

Investor Risk Behavior Moderation in Financial Literacy on Millennial Investment Decisions

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Abstract

Research aim : This study examines the moderating role of investor risk behavior in the relationship between financial literacy and investment decisions among millennials.

Design/Method/Approach : A quantitative approach was employed, collecting data from 96 millennial investors through a structured survey. Structural Equation Modeling-Partial Least Squares (SEM-PLS) was utilized to analyze both direct and indirect relationships among variables.

Research Finding : The findings indicate that financial literacy does not significantly influence investment decisions. However, financial literacy has a positive and significant impact on investor risk behavior, which, in turn, significantly influences investment decisions. Furthermore, investor risk behavior moderates the relationship between financial literacy and investment decisions in a positive and significant manner.

Theoretical contribution/Originality : These results highlight the critical role of risk behavior as both a mediating and moderating mechanism in leveraging financial literacy for improved investment decision-making.

Practitioner/Policy implication : The study's practical implications suggest that financial literacy programs should not only focus on enhancing knowledge but also on fostering risk management skills to support informed investment choices.

Research limitation : This study is limited by its relatively small sample size and geographic focus on Makassar City, which may restrict the generalizability of the findings to broader populations. Additionally, the cross-sectional design captures only a snapshot of behavior, making it difficult to infer long-term patterns or causal relationships.

Abstrak

Tujuan Penelitian : Studi ini meneliti peran moderasi perilaku risiko investor dalam hubungan antara literasi keuangan dan keputusan investasi di kalangan milenial.

Desain/ Metode/ Pendekatan : Pendekatan kuantitatif digunakan dengan mengumpulkan data dari 96 investor milenial melalui survei terstruktur. Structural Equation Modeling-Partial Least Squares (SEM-PLS) digunakan untuk menganalisis hubungan langsung dan tidak langsung antar variabel.

Temuan Penelitian : Temuan penelitian menunjukkan bahwa literasi keuangan tidak memengaruhi keputusan investasi secara signifikan. Akan tetapi, literasi keuangan memiliki dampak positif dan signifikan terhadap perilaku risiko investor, yang pada gilirannya, memengaruhi keputusan investasi secara signifikan. Lebih jauh, perilaku risiko investor memoderasi hubungan antara literasi keuangan dan keputusan investasi secara positif dan signifikan.

Kontribusi Teoritis/ Originalitas: Hasil-hasil ini menyoroti peran penting perilaku berisiko sebagai mekanisme mediasi dan moderasi dalam memanfaatkan literasi keuangan untuk meningkatkan pengambilan keputusan investasi.

Implikasi Praktis : Implikasi praktis penelitian ini menunjukkan bahwa program literasi keuangan tidak hanya berfokus pada peningkatan pengetahuan tetapi juga pada pengembangan keterampilan manajemen risiko untuk mendukung pilihan investasi yang tepat.

Keterbatasan Penelitian : Penelitian ini dibatasi oleh ukuran sampelnya yang relatif kecil dan fokus geografisnya di Kota Makassar, yang dapat membatasi generalisasi

temuannya ke populasi yang lebih luas. Selain itu, desain cross-sectional hanya menangkap gambaran perilaku, sehingga sulit untuk menyimpulkan pola jangka panjang atau hubungan sebab akibat.

Introduction

Investment decisions are a fundamental aspect of financial management, particularly for the millennial generation, which has become a dominant force in contemporary financial markets. Millennials are known for their rapid adoption of technology, openness to investment opportunities, and willingness to take risks. The rise of digital investment platforms has further facilitated their participation in various financial instruments, such as stocks, mutual funds, and cryptocurrencies. However, despite this increasing engagement, the level of financial literacy among millennials remains relatively low. According to the Otoritas Jasa Keuangan [1], financial literacy in Indonesia only reaches 49.68%, whereas financial inclusion stands at 85.10%, highlighting a significant gap between access to financial services and the ability to make informed financial decisions. This discrepancy raises concerns about the quality of investment decisions made by millennials, as inadequate financial knowledge may lead to suboptimal or even detrimental investment choices.

