce fraud victimization across European countries, whereas digital financial security had a strong protective effect against Ponzi and phishing scams. The study also found that overconfidence increased fraud susceptibility, suggesting that financial knowledge may be more effective when supported by digital protective capability. Furthermore, evidence from Indonesia and Sub-Saharan Africa suggests financial literacy supports basic financial inclusion and financial behaviour, but its effectiveness in preventing risky investment behaviour or fraudulent vulnerabilities appears conditional on additional factors, including digital literacy exposure, social context and individual vigilance (Akrofi et al., 2025; Lestari et al., 2025; Umar & Dalimunthe, 2024; Pelawi et al., 2025).

Financial Literacy and Scam awareness among youth and university students

Youth and university students have become a focal group in recent research as they are transitioning into financial independence while also engaging with digital financial products. Research in both developed and developing countries show many students exhibit gaps in basic financial knowledge, such as risk, investment diversification and credit management which are relevant to scam vulnerability (Mitchell & Lusardi, 2015; OECD, 2023). Recent OECD and Global findex evidence indicates despite rising use of digital accounts and mobile payments, young adults lag behind older generation in core financial competenceis (World Bank, 2022; OECD, 2023).

Research shows budgeting skills and hands on financial management practices improve students' awareness of investment scams, whereas more basic financial goals or general attitudes are weaker predictors (Mohd Padil et al., 2022). Another study argue literacy can reduce scam susceptibility by improving the ability to question unrealistic returns, recognize inconsistencies in offers and seek verification before committing funds (Susilo & Hudzaifah, 2025). In Indonesia, Tjondro *et al.* (2025) investigate scam vulnerability among university students and find financial literacy interacts with personality traits and risk tolerance in shaping susceptibility. Students with better personal accounting skills and disciplined financial habits show lower vulnerability, even when they are exposed to persuasive online promotions. Umar and Dalimunthe (2024) model financial literacy and digital literacy together and report adequate budgeting skills enhance investment scam awareness (Umar & Dalimunthe, 2024).

Study on retirees and older adults suggests financial literacy, financial stress and financial behaviour jointly influence scam awareness and victimisation. Individual under stress or facing cognitive load may fail to apply their knowledge effectively, highlighting literacy is necessary but not sufficient (Kasim et al., 2024). Hence, literature positions financial literacy as an important but incomplete defence against fraud, especially for younger individuals navigating complex digital investment environments.

Digital literacy and online deception

As financial services migrate to digital channels, digital literacy has become a key determinant of safe financial behaviour. Digital literacy encompasses not only basic technical skills but also the ability to locate, evaluate and verify online information. Research in psychology and communication shows digital evaluation skills improve the ability to distinguish between accurate and misleading content. Pennycook and Rand (2021), find stronger digital and critical thinking abilities reduce acceptance of online misinformation while Traberg et al. (2022) show inoculation based, gamified training can build resistance to deceptive content. Digital media literacy interventions also lower susceptibility by misinformation, though their effectiveness depends on motivation and cognitive styles of users (Beauvais, 2022).

According to Li et al. (2024), higher digital literacy reduces vulnerabilities to financial fraud with strong effects for online and telecom scams and also finds protective effect of digital literacy is stronger when combined with higher financial knowledge, suggesting complementarity between the two forms of literacy. In Thailand, Kraiwanit et al. (2025), identifies digital literacy as a key predictor of digital fraud victimisation, but also finds overconfidence in one's digital skills can increase risk. In Indonesia, recent study on online fraud prevention positions digital literacy as part of a broader prevention strategy in which citizens are trained to recognise suspicious digital patterns, evaluate online offers and make use of official verification channels (Triananda et al., 2025).

Pak et al. (2026) conceptualized digital financial literacy as a composite capability which includes financial knowledge, digital knowledge, awareness of digital financial services, practical know how and self protection from digital scams and fraud. According to them, digital financial literacy significantly improves the use of digital financial services and the benefits derived from them, while the effects of digital literacy were stronger than financial knowledge alone. This suggests that in digital financial environments, financial knowledge may not be sufficient unless individuals also possess the practical digital capability to identify risks, verify information and protect themselves from online deception.

This understanding is consistent with the view that digital literacy is multi-dimensional, combining technical competence, critical evaluation and responsible online behaviour, all of which are relevant to scam resistance (Sirlin et al., 2021). These dimensions are all relevant to scam resistance, as they enable individuals to identify deceptive cues in digital communication, differentiate legitimate from fraudulent websites or applications and scrutinise unsolicited investment offers. They also warn digital literacy can be undermined by overconfidence and behavioural traits which may lead individuals to underestimate their exposure to online risks.

Behavioural and psychological drivers of scam vulnerability

Behavioural finance and psychological studies emphasize scams succeed not only because of information deficits, but also because of cognitive and emotional vulnerabilities. Research on fraud victims points to optimism bias, impulsivity, trust in authority, social

influence and loneliness as recurring factors that increase compliance with fraudulent requests, even among individuals who possess relevant knowledge (Ecker et al., 2022).

