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ORIGINAL SCIENTIFIC PAPER

Do Investment Decisions Mediate the Effect of Cognitive and Emotional Bias on Financial Performance in Women SMEs?

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A B S T R A C T

Small and medium-sized enterprises (SMEs) can continue to grow due to the contribution of women entrepreneurs. The performance of SMEs and investment decisions made by women entrepreneurs have been proven to have a crucial role in a country, especially in economic growth. This research highlights the role of

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cognitive and emotional biases in investment decisions and the financial performance of female SMEs. Cognitive bias is proxied by overconfidence, representativeness, and herding biases. Emotional bias is proxied by loss aversion bias. The novelty of this study lies in treating investment decisions as an intervening variable. The study population comprised women-owned SMEs in two large provinces in Indonesia: Central Java and the Special Region of Yogyakarta. The sample used in this study was 130 SMEs. The results provide empirical evidence on the role of herding bias and loss aversion in improving investment decisions. The variables of overconfidence and representativeness bias were associated with improved company financial performance. The role of investment decisions as a mediating variable was not proven for all tested variables. This study provides theoretical contributions and practical implications for female SME owners and the government.

KEYWORDS: *overconfidence bias, representativeness bias, herding bias, loss aversion bias, investment decision, performance, women SMEs*

Introduction

Women make a vital contribution to the growth of SMEs. Women also bring unique perspectives, have skills, and contribute to the business world, so that it has an impact on the country's economic growth (Adam et al., 2024). In the world, women entrepreneurs play a role in expanding employment opportunities, reducing poverty, increasing product innovation, and driving the community economy (Popoola, 2025).

In Indonesia, SMEs play a strategic role. Data from the Ministry of Micro, Small, and Medium Enterprises (MSMEs) shows that as of December 2024, there were 30.18 million MSMEs in Indonesia. Of these, 64.5 percent, or 37.5 million, were managed by women (Tubastuvi & Purwidianti, 2023). The contribution of female entrepreneurs in Indonesia is driven by government policies that prioritize women's economic empowerment. Women in SMEs are able to overcome economic disparities, improve their living standards, and achieve empowerment (Prasetyani et al., 2025).

The performance of SMEs and investment decisions made by women entrepreneurs have been proven to have a crucial role in a country, especially in economic growth(Iram et al., 2023). However, many women entrepreneurs exhibit irrational behavior, which influences their investment

decisions. This irrational behavior often leads to hasty investment decisions that fail to consider the risks involved.

Many factors influence investment decisions and SME performance, including cognitive and emotional biases (Dominic & Gupta, 2020; Lestari et al., 2021; Purwidianti et al., 2023; Sukma Ardini et al., 2023). Cognitive bias occurs when there is a systematic deviation from rational judgment. Cognitive biases in this study will be proxied by overconfidence, herding, and representativeness biases. Emotional biases generally occur spontaneously, driven by an individual's personal feelings, when making decisions. In this study, emotional bias is proxied by loss aversion bias.

Overconfidence bias is characterized by an individual's overestimation of the accuracy of investment assessments. demonstrate that overconfidence bias is an important factor in the development of entrepreneurship among women; however, studies on overconfidence bias in relation to investment in entrepreneurship are inconsistent. Changes in investment decisions can be driven by business owners' overconfidence bias. This phenomenon has been captured by numerous studies. (Ahmad & Shah, 2020; Almansour et al., 2023; Elhussein & Abdelgadir, 2020; Iram et al., 2023; Novandalina et al., 2022; Purwidianti et al., 2023, 2024; Rahman & Gan, 2020; S. Z. A. Shah et al., 2018; Zafar et al., 2024). Az-zahara et al. (2024) found results that contradict the majority of research, indicating that investment decisions do not depend on overconfidence.

Improved company financial performance can stem from owner overconfidence. Aljughaiman and Chebbi (2022), Bouteska and Regaieg (2020), and Chang et al. (2022) found an interesting phenomenon: overconfidence bias among company owners can further enhance business performance. This overconfidence leads owners to make financial decisions with greater confidence, thereby improving company financial performance. However, empirical evidence still exists that finds contradictory results regarding overconfidence bias, which actually causes a company's financial performance to decline further (Ahmad & Shah, 2020; Chang et al., 2022).

Representativeness is the tendency of an individual to assess an idea or object based on how well it represents something. Other research on representativeness bias also shows the impact of *representativeness* on investment decisions (Kartini & Nahda, 2021; S. Z. A. Shah et al., 2018).