Prior studies have emphasized the importance of financial literacy in shaping sound financial behavior. Lusardi and Mitchell (2014) [2] argue that individuals with higher financial literacy are more capable of managing financial risks and making informed economic decisions. Meanwhile, Klapper et al. [3] suggest that although financial literacy is crucial, it does not always translate directly into rational investment behavior. In addition, Yolanda and Tasman [4] highlight that investor risk behavior plays a crucial role in decision-making, particularly among younger generations who are often influenced by social trends and overconfidence. However, existing research has not fully explored the interaction between financial literacy and investor risk behavior, particularly in the context of millennial investors. Most studies examine these variables in isolation rather than analyzing how risk behavior moderates the relationship between financial literacy and investment decisions.

This study aims to fill this gap by investigating the moderating role of investor risk behavior in the relationship between financial literacy and investment decisions among millennials. Drawing on Prospect Theory [5], which posits that individuals assess gains and losses differently under risk conditions, this study examines whether financial literacy alone is sufficient to influence investment decisions or if risk behavior plays a more substantial role. Additionally, the Theory of Planned Behavior [6] suggests that financial knowledge shapes investment attitudes, while risk perception influences whether individuals act on this knowledge. Thus, this research hypothesizes that investor risk behavior not only influences investment decisions directly but also strengthens the impact of financial literacy on those decisions. Based on this theoretical framework, the following hypotheses are proposed:

- H1: Financial literacy has a positive and significant effect on investment decisions.
- H2: Financial literacy has a positive and significant effect on investor risk behavior.
- H3: Investor risk behavior has a positive and significant effect on investment decisions.
- H4: Investor risk behavior moderates the relationship between financial literacy and investment decisions in a positive and significant manner.

By examining these hypotheses, this study contributes to the discourse on financial decision-making by offering a deeper understanding of how financial literacy and risk behavior interact in shaping millennial investment choices. The findings are expected to provide insights for policymakers, financial educators, and investment service providers in developing more effective financial literacy programs that emphasize not only knowledge enhancement but also risk management strategies to foster more informed and responsible investors. The author describes the Conceptual Framework of this research as in **Figure 1** below.

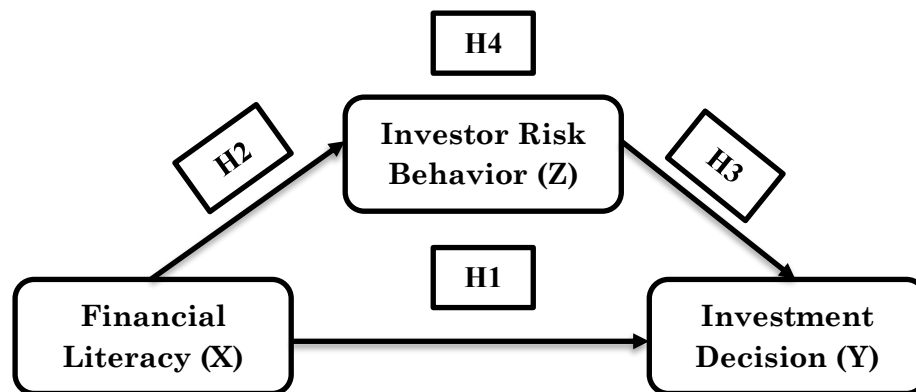


Figure 1. Research Model Framework

Source: Author's Personal Conception (2024)

Method

This study aims to analyze the moderating role of investor risk behavior on the relationship between financial literacy and investment decisions of the millennial generation. This study uses a quantitative approach with a survey method. The design of this study is explanatory research which aims to explain the causal relationship between research variables. This study also tests the role of investor risk behavior (Z) as a moderating variable in the relationship between the independent variable, namely Financial Literacy (X) and the dependent variable, namely Investment Decisions of the Millennial Generation (Y) using a statistical approach.