Studies on young adults show personality traits and family socialisation play an important role. Tjondro et al. (2025) show low consciousness and high neuroticism, increase susceptibly among university students by shaping risk tolerance. Research also finds vigilance and exposure to simulated fraud scenarios are better able to detect scams, but those exposed in unstructured environments may become desensitized or cognitive overload (Pelawi et al., 2025). These highlights scam vulnerability emerges from a broader interaction of cognitive capabilities, emotional states and situational influence. While these behavioural dynamics form an important contextual foundation, the present study focuses on financial and digital literacy as teachable cognitive skill sets that can be strengthened to improve scam awareness.

Evidence from emerging and frontier markets

In emerging and frontier markets, rapid expansion of digital finance has outpaced consumer protection and education initiatives. Studies across South and Southeast Asia show low levels of financial and digital literacy among youth, combined with growing use of mobile banking, online trading platforms and social media-based financial promotions (International Labour Organization (ILO), 2023; United Nations Conference on Trade and Development, 2024). This environment increases the exposure to online investment scams and other cyber enables fraud. The Global Findex Database shows while account ownership and digital payment usage have expanded in developing economies, many users lack the financial capability and digital skills needed to manage risks associated with digital financial services (World Bank, 2022). Further, (OECD, 2023) also highlights digital marketplaces and online financial offers can exacerbate risks for less sophisticated users in lower income countries.

In Sri Lanka, many studies have examined financial literacy among university students. Kumari and Rasakumar (2025), find undergraduates possess only moderate financial knowledge with disparities cross gender, study discipline, and socioeconomic background. Higher literacy is linked to better financial planning, more informed investment choices and improved financial well being. Evidence on cybersecurity behaviour shows that although students are active digital users, their awareness of phishing, password security and safe online practices remains uneven. despite frequent engagement with social media and digital communication tools (Nagahawatta et al., 2020). Policy and national strategies emphasis strengthening digital literacy and cybersecurity awareness is now a priority for regulators and education providers (Sri Lanka CERT, 2025).

Despite these studies, there is limited empirical evidence in Sri Lanka that examines financial literacy, digital literacy and scam awareness within a single behavioural framework. Existing studies focus on either financial literacy and financial behaviour or cyber security attitudes rather than on how these literacies combine to influence students' capacity to recognize and resist investment scams in digital settings. This gap is important in frontier markets like Sri Lanka, where digital financial adoption is rising but literacy gaps remain persistent.

Hence, financial literacy improves individuals' ability to interpret financial information and recognize suspicious investment offers, though its protective effect is not always consistent. Digital literacy has become important as it enables users to authenticate online content and detect deceptive digital cues. Evidence from emerging markets further shows a mismatch between young adults' heavy use of digital platforms and their limited financial and digital competencies.

Theoretical basis for mediation – Protection Motivation Theory (PMT)

PMT explains protective behaviour through two cognitive processes: threat appraisal and coping appraisal. In the context of investment scams, financial literacy may support threat appraisal by helping individuals recognize unrealistic returns, identify risky offers and distinguish legitimate from fraudulent financial products. Digital literacy may support coping appraisal by enabling users to authenticate online platforms, evaluate digital content, detect deceptive cues and use verification mechanisms. Therefore, PMT provides a useful theoretical basis for proposing that digital literacy can transmit the influence of financial literacy into scam awareness. However, this study does not directly measure the complete PMT constructs of perceived severity, perceived vulnerability, response efficacy, self-efficacy and response cost. Accordingly, PMT is used as a guiding theoretical lens, and future studies should directly measure threat appraisal and coping appraisal to validate the theory more fully.

Based on the review and theoretical support, following hypotheses can be formulated.

H1: Financial literacy has a significant impact on awareness of investment scams

H1a: Budgeting skills has a significant impact on awareness of investment scams

H1b: Financial attitude has a significant impact on awareness of investment scams

H1c: Financial product literacy has a significant impact on awareness of investment scams

H1d: Risk awareness has a significant impact on awareness of investment scams

H2: Digital literacy mediates the relationship between financial literacy and awareness of investment scams.

H2a: Digital literacy mediates the relationship between budgeting skills and awareness of investment scams

H2b: Digital literacy mediates the relationship between financial attitude and awareness of investment scams

H2c: Digital literacy mediates the relationship between financial product literacy and awareness of investment scams

H2d: Digital literacy mediates the relationship between risk awareness and awareness of investment scams

CONCEPTUALIZATION

The conceptual framework integrates insights from financial literacy, digital literacy and scam awareness literature, supported by PMT as a guiding theoretical lens. Financial literacy is conceptualised as a multidimensional construct comprising budgeting skills, financial attitude, financial product literacy and risk awareness. Digital literacy is positioned as the mediating mechanism that enables individuals to operationalise financial knowledge within digital environments. The model proposes both direct associations between financial literacy dimensions and scam awareness and indirect associations through digital literacy. Since the constructs are measured at a single point in time, the mediation model is interpreted as a statistical indirect effect rather than proof of a causal process.