SME owners often exhibit follow-the-track behavior by following the investments made by other SMEs. In financial management, this follow-the-track behavior is known as herding bias. This behavior stems more from

SME owners' tendency to avoid investing in areas that differ from those of their peers. This is shown by the results of research (Adielyani & Mawardi, 2020; Almansour et al., 2023; Keswani et al., 2019; Naomi et al., 2018; Purwidianti et al., 2023; Zafar et al., 2024). Some studies (Rahman & Gan, 2020; Sukma Ardini et al., 2023) reported different results, finding that herding bias does not affect changes in investment decisions. *Herding bias* can affect a company's performance. Research by S. S. H. Shah et al. (2024) provides empirical evidence that herding bias can affect a company's financial performance.

Loss aversion bias states that, in general, humans tend to have a stronger drive to avoid losses than to gain profits. Changes in a 'company's investment decisions can also be caused by loss aversion bias (Az-zahara et al., 2024; Elhussein & Abdelgadir, 2020; Sapkota, 2023). Research by Sukma Ardini et al. (2023) yields conflicting results regarding the impact of loss aversion bias on investment decision-making. The relationship between *loss aversion* bias and performance has been shown by several studies. Company performance can decline further due to loss aversion bias(Aljughaiman & Chebbi, 2022; Bouteska & Regaieg, 2020).

The results of the aforementioned study show that there is a research inconsistency regarding cognitive and emotional biases in investment decisions and performance. This research will overcome the research gap by placing investment decisions as a mediating variable. This is based on the idea that the impact of investment decisions on performance has been established by previous research (Nguyen et al., 2023; Quddus et al., 2022).

Literature Review

Overconfidence and Investment Decision

An entrepreneur will have the courage to take risks in environments with high uncertainty. They will dare to allocate the resources they have, even though the level of success of their business is still uncertain (Gochhait & Korter, 2025). Overconfidence is a tendency to overestimate one's abilities and knowledge. An overconfident individual tends to make risky investment decisions because they are confident in the ideas guiding their business (Aljughaiman & Chebbi, 2022). Previous studies have reinforced the finding that overconfidence affects overinvestment decision-making.

Research by Purwidianti et al. (2023) shows that overconfidence among SME owners increases their willingness to invest. The same results are reported in studies by Aeni et al. (2024), Almansour et al. (2023), Syarkani and Alghifari (2022), and Zafar et al. (2024), which highlight the positive impact of overconfidence on investment decisions.

H1: Overconfidence behavior can improve investment decision-making

Representativeness and Investment Decision

Representativeness is the tendency for an individual to make decisions based on limited observations and to perceive those decisions as representing his or her interests. This representative bias can cause investors or individuals to overreact to information. This representative can lead to wrong decision-making because it does not consider future investment results (Kartini & Nahda, 2021).

Research on representativeness bias shows the results of an increase in investment decisions due to *representativeness* (Elhussein & Abdelgadir, 2020; Kartini & Nahda, 2021; S. Z. A. Shah et al., 2018). Investors have an optimistic tendency towards their investment decisions because they have been optimistic about profits in the past (Lazuarni & Asri, 2020).

H2: Representativeness bias is able to improve investment decision-making

Herding Bias and Investment Decision

Herding bias describes behavior that always follows investment decisions that have been made by other investors without any prior analysis (Armansyah, 2022). This behavior will lead individuals to make investment decisions simply because many others are doing so. This behavior is encouraged because individuals want to minimize risk by following the behavior of their group (Almansour et al., 2023).

Research on herding bias in investment decision-making provides clues to increased investment decisions driven by herding. Several studies provide evidence supporting this (Almansour et al., 2023; Purwidianti et al., 2023; Zafar et al., 2024).

H3: Herding bias can improve investment decision-making

Loss Aversion and Investment Decision

Loss aversion is the tendency to avoid losses because individuals do not evaluate gains and losses equally. They will evaluate investments based on expected profits, without considering potential losses due to fear of risk (Aljughaiman & Chebbi, 2022).

Research on the influence of *loss aversion* bias in investment decision-making is shown by Az-zahara et al. (2024), Elhussein & Abdelgadir (2020), and Sapkota. In general, individuals are more stressed about losses than about gains of the same amount (Hossain & Siddiqua, 2022).

H4: Loss aversion bias leads to an increase in investment decisions.