The population of this study is the millennial generation in Indonesia aged 25-40 years (according to the definition of the millennial generation from the Pew Research Center) and has invested in financial markets, such as stocks, mutual funds, or digital assets. The purposive sampling technique was used to select respondents who met the following criteria: Have at least one year of investment experience, Use a digital platform to make investments, and Are willing to fill out the questionnaire completely. Since the exact number of the current Millennial generation population is unknown, researchers use the Lameshow formula[7]. The Lameshow formula is important for researchers to calculate samples if the number of populations in the research sample is unknown or the number of populations is unlimited [8]. It does not need to present any research method for conceptual article/ literature study, it is only result and discussion right after introduction.

$$n = \frac{z^2 \times P(1-P)}{d^2} \dots \dots \dots (1)$$

To determine the required sample size (n) for a study with a 95 percent confidence level, a prevalence of 50 percent (P 0.500), and a desired sampling error (d) of 10 percent (d 0.100), we use the above equation (**Equation 1**).

So, the sample size obtained is as follows:

$$n = \frac{(1,96)^2 \times 0,5(1-0,5)}{(0,10)^2} = 96,04 \dots \dots \dots (2)$$

Data from respondents' answers through the questionnaire were then processed and analyzed using Partial Least Square (PLS) analysis because the author found that this method is most suitable for testing complex path models and can handle data with small sample sizes and high multicollinearity. Hypothesis testing was then carried out using Smart PLS software version 4. All constructs used in this study were taken from previous studies. The Financial Literacy variable (X) is measured using five indicators adapted from Daud et al and Halik, et al [9,10]. The Investor Risk behaviour variable (Z) is measured using five indicator items adapted from Risqina, and Shefrin [11,12]. And to measure Investment Decisions in the Millennial Generation (Y), we use five indicator items adapted from research by Sawitri and Yolanda [4,13]. A 5-point Likert scale, ranging from “strongly disagree” (1) to “strongly agree” (5), was used for all measurement items in the questionnaire. Table 1 provides a complete list of all measurement items used to conduct this study.

Table 1. Measurement Item

Construct		Item Code	Items	References
Financial Literacy (X)		X1	I understand the concept of compound interest in investing.	[9,10]
		X2	I know the impact of inflation on the future value of money.	
		X3	I understand the importance of diversification in investing.	
		X4	I have knowledge of investment risks in various assets	
		X5	I have the ability to calculate potential investment profits.	
Investor Behavior (Z)	Risk	Z1	I am willing to take high risks in investing to gain the potential for large profits.	[11,12]
		Z2	I am not easily affected by fluctuations in asset values in the market.	
		Z3	I tend to hold onto investment assets even if they experience a temporary decline in value.	
		Z4	I prefer to diversify assets to reduce risk rather than focusing on one type of asset.	
		Z5	I am comfortable with market volatility over a period of time.	
Millennial Generation Investment Decisions (Y)		Y1	I make investment decisions based on relevant market information.	[4,13]
		Y2	I utilize applications or technology to support my investment decisions.	
		Y3	I make sure my investment portfolio is diversified	
		Y4	I consider the risks and benefits in balance before investing.	
		Y5	I have a clear financial plan to support investment decisions.	

Source: Primary Data Processed (2024)

Results and Discussion

This section presents the statistical results of the analysis examining the relationship between financial literacy, investor risk behavior, and investment decisions among millennials. The data were processed using Structural Equation Modeling-Partial Least Squares (SEM-PLS), and the results are presented based on direct and moderating effects.

Descriptive Statistics. The study involved 96 respondents from the millennial generation who met the predetermined criteria. The characteristics of the respondents include gender, age, education level, employment status, and investment preferences. The distribution of respondents indicates that 52.08% are female and 47.92% are male, with the majority aged 31–35 years (43.75%), followed by 25–30 years (37.50%) and 36–40 years (18.75%). Regarding

investment preferences, gold (62.5%) was the most preferred asset, followed by cryptocurrencies (33.33%), stocks (22.92%), mutual funds (19.79%), and deposits/securities (15.63%). This reflects the growing interest of millennials in both traditional and digital investment instruments. For further clarity, the author presents respondent data in **Table 2** below.