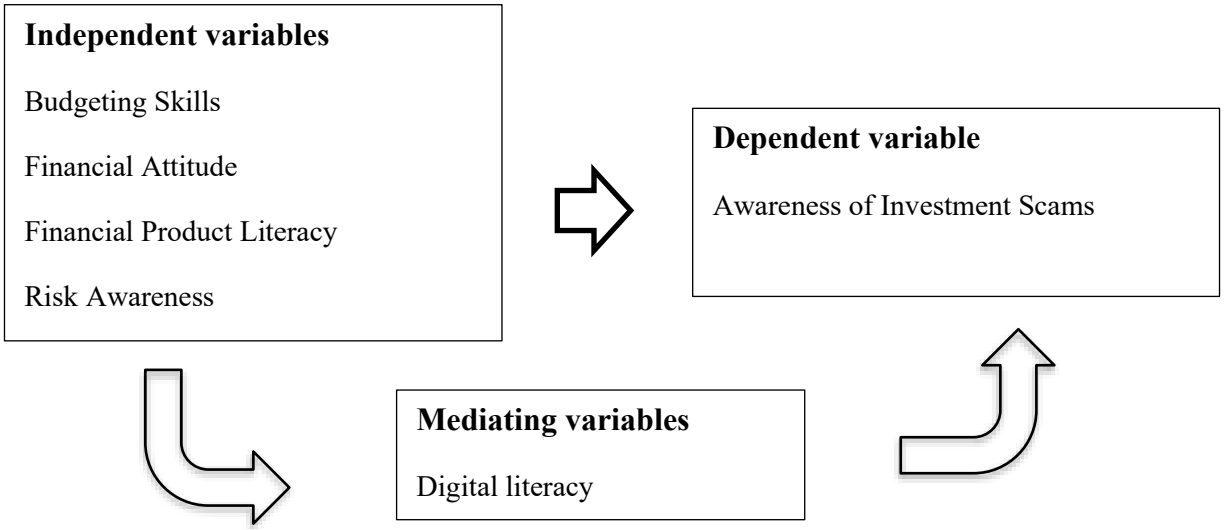


Figure 01: Conceptual Framework

OPERATIONALIZATION

Variables	Dimension	Indicator	Measurement	Reference
Investment Scam Awareness (Dependent Variable)	Investment Scam Awareness	Recognizing Scam Characteristics Differentiating legitimate vs Fraudulent Awareness of regulatory Protections Prior exposure to scams Precautionary Behaviours	Five-point Likert scale from 1 "Strongly disagree to 5 "Strongly agree" Q4 – Q10	van Rooij et al. (2011)
Financial Literacy	Budgeting Skills	Creating a budget Monitoring spending	Q11 – Q16	Lusardi & Mitchell (2011) Hilgert et al. (2003)

(Independent Variable)		Adjusting budgets for unexpected expenses		
	Financial Attitude	Prioritizing essential expenses Cost comparison behaviour Cautious decision-making in financial matters Financial self-control.	Q17 – Q22	Lusardi & Mitchell (2011)
	Financial Product Literacy	Understanding savings accounts and fixed deposits Comparing credit and loan options Understanding principles of insurance Awareness of fees and interest rates	Q23 – Q28	OECD (2018)
	Risk Awareness	Evaluating risks before financial decisions Recognizing "too good to be true" offers Researching financial institution credibility Seeking advice before committing to high-risk products	Q29 – Q33	van Rooij et al. (2011)
Digital Literacy (Mediating Variable)	Digital Literacy	Secure Online Practices Identifying Online Fraud	Q34 – Q38	Choi & Kim (2023)

Source: Survey Data

3. RESEARCH DESIGN AND METHODS

This study adopts a positivist, deductive research design to test hypotheses on the mediating role of digital literacy in the relationship between financial literacy dimensions and investment scam awareness among undergraduates in a frontier economy context. A cross-sectional survey strategy and quantitative approach were employed, consistent with prior behavioural finance and literacy studies using structural equation modelling. As the design is cross-sectional, the results are interpreted as associations among constructs and not as evidence of causal effects.

The population for this study consists of undergraduate students in selected faculties at the University of Jaffna from 1st to 4th year from the targeted faculties of Agriculture (640 students), Engineering (959), Management Studies and Commerce (2,090), Allied Health Science (740), Science (1,614) and Technology (1,297). Based on the available information of enrolled students, the population size is 7,340 students and the sample size of 366 was

calculated using Krejcie & Morgan's (1970) sample size formula. By using stratified random sampling technique was employed to ensure proportional representation across faculties and academic years (1st to 4th year). Stratification was used to minimize sampling bias and improve the generalizability of findings by capturing variations in academic discipline and exposure to digital financial systems. A structured, self-administered questionnaire was distributed in both digital and hard copy formats.

A pilot test was conducted to refine wording, assess clarity and check preliminary reliability and content validity. A total of 416 responses were collected. After removing 20 incomplete responses, 396 valid questionnaires were retained for analysis, exceeding the minimum sample requirement and meeting recommended thresholds for PLS-SEM models of moderate complexity. Ethical compliance was maintained. Data analysis followed the Partial Least Squares Structural Equation Modelling (PLS- SEM) approach using Smart PLS 4. PLS-SEM is appropriate when the model contains multiple latent constructs and mediation paths, and the sample size is moderate relative to model complexity.