Overconfidence and Financial Performance

Overconfidence arises because individuals feel that they have an advantage over others in terms of knowledge and skills (Ahmad & Shah, 2020). A study by Aljughaiman and Chebbi (2022) explores the relationship between overconfidence and company performance. The results provide evidence that overconfidence can support improvements in company performance. An individual who is overconfident can improve the company's performance due to their willingness to undertake riskier business strategies (Aljughaiman & Chebbi, 2022). Overconfident leaders will engage in strategic business risk-taking through cognitive, motivational, and social mechanisms (Burkhard et al., 2023).

The overconfidence bias in the belief that performance can be improved has been shown by Aljughaiman & Chebbi (2022), Bouteska & Regaieg (2020), and Chang et al. (2022). The higher the *overconfidence* bias, the higher the performance will increase.

H5: Overconfidence bias leads to an increase in the 'company's financial performance

Representativeness and Financial Performance

Research on the relationship between representative bias and financial performance remains very limited. One study illustrating this relationship was conducted by Alex and Koske (2020). The study shows that SME owners' representativeness bias can improve financial performance. SME

owners who tend to trust past events can predict the future; they will invest in products or in the company's reputation based on past experience.

H6: Representativeness bias leads to an increase in the company's financial performance

Herding Bias and Financial Performance

Several reasons for herding behavior among company owners have been identified in previous research (S. S. H. Shah et al., 2024). First, the fear of the 'company's risk will fall if it takes actions that are contrary to those of its competitors. Second, the company's owner deduces information from his personal interactions with competitors. Third, the company owner can access the same information as his competitors.

Several studies have proven that investment strategies based on herding behavior can improve company performance. Herding behavior also has a role in changes in the company's performance. Research by Alabass et al. (2019) and S. S. H. Shah et al. (2019, 2024) provides empirical evidence that herding bias can improve company performance.

H7: Herding bias leads to an increase in the 'company's financial performance

Loss Aversion and Financial Performance

SME owners with a loss-aversion bias will be unwilling to accept the same losses based on the 'company's past performance. Therefore, SME owners are reluctant to develop their businesses for fear of losing money. Aljughaiman and Chebbi (2022) examined how loss aversion behavior affects company performance. The results show that loss aversion behavior leads to a decline in company performance.

Several studies have shown the relationship between loss aversion bias and performance. The loss aversion bias will negatively affect performance, as demonstrated by Aljughaiman and Chebbi (2022) and Bouteska and Regaieg (2020).

H8: Loss aversion bias causes a decline in the 'company's financial performance

Investment Decision and Financial Performance

Investment decisions are crucial for companies. This decision will involve the use of the company's capital. This decision will also affect the company's survival. Several studies have provided evidence of the tangible contribution of investment decisions to a company's financial performance. Bokhari et al. (2023), Nguyen et al. (2023), and Quddus et al. (2022) provide guidance in their research on improving investment decisions, which can enhance a company's financial performance.

H9: Investment decisions improve the 'company's financial performance

Investment Decision Mediation

Previous studies have provided a general overview of the close relationships among overconfidence bias, herding bias, representativeness bias, and loss aversion bias in investment decisions and company financial performance. However, existing studies have not explored the relationship between these variables. A mediation test is needed for further verification. This research treats investment decisions as a mediator because they determine changes in company financial performance.

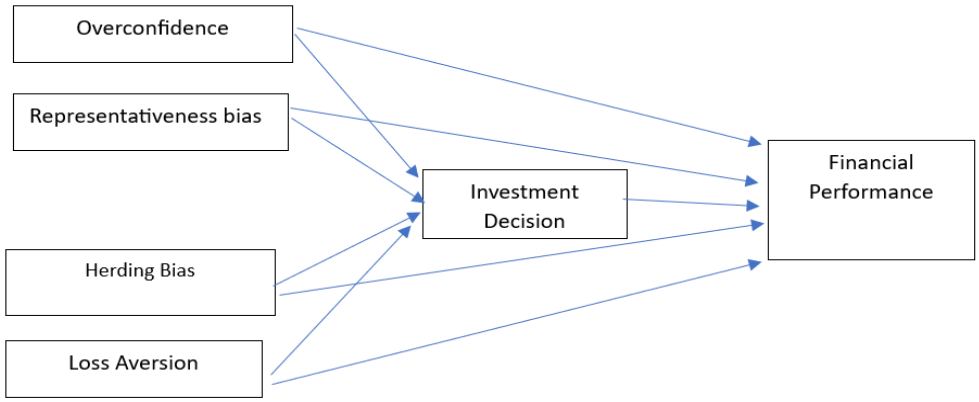
H10: The intervening role of investment decisions can improve financial performance due to overconfidence bias.