Table 2. Respondent Characteristics (N = 96)

Variable	Frequency	Percentage
Gender		
Male	46	47.917
Female	50	52.083
Respondents age		
25 to 30 years	36	37.500
31 to 35 years	42	43.750
36 to 40 years	18	18.750
Level of Education		
High school/equivalent	12	12.500
D3 (Diploma)	23	23.958
Bachelor degree (S1)	52	54.167
Magister / Doctoral	9	9.375
Respondent's job		
Private employees	54	56.250
Government employees	22	22.916
Professional (doctor, lecturer, lawyer, etc)	14	14.583
Self-employed	6	6.250
Types of Investments Owned		
Gold	60	62.500
Crypto Assets	32	33.333
Stocks	22	22.917
Mutual funds	19	19.791
Deposits and Securities	15	15.625

Source: Primary Data Processed (2024)

Validity and Reliability Tests. Before hypothesis testing, an evaluation of convergent validity, discriminant validity, and reliability was conducted. The factor loading values for all constructs exceeded the 0.7 threshold, indicating good convergent validity [14]. The Average Variance Extracted (AVE) values for all constructs were above 0.5, confirming strong discriminant validity. Furthermore, Cronbach's Alpha and Composite Reliability (CR) values for all variables were above 0.7, indicating high internal consistency. The results can be seen in **Table 3** and **Table 4** below.

Table 3. Evaluation of Measurement Models

Construct	Code	Loading Factor	Cronbach's Alpha	CR	AVE
Financial Literacy (X)	X1	0.855	0.890	0.893	0.696
	X2	0.855			
	X3	0.895			
	X4	0.832			
	X5	0.727			
Investor Risk Behavior (Z)	Z1	0.844	0.907	0.909	0.729
	Z2	0.847			
	Z3	0.919			
	Z4	0.864			
	Z5	0.791			
Investment Decision (Y)	Y1	0.871	0.908	0.921	0.731
	Y2	0.894			
	Y3	0.872			
	Y4	0.862			
	Y5	0.769			

Source: Primary Data Processed (2024)

Table 4. Discriminant Validity with the Fornell Larcker Approach

Variable	Financial Literacy	Investment Decision	Investor Risk Behavior
Financial Literacy	0.835		
Investment Decision	0.497	0.855	
Investor Risk Behavior	0.522	0.707	0.854

Source: Primary Data Processed (2024)

By comparing the correlation value between latent variables with the Average Variance Extracted Square Root (AVE), the discriminant validity can also be verified. The square root value of AVE must be higher than the correlation between latent variables, using the Fornell-Larcker Criterion [15]. This is shown in **Table 4**, where the square root of AVE is greater than the correlation coefficient between latent variables. As a result, each statement item in the research instrument is reliable and suitable for use as a measuring tool.

Structural Model Analysis (R-Square & Effect Size). The R-Square (R^2) values indicate the proportion of variance explained by the independent variables. The results show that 27.3% of investor risk behavior is explained by financial literacy ($R^2 = 0.273$), while 52.3% of investment decisions are explained by financial literacy and investor risk behavior ($R^2 = 0.523$), indicating a moderate explanatory power (Hair et al., 2019). (See **Table 5**)

Table 5. R-Square Value

	R-Square	R-Square Adjusted
Investor Risk Behavior	0.273	0.265
Investment Decision	0.523	0.512

Source: Primary Data Processed (2024)

The effect size (f^2) analysis further supports the structural model's validity. The influence of financial literacy on investor risk behaviour is classified as strong ($f^2 = 0.375$), while the effect of investor risk behaviour on investment decisions is also strong ($f^2 = 0.578$). In contrast, the direct effect of financial literacy on investment decisions is relatively weak ($f^2 = 0.047$). (See result at **Table 6**)

Table 6. F-Square Value

Variable	Financial Literacy	Investor Risk Behavior	Risk	Investment Decision
Financial Literacy		0.375		0.047
Investor Risk Behavior				0.578
Investment Decision				

Source: Primary Data Processed (2024)

This research model also shows good relevance. The Standardized Root Mean Square Residual (SRMR) value, as seen in Table 7, is 0.077, which is lower than the recommended threshold of 0.080 [16,17].