The present model focuses on the core theoretical relationships among financial literacy dimensions, digital literacy and investment scam awareness. Demographic and experience-based control variables such as gender, faculty, year of study, prior investment experience, prior exposure to scams, digital payment usage and socioeconomic background were not included in the structural model. This is acknowledged as a limitation, and future studies should include these controls to improve robustness and to identify whether scam awareness differs across student groups.

The analysis proceeded in two stages. The measurement model was evaluated through indicator reliability, internal consistency reliability using Cronbach's alpha and composite reliability, convergent validity using average variance extracted (AVE), and discriminant validity using the Fornell-Larcker criterion. Next, the structural model was assessed using coefficient of determination (R2), effect size (f2), variance inflation factors and bootstrapped path coefficients. Mediation was examined through bootstrapped indirect effects for each financial literacy dimension on scam awareness through digital literacy. Because all variables were collected from the same respondents at one point in time, the possibility of common method bias is acknowledged, and future research should apply procedural and statistical remedies such as temporal separation, multiple data sources, marker variables or formal common method bias tests.

4. FINDINGS AND DISCUSSION

Descriptive Statistics

Summary of collected data presented below.

Table 01. Summary Statistics of the variables.

Variable	Mean	Median	Observed min	Observed max	Standard deviation	Excess kurtosis	Skewness
AIS Q1	3.217	4.000	1.000	5.000	1.572	-1.523	-0.212
AIS Q2	3.228	4.000	1.000	5.000	1.540	-1.444	-0.254

AIS Q3	3.223	4.000	1.000	5.000	1.521	-1.430	-0.248
AIS Q4	3.235	4.000	1.000	5.000	1.526	-1.424	-0.261
AIS Q5	3.118	3.000	1.000	5.000	1.603	-1.593	-0.101
AIS Q6	3.178	3.000	1.000	5.000	1.559	-1.508	-0.190
BS Q1	3.080	3.000	1.000	5.000	1.445	-1.357	-0.095
BS Q2	3.075	3.000	1.000	5.000	1.523	-1.489	-0.076
BS Q3	3.127	3.000	1.000	5.000	1.490	-1.418	-0.129
BS Q4	3.078	3.000	1.000	5.000	1.519	-1.469	-0.106
BS Q5	3.098	3.000	1.000	5.000	1.472	-1.428	-0.056
FA Q1	3.085	3.000	1.000	5.000	1.509	-1.475	-0.062
FA Q2	3.067	3.000	1.000	5.000	1.474	-1.427	-0.051
FA Q3	3.060	3.000	1.000	5.000	1.512	-1.466	-0.080
FA Q4	3.065	3.000	1.000	5.000	1.463	-1.389	-0.103
FA Q5	3.040	3.000	1.000	5.000	1.476	-1.428	-0.008
FPL Q1	3.015	3.000	1.000	5.000	1.503	-1.458	0.036
FPL Q2	2.970	3.000	1.000	5.000	1.474	-1.423	0.061
FPL Q3	3.107	3.000	1.000	5.000	1.490	-1.415	-0.144
FPL Q4	3.092	3.000	1.000	5.000	1.476	-1.419	-0.062
FPL Q5	3.105	3.000	1.000	5.000	1.466	-1.362	-0.163
Risk Q1	3.058	3.000	1.000	5.000	1.506	-1.467	-0.054
Risk Q2	3.055	3.000	1.000	5.000	1.455	-1.372	-0.096
Risk Q3	3.158	3.000	1.000	5.000	1.532	-1.494	-0.145
Risk Q4	3.053	3.000	1.000	5.000	1.459	-1.383	0.001
Risk Q5	3.035	3.000	1.000	5.000	1.483	-1.430	-0.042
DL Q1	3.080	3.000	1.000	5.000	1.529	-1.493	-0.059
DL Q2	3.013	3.000	1.000	5.000	1.467	-1.438	-0.003
DL Q3	3.033	3.000	1.000	5.000	1.504	-1.469	-0.047
DL Q4	2.970	3.000	1.000	5.000	1.469	-1.403	0.071
DL Q5	3.078	3.000	1.000	5.000	1.492	-1.454	-0.038

The mean scores range from 2.97 to 3.23, which indicates students are neither highly confident nor completely unaware, suggesting a meaningful baseline, yet leaves room for improvement. The standard deviation values within +/- 2 suggest no severe deviations from normality.

Reliability and Validity Test

Indicator Reliability

Table 02. Indicator Reliability

	Budgeting	Digital Lit	Fin Attitude	Fin Product literacy	Risk	Scam Awareness
Budgeting_1	0.812					
Budgeting_2	0.740					
Budgeting_3	0.772					
Budgeting_4	0.761					
Budgeting_5	0.775					
Digital_1		0.815				
Digital_2		0.770				
Digital_3		0.800				
Digital_4		0.745				
Digital_5		0.797				
Fin_Attitude_1			0.780			
Fin_Attitude_2			0.789			
Fin_Attitude_3			0.781			
Fin_Attitude_4			0.782			
Fin_Attitude_5			0.796			
Fin_Product_1				0.761		
Fin_Product_2				0.759		
Fin_Product_3				0.815		
Fin_Product_4				0.765		
Fin_Product_5				0.796		
Risk_1					0.774	
Risk_2					0.764	
Risk_3					0.793	
Risk_4					0.802	
Risk_5					0.772	
Scam_Awareness_1						0.855
Scam_Awareness_2						0.817
Scam_Awareness_3						0.832
Scam_Awareness_4						0.819
Scam_Awareness_5						0.836
Scam_Awareness_6						0.804

All out loadings exceed 0.74, which is well above the recommended threshold of 0.70, indicating, each item explains more than 50% of the variance in its latent construct. No item fell below 0.7, so no indicators were removed.