H11: The intervening role of investment decisions can improve financial performance due to representativeness bias.

H12: The intervening role of investment decisions can improve financial performance due to herding bias.

H13: The intervening role of investment decisions can decrease financial performance due to loss aversion bias

Figure 1: Research framework



Source: processed by researchers, 2025

Method

Female SME owners in Central Java Province and the Special Region of Yogyakarta were selected as the population for this research. The sampling technique used was convenience sampling due to the large study area and the inability to obtain the names of all operating SMEs. The use of convenience sampling will introduce bias in respondents' answers; the researcher conducted a common bias test to ensure the accuracy of the responses. The sample criteria used are SMEs whose owners or managers are women, non-financial SMEs, and SMEs that were still producing in the research year.

The minimum number of samples to be used is five observations of each parameter (Hair et al., 2014). This study has four independent variables, one mediation variable, one dependent variable, and 20 question indicators. The minimum sample size used is 130 female SME owners from Central Java Province and the Special Region of Yogyakarta.

All of these research items were measured using a Likert scale of 1 to 5. The variables of overconfidence and representativeness were measured by the statements used in the study (Iram et al., 2023). Overconfidence bias is characterized by an individual's excessive confidence in their ability to accurately assess investments. The variable of overconfidence comprises five statements about confidence in investment experience, belief in the knowledge possessed, feeling wiser than others, greater confidence in one's

knowledge than analysts' or experts' results, and deciding to invest because of confidence in oneself (Iram et al., 2023).

Representativeness refers to an individual's tendency to consider an idea or object as representative of themselves. The representativeness variable was measured using four statements: avoiding underperforming transactions, using trend analysis to predict investment returns, investing according to the desired quality, and investing based on selective sources of information (Iram et al., 2023).

Herding bias is reflected in the tendency to follow the investment decisions of other investors. . Indicators of herding bias include choosing the most popular investments, choosing investments based on the best price, following other investors due to a reluctance to act differently, and choosing investments that consider market conditions (Metawa et al., 2019).

Loss aversion bias refers to the tendency of individuals to be more motivated to avoid losses than to achieve gains. The loss aversion variable was measured using statements based on previous studies (Hossain & Siddiqua, 2022; Kumar et al., 2020). Four statements were used: large losses are more significant than equivalent gains; experiencing nervousness due to declining turnover; avoiding additional investments when the market is falling; and refraining from sales during volatile market conditions. Several items are used to measure investment decisions (Gveroski & Jankuloska, 2017; Purwidianti et al., 2024). The first item addresses the type of investment planned for the future. The second item addresses the use of intuition in investment planning. The third item addresses the relationship between investment planning and the market conditions the company faces. The fourth item addresses the role of consumer needs orientation in investment planning. The fifth item addresses environmental factors and their influence on investment plans. The final item addresses the need for an investment feasibility study before undertaking an investment plan.

This research used five items to measure SMEs' financial performance (Nabeel-rehman & Nazri, 2019; Purwidianti et al., 2022). The first and second items indicate an increase in return on assets and return on equity from the previous year. The third item relates to the 'company's profit margin. The fourth item addresses the 'company's ability to gain market share in the industry. The final item relates to sales growth from the previous year.

Results

Statistics Descriptive

The respondents in this research are the owners of female SMEs in two major provinces in Indonesia, namely Central Java and the Special Region of Yogyakarta, for a total of 130 respondents. The results of the respondent statistics are shown in Table 1 below.

Table 1: Descriptive Statistics

	N	**%**
Age		
a. Less than 20 years	7	5,38
b. 20-30 years	35	26,92
c. 31-40 years	30	23,08
d. More than 40 years	58	44,62
Education		
a. High school graduate or less	13	10
b. High school graduate	66	50,77
c. Diploma graduate	13	10
d. 'Bachelor's degree or above	38	29,23
Type of Business		
a. Trade	85	65,39
b. Service	30	23,07
c. Manufacturing	15	11,54
Length of Business		
a. Less than 1 year	19	14,62
b. 1-5 years	62	47,69
c. 6-10 years	31	23,85
d. 11-15 years	6	4,61
More than 15 years	12	9,23

Source: processed by researchers, 2025

Statistical Testing

Statistical testing begins with a common biased test using Harman's Single Factor. The test result showed a statistical figure of 29.039%, less than 50%, indicating that the respondents' responses showed no bias (Tehseen et al., 2017).