Table 7. Model Fit Result

	Saturated Model	Estimated Model
SRMR	0.077	0.077
d_ULS	0.704	0.704
d_G	0.400	0.400
Chi-square	206.578	206.578
NFI	0.822	0.822

Source: Primary Data Processed (2024)

Figure 2 below shows the path coefficients for the structural equation model.

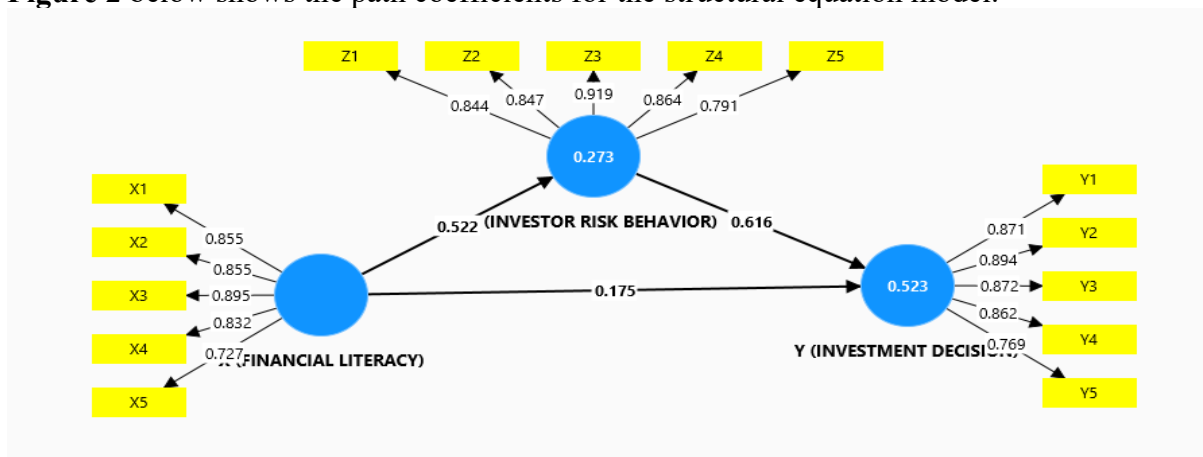


Figure 2. Structural Equation Modeling

Source: Primary Data Processed (2024)



Hypothesis Testing Results. The study tested four hypotheses using bootstrapping analysis in SEM-PLS. The results are summarized as follows:

Table 9. Path Coefficient and Hypotheses Testing

Hypothesis	Relation	Original Sample	Mean	SD	T-Statistics	P-Values	Description
H1	FL → ID	0.175	0.177	0.103	1.694	0.090	Not Supported
H2	FL → IRB	0.522	0.533	0.078	6.730	0.000	Supported
H3	IRB → ID	0.616	0.617	0.087	7.102	0.000	Supported
H4	FL → IRB → ID	0.322	0.328	0.065	4.925	0.000	Supported

Note: FL = Financial Literacy; IRB = Investor Risk Behavior; ID= Investment Decision

Source: Primary Data Processed (2024)

Interpretation of Findings

- H1 (Financial Literacy → Investment Decisions): The relationship is not significant ($p = 0.090$, $t = 1.694$), indicating that financial literacy alone does not directly influence investment decisions.
- H2 (Financial Literacy → Investor Risk Behavior): A significant positive relationship was found ($p = 0.000$, $t = 6.730$), suggesting that higher financial literacy leads to more structured risk behavior.
- H3 (Investor Risk Behavior → Investment Decisions): The effect is significant and positive ($p = 0.000$, $t = 7.102$), confirming that risk behavior is a key determinant of investment decisions.
- H4 (Moderating Effect of Investor Risk Behavior): The interaction is significant ($p = 0.000$, $t = 4.925$), demonstrating that investor risk behavior strengthens the impact of financial literacy on investment decisions.