Internal Consistent Reliability

In PLS SEM, the common internal consistency assessments are Cronbach's Alpha (α), Composite Reliability (CR) and Average Variance Extracted (AVE).

Table 03. Internal Consistent Reliability

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Budgeting	0.831	0.836	0.881	0.597
Digital Lit	0.845	0.847	0.890	0.618
Fin Attitude	0.845	0.848	0.890	0.617
Fin Product lit	0.839	0.842	0.886	0.608
Risk	0.841	0.845	0.887	0.610
Scam Awareness	0.908	0.908	0.929	0.684

The Cronbach's alpha values of the model constructs ranged from 0.831 to 0.908 and indicated items within the constructs are highly correlated and internally consistent. The CR values of the constructs ranged from 0.836 and 0.929, confirming the high stability and reliability of the constructs noted in the model. The AVE values for the constructs ranged from 0.597 to 0.684, confirming constructs show adequate evidence of convergent validity.

Discriminate Validity

Table 04. Discriminate Validity

	Budgeting	Digital Lit	Fin Attitude	Fin Product literacy	Risk	Scam Awareness
Budgeting	**0.802**					
Digital Lit	0.421	**0.784**				
Fin Attitude	0.389	0.352	**0.768**			
Fin Product literacy	0.512	0.468	0.441	**0.816**		
Risk	0.476	0.455	0.398	0.502	**0.791**	
Scam Awareness	0.344	0.552	0.338	0.431	0.487	**0.804**

Discriminant validity was assessed using the Fornell- Larcker criterion. As shown in the table 04, the square root of AVE for each component is greater than the inter-construct

correlations, which indicates each latent variable shares more variance with its own indicators than with other constructs in the model, thereby confirming adequate discriminant validity

Multicollinearity Test

Following table 05 shows the multicollinearity among the variable.

Table 05. VIF

Variable	VIF
Budgeting_1	1.801
Budgeting_2	1.541
Budgeting_3	1.669
Budgeting_4	1.678
Budgeting_5	1.689
Digital_1	1.922
Digital_2	1.623
Digital_3	1.840
Digital_4	1.604
Digital_5	1.827
Fin_Attitude_1	1.683
Fin_Attitude_2	1.761
Fin_Attitude_3	1.809
Fin_Attitude_4	1.648
Fin_Attitude_5	1.936
Fin_Product_1	1.696
Fin_Product_2	1.664
Fin_Product_3	1.932
Fin_Product_4	1.648
Fin_Product_5	1.725
Risk_1	1.692
Risk_2	1.702
Risk_3	1.843
Risk_4	1.724
Risk_5	1.704
Scam_Awareness_1	2.584
Scam_Awareness_2	2.169
Scam_Awareness_3	2.276
Scam_Awareness_4	2.189
Scam_Awareness_5	2.384
Scam_Awareness_6	2.053

The VIF results shown in Table 05 indicate all indicator VIF values are in the range of 1.541 to 2.587, all of which are much lower than accepted limits of 5.0. The results show there is no multicollinearity concern for any observed variables in the measurement model and has unique contribution into its construct with minimal redundancy.

Structural Model Evaluation

This includes evaluating several important statistical criteria namely the coefficient of determination (R^2), effect size (f^2) and path coefficients (β)

Coefficient of determination (R^2)

Table 06. Coefficient of determination (R2)

	R- square	R- square adjusted
Digital Literacy	0.205	0.197
Scam Awareness	0.408	0.400

Table 06 shows that the adjusted R2 for digital literacy is 0.197, indicating that 19.7% of the variance in digital literacy is explained by budgeting skills, financial attitude, financial product literacy and risk awareness. This reflects modest explanatory power and suggests that digital literacy is influenced by several additional factors beyond financial literacy, such as internet experience, cybersecurity training, socioeconomic background, access to digital devices, technology exposure and prior experience with online financial platforms. For investment scam awareness, the adjusted R2 is 0.400, meaning that 40.0% of the variance is explained by financial literacy dimensions and digital literacy together.