This research uses SEM-PLS for statistical testing, comprising outer and inner model testing.

Evaluation of the Outer Model

Several tests required to test the outer model are shown in Table 2. A value of 0.7 is the standard for outer loading factors.

Table 2: Outer Model Results

Variable	Indicator	Outer Loading	Cronbach's Alpha	Composite Reliability	AVE
Overconfidence/ OD (X1)	X1.2	0,792	0,645	0,808	0,585
	X1.3	0,765			
	X1.5	0,736			
Representativeness Bias/ RPV (X2)	X2.1	0,736	0,626	0,799	0,570
	X2.3	0,795			
	X2.4	0,733			
Herding Bias/ HB (X3)	X3.2	0,860	0,643	0,849	0,737
	X3.4	0,857			
Loss Aversion/ LA (X4)	X4.2	0,811	0,622	0,839	0,723
	X4.3	0,888			
Investment Decision/ ID (Z)	Z1	0,787	0,763	0,849	0,585
	Z3	0,735			
	Z5	0,731			
	Z6	0,805			
Financial Performance/FP (Y)	Y1	0,853	0,913	0,933	0,700
	Y2	0,899			
	Y3	0,833			
	Y4	0,876			
	Y5	0,793			
	Y6	0,758			

Source: processed by researchers, 2025

Table 3 below presents the results of discriminant testing using the Fornell-Larcker Criterion.

Table 3: Discriminant Analysis Results

Variable	FP	HB	ID	LA	OD	RPV
FP	0,837					
HB	0,409	0,859				
ID	0,491	0,548	0,765			
LA	0,130	0,255	0,350	0,850		
OD	0,467	0,651	0,520	0,325	0,765	
RPV	0,471	0,555	0,491	0,361	0,613	0,755

Source: processed by researchers, 2025

Inner Model Evaluation

The inner model test was carried out in two stages, evaluating the test results for the determination coefficient and the regression path coefficient. This research uses two regression equations that show the existence of direct and indirect influences. The results of the direct influence test showed R-squared values of 0.318 and 0.371 for the indirect test. The results of the test of the two equations are presented in Table 4 as follows.

Table 4: Path coefficient and hypothesis result

Hyphotesess	Path Coefficient	t Statistic	p-value	Result
H1: OD -> ID	0,171	1,328	0,185	Not supported
H2: RPV -> ID	0,158	1,468	0,143	Not supported
H3: HB -> ID	0,308	3,476	0,001	Supported
H4: LA -> ID	0,159	2,159	0,031	Supported
H5: OD -> FP	0,245	2,083	0,038	Supported
H6: RPV -> FP	0,290	3,265	0,001	Supported
H7: HB -> FP	0,109	0,979	0,328	Not supported
H8: LA -> FP	-0,082	0,948	0,343	Not supported
H9: ID -> FP	0,312	1,999	0,046	Supported
H10: OD -> ID -> FP	0,053	0,895	0,371	Not supported
H11: RPV -> ID -> FP	0,049	1,007	0,314	Not supported
H12: HB -> ID -> FP	0,096	1,728	0,085	Not supported
H13: LA -> ID -> FP	0,050	1,469	0,142	Not supported

Source: processed by researchers, 2025

Table 3 presents the results of hypothesis testing for 13 hypotheses developed in this research. The findings do not provide sufficient evidence to reject six hypotheses: H3, H4, H5, H6, H9, and H12. Only one hypothesis shows the intervening role of investment decisions on the influence of herding bias on financial performance.

Discussion

The test results in this study show overconfidence among women entrepreneurs. These results differ from the majority of studies produced in the previous period. In theory, a high level of trust will increase investment by individuals (Aeni et al., 2024; Almansour et al., 2023; Syarkani & Alghifari, 2022; Zafar et al., 2024). The different results of this study compared to previous studies are possible because the sample of female SME owners does not have excessive confidence. The results are in line with the opinion (Amirkhanyan et al., 2021) that women have low confidence in investment decision-making. Syarkani and Alghifari (2022) also stated that men have greater confidence than women because they have a greater ability to process information and make investment decisions. (2023) stated that one obstacle to entrepreneurship for women is a lack of self-confidence, so an entrepreneurship education for women is needed that focuses more on developing self-confidence.