Discussion

Financial Literacy and Investment Decisions

The results indicate that financial literacy does not have a significant direct effect on investment decisions among millennial investors. This finding contrasts with the widely accepted notion that individuals with greater financial knowledge make better investment decisions [2]. Previous research has often emphasized that financial literacy improves one's ability to evaluate financial risks and choose appropriate investment instruments [3]. However, the present study suggests that mere financial knowledge may not be sufficient to influence actual investment choices, particularly in the millennial cohort.

One possible explanation for this result is that millennials often rely on social trends, peer recommendations, and digital investment platforms rather than making investment decisions based on their financial knowledge. Studies have shown that this generation exhibits herding behaviour, where investment decisions are influenced by the actions of others rather than an independent assessment of risk and return [18,19]. Moreover, the accessibility of



investment applications has made investment decisions more impulsive, reducing the influence of financial literacy as a decisive factor [13].

Another reason for this insignificant relationship could be the nature of financial literacy itself. Many financial education programs focus on theoretical knowledge rather than practical investment decision-making skills. Even if millennials possess basic financial knowledge, they may lack the experience or confidence to apply it in real-world investment scenarios [10]. Thus, this study aligns with research suggesting that financial literacy alone does not always translate into improved financial behaviour, unless accompanied by other behavioural or psychological factors [20].

Financial Literacy and Investor Risk Behavior

The findings confirm that financial literacy has a positive and significant effect on investor risk behaviour, indicating that individuals with higher financial knowledge tend to exhibit more rational and calculated risk-taking behaviour. This result is consistent with the findings of Lusardi and Mitchell [2] and Daud et al [9], who argue that individuals with higher financial literacy are more capable of evaluating risks and managing their investments prudently.

One possible explanation for this result is that financial literacy enhances an investor's ability to differentiate between high-risk and low-risk investments, enabling them to engage in risk-taking behavior in a more measured manner. Financially literate individuals are less prone to panic selling, overconfidence bias, or emotional decision-making, which are common among inexperienced investors [12]. Furthermore, [5] Kahneman's Prospect Theory supports the idea that well-informed investors assess risk differently compared to those with limited knowledge, allowing them to navigate financial markets more effectively.

Despite these findings, previous research has also highlighted the existence of a non-linear relationship between financial literacy and risk-taking. While basic financial literacy may increase risk awareness, it does not necessarily lead to higher risk tolerance unless individuals have substantial experience in managing investments [10]. Future research could explore whether financial literacy interacts with investment experience to influence risk behaviour more profoundly.

Investor Risk Behavior and Investment Decisions

This study confirms that investor risk behaviour has a positive and significant impact on investment decisions, suggesting that individuals who are more comfortable with risk are more likely to engage in investment activities. This aligns with Sawitri [13] and Yolanda & Tasman [4], who found that investors with higher risk tolerance tend to diversify their portfolios and actively participate in financial markets.

A possible explanation for this finding is that risk tolerance influences an investor's willingness to explore different financial instruments, including high-volatility assets such as stocks and cryptocurrencies. Millennials, in particular, have been observed to engage in risk-taking behaviour due to their exposure to digital investment trends and online financial communities [18].



However, this finding contrasts with research suggesting that excessive risk-taking may lead to suboptimal investment outcomes. [12] Shefrin argue that overconfident investors often engage in speculative trading, leading to losses rather than long-term financial stability. The present study suggests that while risk tolerance is beneficial for investment participation, it must be accompanied by financial knowledge and strategic decision-making.

Another factor influencing this relationship is the role of behavioural biases. [20] Thaler notes that investor decisions are not always rational, as emotions, cognitive biases, and external influences often play a role. While risk-taking behaviour is necessary for investment participation, future research should examine whether millennials differentiate between calculated risks and impulsive financial decisions.