Effect size (f^2)

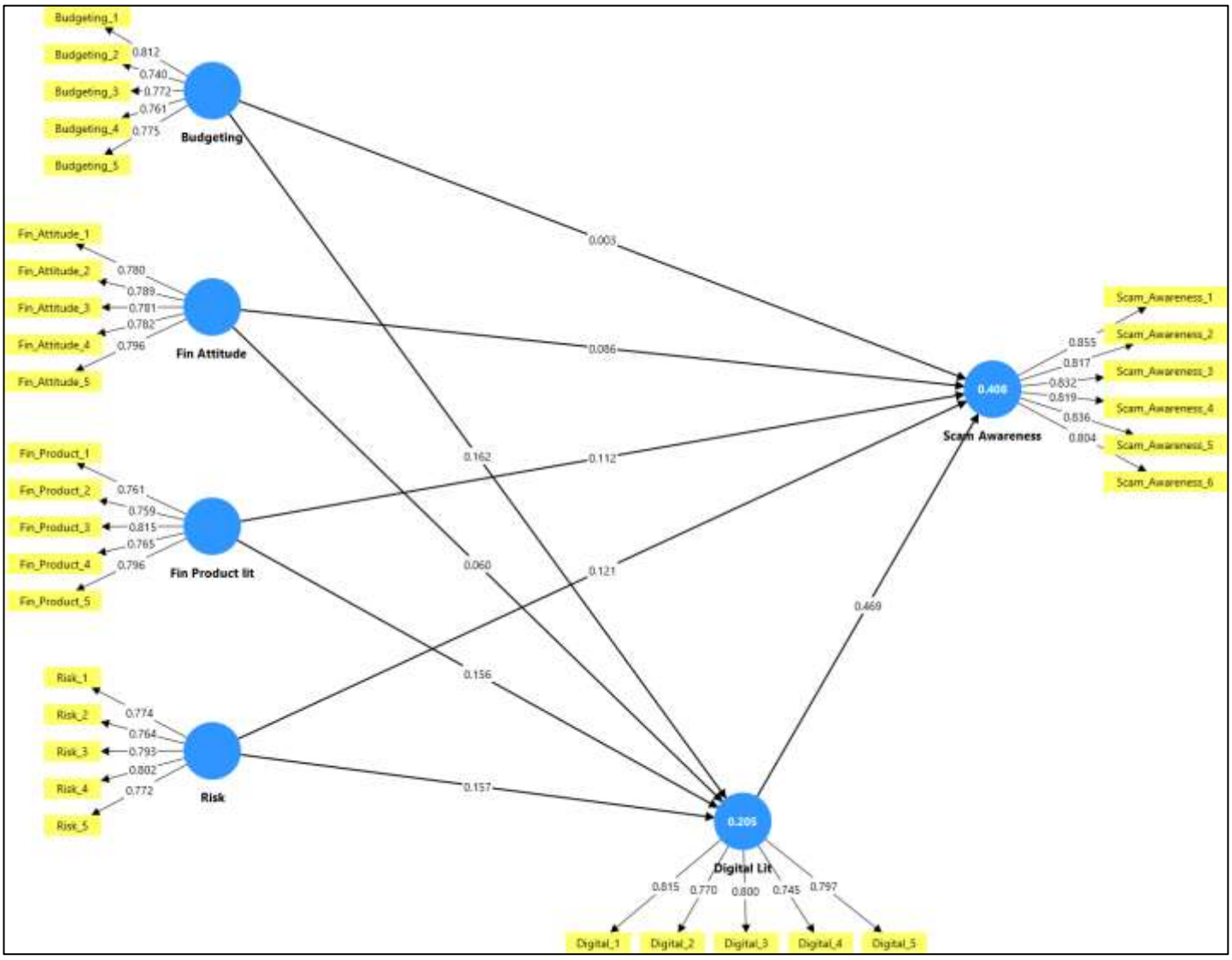
This shows how much each exogenous (independent) construct impacts (or contributes) to endogenous (dependent) construct within the model.

Table 07. Effect size (f2)

	Digital Lit	Scam Awareness
Budgeting	0.015	0.000
Digital	-	0.295
Fin Attitude	0.002	0.006
Fin Product lit	0.014	0.010
Risk	0.017	0.013

The findings indicate that digital literacy has a substantial influence on awareness of investment scams, with an f^2 value of 0.295. This suggests that digital skills play a practically meaningful role in helping students identify and evaluate potentially fraudulent investment activity. In contrast, the four financial literacy constructs show small effect sizes on digital literacy and scam awareness. Therefore, although some financial literacy dimensions are statistically significant, their practical direct influence is limited. This strengthens the interpretation that financial literacy becomes more relevant to scam awareness when it is supported by digital literacy.

Path coefficients



Path Coefficients (Direct Effects)

Table 08. Path Coefficients (Direct Effects)

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Budgeting ⇨ Digital Literacy	0.162	0.165	0.071	2.288	0.022
Budgeting ⇨ Scam Awareness	0.003	0.005	0.057	0.056	0.956

Digital Literacy ⇨ Scam Awareness	0.469	0.470	0.040	11.639	0.000
Fin Attitude ⇨ Digital Literacy	0.060	0.059	0.069	0.865	0.387
Fin Attitude ⇨ Scam Awareness	0.086	0.086	0.060	1.439	0.150
Fin Product Lit ⇨ Digital Literacy	0.156	0.158	0.067	2.321	0.020
Fin Product Lit ⇨ Scam Awareness	0.112	0.110	0.061	1.847	0.065
Risk ⇨ Digital Literacy	0.157	0.157	0.064	2.451	0.014
Risk ⇨ Scam Awareness	0.121	0.122	0.053	2.303	0.021

Indirect Effects (Mediation through Digital Literacy)

Table 09. Indirect Effects

	Original sample (O)	**Sample mean (M)**	**Standard deviation (STDEV)**	**T statistics (|O/STDEV|)**	**P values**
Budgeting ⇨ Digital Literacy ⇨ Scam Awareness	0.076	0.077	0.034	2.235	0.025
Fin Attitude ⇨ Digital Literacy ⇨ Scam Awareness	0.028	0.028	0.033	0.852	0.394
Fin Product Lit ⇨ Digital Literacy ⇨ Scam Awareness	0.073	0.074	0.032	2.255	0.024
Risk ⇨ Digital Literacy ⇨ Scam Awareness	0.074	0.074	0.031	2.408	0.016

associated p values. These path estimates are interpreted as statistical associations rather than causal effects, given the cross-sectional nature of the data.