Representativeness bias does not appear to impact investment decisions. These results do not support previous research (Elhussein & Abdelgadir, 2020; Kartini & Nahda, 2021; S. Z. A. Shah et al., 2018), which provides evidence that higher levels of representativeness bias can influence investment decisions. Indicators of representativeness bias include making investment decisions based on financial analysis and relying on selective or trusted sources of information. The responses to the indicator suggest that respondents are more likely to be neutral toward the statement. Indicators of representativeness bias include basing investment decisions on financial analysis and depending on selective or trusted sources of information.

Herding biased behavior can improve investment decisions. Investors with this bias will always follow market trends. These results are in line with previous studies conducted (Almansour et al., 2023; Purwidianti et al., 2023; Zafar et al., 2024). Investment decisions made by female SME owners are based on those of other SME owners and are driven by market information.

Loss aversion bias has proven to be a driving factor for the increase in investment decisions of female SMEs. Loss aversion bias signifies an individual's aversion to loss. Among women SME owners in the two provinces studied, the answer score for this loss aversion bias was low, suggesting that female SME owners are willing to bear the risk of losing their businesses. This is what drives investment decisions. These results are in line with previous studies by Az-zahara et al. (2024), Elhussein & Abdelgadir (2020), and Sapkota (2023).

Overconfidence bias is a factor contributing to higher financial performance. Aljughaiman & Chebbi (2022) emphasized that excessive confidence can drive companies to outperform their competitors, thereby improving performance. This study reinforces prior research findings (Aljughaiman & Chebbi, 2022; Bouteska & Regaieg, 2020; Chang et al., 2022). One effort to increase women entrepreneurs' confidence is to expand women's empowerment programs to enable them to offer high-quality, diverse products (Prasetyani et al., 2025).

Representativeness bias also affects the company's improvement in financial performance. Alex and Koske (2020) reveal that representativeness bias can improve company performance. By choosing high-quality products and avoiding transactions that have performed poorly in the past, women SME owners can improve their businesses' financial performance.

This study could not prove the effect of herding bias behavior on financial performance. The trailing behavior shown by female SME owners has not improved business financial performance. These results are not in line with research (Alabass et al., 2019; S. S. H. Shah et al., 2019, 2024).

Financial performance is statistically not affected by loss aversion bias. These results differ from previous research by Aljughaiman & Chebbi (2022) and Bouteska & Regaieg (2020). Female SME owners continue to try to maintain product sales volume in uncertain market conditions, even though it does not have a significant impact on financial performance.

Investment decisions affect the improvement of financial performance. Several studies have provided evidence of the tangible contribution of investment decisions to a company's financial performance. Bokhari et al. (2023), Nguyen et al. (2023), and Quddus et al. (2022) provide guidance on improving investment decisions, which can enhance a company's financial performance.

The role of investment decisions as a mediating variable was not confirmed for all tested variables. This study did not find evidence that

investment decisions mediate the effects of overconfidence bias, representativeness bias, herding bias, or loss aversion bias on financial performance. The direct influence of overconfidence bias and representativeness bias was more pronounced on the financial performance of women-owned SMEs. Respondents' answers to the overconfidence variable indicated that women entrepreneurs make investment decisions based on their beliefs, which can affect performance. The representativeness variable reflects women entrepreneurs' behavior in conducting transactions based on desired quality, with the aim of enhancing the company's financial performance.

Conclusion

A significant issue in the field of financial management concerns the role of cognitive and emotional biases in investment decision-making. This study examines how these two biases contribute to investment decision-making and improve the financial performance of women-managed SMEs. The results provide clues to the role of overconfidence bias and representative bias in improving SME performance. The roles of herding and loss aversion biases are clearly evident in their influence on investment decision-making.

This research has implications for women entrepreneurs. First, investment decision-making must consider herding bias and loss aversion, as well as the tendency to always follow market trends and the attitude of prudence in making investment decisions, which are key determinants of investment success. Second, a company's financial performance can improve with higher levels of overconfidence bias, representativeness bias, and effective investment decision-making. Therefore, women entrepreneurs should demonstrate a bold entrepreneurial attitude, utilize trend analysis to anticipate future business opportunities, and consistently engage in business planning.

This research has several limitations that can be addressed in future studies. The use of convenience sampling could be improved by adopting more rigorous sampling methods. Additionally, the relatively low R^2 value suggests that future research could incorporate other cognitive and emotional bias variables, such as mental accounting bias, recency bias, confirmation bias, and endowment bias, to better explain financial performance.

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