The Moderating Role of Investor Risk Behavior

The study finds that investor risk behaviour moderates the relationship between financial literacy and investment decisions in a significant and positive manner. This means that individuals with higher financial literacy are more likely to translate their knowledge into investment actions when they also possess a higher tolerance for risk. This extends the findings of Klapper et al [3] and Lusardi & Mitchell [2] by demonstrating that risk behaviour serves as a key mechanism in converting financial knowledge into tangible investment decisions.

This finding aligns with the Theory of Planned Behaviour [6], which suggests that financial literacy alone does not guarantee action unless an individual's attitude toward risk supports investment decision-making. Individuals who understand financial concepts but have a low risk tolerance may avoid investment opportunities due to fear of losses, whereas those who are both knowledgeable and risk-tolerant are more likely to act on their financial literacy.

Previous research has largely overlooked the interactive effect of risk behaviour and financial literacy, treating them as separate constructs rather than examining their combined influence. The present study highlights the importance of integrating risk tolerance into financial education programs, ensuring that individuals not only acquire knowledge but also develop confidence in making investment decisions.

Conclusion

This study investigates the relationship between financial literacy, investor risk behaviour, and investment decisions among millennials, with a particular focus on the moderating role of investor risk behaviour. The findings reveal that financial literacy alone does not directly influence investment decisions, suggesting that knowledge of financial concepts is not always sufficient to drive rational investment behaviour. Instead, investor risk behaviour plays a crucial role in translating financial literacy into actionable investment decisions. Individuals with higher financial literacy exhibit more structured and calculated risk-taking tendencies, which in turn positively influence their investment choices. Furthermore, investor risk behaviour significantly moderates the relationship between financial literacy and investment decisions, indicating that financial knowledge becomes more impactful when paired with an appropriate level of risk tolerance.

These findings underscore the importance of behavioural factors in financial decision-making. While financial literacy remains an essential foundation for sound investment practices, it must be complemented by an individual's ability to assess and manage risk effectively. Millennials, as digital-native investors, are increasingly exposed to financial opportunities through online platforms, yet their investment choices are often influenced by external factors such as social trends and peer recommendations. This highlights the need for a more holistic approach to financial education that integrates both knowledge acquisition and behavioural training to foster well-informed and rational investors.

Implications

The results of this study offer several practical implications for financial educators, policymakers, and investment service providers. **First**, financial literacy programs should go beyond theoretical knowledge and incorporate experiential learning methods that enhance risk assessment skills and strategic decision-making. Interactive simulations, real-world investment case studies, and behavioural finance training can help individuals develop a more comprehensive understanding of risk and return dynamics.

Second, financial service providers should consider integrating risk assessment tools into investment platforms to assist investors in making informed decisions. Personalized investment recommendations based on an individual's financial literacy level and risk tolerance can mitigate impulsive decision-making and reduce exposure to excessive financial risks. Additionally, regulators and policymakers should prioritize financial literacy campaigns that emphasize responsible investing, especially as digital investment platforms continue to reshape financial markets.

Research Limitations and Suggestions for Further Research

This study is limited by its relatively small sample size and geographic focus on Makassar City, which may restrict the generalizability of the findings to broader populations. Additionally, the cross-sectional design captures only a snapshot of behavior, making it difficult to infer long-term patterns or causal relationships. The reliance on self-reported data introduces potential biases, such as respondents overestimating their financial literacy or underreporting risky behaviors. Furthermore, the study focuses on financial literacy and risk behavior while excluding other influential factors, such as emotional intelligence, peer influence, and market conditions. Future research should consider expanding the sample size and geographic scope, adopting longitudinal designs to capture evolving behaviors, integrating additional variables like behavioral biases and social influences, and incorporating qualitative methods to gain deeper insights into the motivations behind investment decisions. Comparative

studies across different generations could also provide valuable perspectives on how financial literacy and risk behavior vary and influence decision-making.

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