Table 08 indicates a significant positive relationship between budgeting skills and digital literacy (β = 0.162, p = 0.022), meaning that students with stronger budgeting skills also tend to report higher digital literacy. This suggests that individuals who actively manage their finances may also engage more carefully with digital tools and platforms. However, the direct relationship between budgeting skills and investment scam awareness is not significant (β = 0.003, p = 0.956), indicating that budgeting skills alone may not be sufficient to improve scam awareness unless supported by digital competence.

Digital literacy has a significant positive association with investment scam awareness (β = 0.469, p = 0.000), illustrating the important role of digital literacy in increasing students' awareness of investment scams. This suggests that students with stronger abilities to identify online risks, verify information and recognize suspicious digital cues are better positioned to recognize investment scam characteristics. However, the outcome measured in this study is awareness, not actual resistance to scams or victimisation behaviour.

In comparison, the paths from financial attitude to digital literacy (β = 0.060, p = 0.387) and from financial attitude to investment scam awareness (β = 0.086, p = 0.150) are not statistically significant in the present model. This result should be interpreted cautiously, as it may reflect the way financial attitude was measured rather than the complete absence of attitudinal influence. Future studies may use more behaviourally specific attitude measures, including overconfidence, trust in online information, impulsivity and willingness to verify investment claims. Financial product literacy shows a positive significant relationship with digital literacy (β = 0.156, p = 0.020), indicating that students with stronger knowledge of financial products also tend to report better digital literacy. However, its direct association with investment scam awareness (β = 0.112, p = 0.065) is significant only at the 10% level, suggesting a limited direct relationship.

The relationship between risk awareness and digital literacy (β = 0.157, p = 0.014) suggests students with a higher awareness of financial risks also have better digital literacy. This shows individuals who are aware of potential financial risks are more likely to develop and engage their digital capabilities to keep themselves safe while online. The relationship between risk awareness and investment scams (β = 0.157, p = 0.021) was significant, suggesting risk aware students are more vigilant and prepared to recognize fraudulent investment opportunities. This shows risk awareness contributes to knowledge of scams, in addition to being an indirect contribution through digital literacy.

The indirect effects support the mediating role of digital literacy. Table 09 shows that the indirect effects of budgeting skills (β = 0.076, p = 0.025), financial product literacy (β = 0.073, p = 0.024) and risk awareness (β = 0.074, p = 0.016) on investment scam awareness through digital literacy are statistically significant. This indicates that these financial literacy dimensions are associated with scam awareness mainly through digital literacy. However, the indirect effect of financial attitude (β = 0.028, p = 0.394) is not significant, suggesting that financial attitude does not significantly predict scam awareness through digital literacy in this sample.

5. DISCUSSION

The findings provide evidence on whether financial and digital literacies are associated with investment scam awareness among undergraduates in a frontier economy. Consistent with

broader financial literacy literature, budgeting skills, product literacy and risk awareness are linked with higher levels of protective capability (Engels et al., 2020). However, their influence on scam awareness appears to operate mainly through digital literacy. Therefore, the study does not claim that financial literacy alone produces scam resistance; rather, it suggests that financial literacy may be more useful when students also possess digital skills needed to evaluate online financial information.

The positive paths from budgeting skills, financial product literacy and risk awareness to digital literacy suggest students who manage their finances actively, understand common financial products and are attentive to financial risks are more likely to use digital competences relevant to financial decision making. Such students may be more inclined to verify the credibility of online investment opportunities, consult official regulator websites or use digital tools to compare offers. This complements evidence financial and digital literacies are jointly reduce vulnerability to online fraud (Umar & Dalimunthe, 2024).

Digital literacy shows a strong, positive significant effect on investment scam awareness, with the largest effect size in the model. This aligns with research indicating digital and media literacy improve the ability to discern misleading online content and reduce susceptibility to deceptive digital messages, including misinformation and fraudulent solicitations (Pelawi et al., 2025). Li et al. (2024), show higher digital literacy significantly lowers the probability of financial fraud victimization, particularly for online and telecom scams and that its protective effect is stronger when combined with financial knowledge. This study reinforces this complementarity in a frontier market, student context.

The non-significant direct effect of financial attitude on both digital literacy and scam awareness is also important. Although attitudes toward saving, spending control and goal setting are often emphasized in financial education, the findings suggest that these general attitudes did not translate into higher scam awareness in the present sample. This result should not be interpreted as evidence that financial attitude is irrelevant in all contexts. Instead, it may indicate that the selected attitude indicators did not fully capture scam-related behavioural tendencies such as overconfidence, trust, impulsivity or willingness to verify online investment offers.

The mediation paths indicate that digital literacy functions as a behavioural channel through which financial literacy becomes operational in digital contexts. This pattern is consistent with PMT, which explains protective behaviour through threat appraisal, such as recognising the riskiness of an investment offer, and coping appraisal, such as feeling capable of verifying and managing that risk (Rogers, 1975). In this study, financial literacy is interpreted as contributing to threat appraisal, whereas digital literacy is interpreted as strengthening coping appraisal by enabling students to evaluate online information, identify deceptive cues and consult authoritative sources. Umar and Dalimunthe (2024) and Pelawi et al. (2025), who find financial literacy and vigilance or cybercrime awareness jointly shape investment scam awareness and fraud resilience. However, because threat and coping appraisal were not directly measured, this interpretation should be viewed as theory-based rather than a direct empirical validation of the full PMT model.

Overall, the results suggest that in digitalized financial environments, financial literacy alone may be insufficient. Awareness of investment scams appears to depend on how effectively financial knowledge is supported by digital competence. At the same time, the

study measures awareness rather than actual scam avoidance behaviour; therefore, the findings should be interpreted as evidence of perceived awareness and not as direct evidence of real-world scam resistance.

6. IMPLICATIONS

Theoretical implications

This study enriches behavioural finance theory by showing that financial and digital literacy operate jointly, with digital competence mediating how budgeting skills, product knowledge and risk awareness are associated with scam awareness. The findings support emerging calls to conceptualize digital financial literacy as an integrated capability rather than as separate skill sets. By applying PMT as a guiding framework, the study suggests that financial literacy may inform threat appraisal while digital literacy may enable coping and protective action. However, because PMT dimensions were not directly measured, the theoretical contribution is positioned as an extension of the framework rather than a full empirical validation. Evidence from Sri Lanka also extends existing literature by showing how these mechanisms may operate in a frontier-market student context where digital adoption advances faster than formal financial literacy.

Managerial implications

The results highlight the need for organizations involved in youth financial education, including universities, financial institutions and training providers, to adopt an integrated approach that develops both financial and digital competencies. Since budgeting skills, product knowledge and risk awareness are associated with scam awareness through digital literacy, training programmes should move beyond theoretical instruction and incorporate applied, scenario-based exercises where students evaluate online investment offers, identify digital red flags and practise verification techniques. Collaboration between universities and regulated financial or fintech firms can also strengthen students' exposure to real tools and secure digital practices. These implications should be interpreted as preliminary because the evidence is drawn from one institutional context.

Policy Implications

The findings support the need to embed digital financial literacy within financial education and consumer protection initiatives. Regulatory bodies such as central banks, securities regulators and consumer protection agencies may coordinate with national cybersecurity institutions to deliver fraud awareness initiatives that emphasize platform verification, recognition of high-risk digital behaviours and safe navigation of online financial ecosystems. However, these policy implications should be presented cautiously. Since the study is based on undergraduates from a single university, the results should be validated across broader and more diverse populations before they are used to support large-scale policy recommendations.

7. LIMITATIONS AND FUTURE RESEARCH

Several limitations should be considered when interpreting the findings. Although PMT provides the theoretical foundation of the study, the core PMT dimensions of threat appraisal

and coping appraisal were not directly measured. Future research should include direct measures of perceived vulnerability, perceived severity, response efficacy and self-efficacy to provide a fuller empirical test of PMT.

Then, the study uses a cross-sectional and self-reported survey design based on undergraduates from the University of Jaffna. Therefore, the results cannot establish causality and may be affected by common method bias. Future studies should use longitudinal data, experimental designs, multiple data sources or procedural and statistical remedies for common method bias.

Next, the model explains a modest proportion of variance in digital literacy, suggesting that other determinants such as internet experience, cybersecurity training, socioeconomic background, access to technology and prior use of digital financial services should be included in future models. The present model also does not include control variables such as gender, faculty, year of study, prior investment experience and previous exposure to scams.

Finally, the dependent variable measures investment scam awareness rather than actual scam resistance or victimisation behaviour. Awareness does not always translate into real-world protective behaviour. Future studies could use simulated fraud scenarios, behavioural tasks or verified victimisation data to examine whether literacy improves actual scam avoidance.

8. CONCLUSION

This study examines whether financial and digital literacy jointly shape investment scam awareness among undergraduates in a frontier-market context. The findings show that budgeting skills, financial product knowledge and risk awareness are associated with scam awareness through the development of digital literacy, highlighting that financial knowledge alone may be insufficient for navigating complex digital financial environments. Digital literacy emerges as the strongest predictor of scam awareness, reinforcing its role as a mechanism that enables individuals to verify information, assess risks and recognize deceptive online investment schemes. By offering empirical evidence from Sri Lanka, the study expands a literature dominated by large-economy contexts and highlights the importance of integrating digital competence into behavioural finance models. Nevertheless, the conclusions are limited to awareness-based outcomes among undergraduates in one institutional setting. Future studies should test the model using multi-institutional samples, include relevant control variables and employ longitudinal, experimental or simulated-fraud designs to examine actual scam resistance, victimisation and behavioural outcomes.

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