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Behavioural bias in investment decisions: moderate role of self-control

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ABSTRACT

Behavioural aspects in making financial or investment decisions have been inspired by the increasing role of behaviour as determinants of buying and selling securities. This study aims to analyze the effect of loss aversion and mental accounting on investment decisions and the role of self-control as a moderating variable on the effect of loss aversion and mental accounting on investment decisions. The research sample was 137 *Small and Medium Footwear Industries* in Mojokerto City. The sampling technique was probability sampling. Thus, this research used simple random sampling. The respondents of this research were the owners or managers of Small and Medium Industries (SMIs). The primary data was obtained directly from respondents' answers to questionnaire statements. The data analysis method was Structural Equation Model-Partial Least Square (SEM-PLS). The results showed that: First, loss aversion and mental accounting have a significant positive effect on investment decisions. Second, self-control is not moderate the effect of loss aversion on investment decisions but moderates the effect of mental accounting on investment decisions. Psychomotor aspects of mental accounting from owners or managers of SMIs is realizing that the existing accounts receivable is the primary source of income for the business.

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Introduction

Investment decisions are a series of processes by investors, both individuals and organizations, in making an investment decision based on resources (including capital) and information held to obtain an *expected return*. (Awais et al., 2016). Investors will understand and react differently to information available in the market, reflected in rational and irrational investor behaviour. There are behavioural aspects or elements in making financial or investment decisions. It is much inspired by the increasing role of behaviour as determinants of *buying* and *selling* securities. Behavioural finance has become a constitutional part of the decision-making process because of its impact on investors' performance. (Jahanzeb et al., 2012). Behavioural finance also reveals the emotional aspects as the reasons in influencing the decision-making process. Behavioural finance answers financial and investment decisions from a human perspective (Ricciardi & Simon, 2000).

Psychological factors related to investment can not be separated from the individual's efforts to earn income on investment in the future. Investors can choose various investments according to the wishes and expectations of investors, including real investments and financial investments. Many investment alternatives

are available with various types, from low risk to high risk, some with fixed income to varying income. Indonesian people have various investment instruments (Atmaningrum et al., 2021). Several studies examine psychological factors such as loss aversion, mental accounting, self-control and investment decisions. Loss aversion describes a person's tendency to be sensitive to lose rather than gain. (Kahneman & Tversky, 1991) experiment on a group of individuals with beautiful mugs, then they are asked to estimate the price level at which they are willing to release the mug (group A). Meanwhile, another group is also asked to observe the mug and decide the suits price of the mugs (group B). The experimental results show that group A is much greater in estimating prices than group B. The results show that group A's high sense of will is due to losing something that has been owned more than the pleasure of getting it.

Mental accounting is a person's economic behaviour that classifies income and expenditures based on items such as accounting models. *Mental accounting* is a set of activities by individuals and households to code, categories, and evaluate financial activities (Thaler, 1999). According to this theory, individuals assign different functions to each asset group, which is sometimes irrational and detrimental to consumption decisions and other behaviours. Another aspect of *mental accounting* is that money is treated differently depending on its source. For example, there is a tendency to spend more easily earned money, such as taxes, job incentives and bonuses, than their wages. Several studies on the effect of mental accounting on investment decisions have shown inconsistent results. Research carried out by Cherono et al. (2019); Hunguru et al. (2020) explained that *mental accounting* affects investment decisions, while Hallale & Gadekar (2019) showed that weak relationship, Aziz & Khan (2016); (Jain et al., (2020) revealed that *mental accounting* and investment decisions do not have a significant relationship.

Another psychological factor that affects investment is self-control. A psychological variable includes an individual's ability to modify behaviour, manage information, and choose an action based on belief (Shefrin & Thaler, 1981). *Self-control* in financial management is a strategy used for investment planning, by controlling the funds owned, to carry out investment planning properly. Self-Control it is the ability of an individual to control one's thoughts, emotions, pressures and even behaviour. The measurement of the self-control variable refers to Tangney et al. (2004), who identify four main self-control domains: controlling thoughts, emotions, impulses, and performance.Previous research has shown that self-control affects investment decisions (Sekścińska et al., 2021); (Addinpujoartanto & Darmawan, 2020).

This study analyzed the effect of loss aversion and mental accounting on investment decisions with self-control as a moderating variable. Most research focuses on cognitive factors that affect investment decisions while ignoring non-cognitive factors such as self-control that can affect investment decisions. (Mpaata, 2021). Investment decision it is a funds placement decision of working capital measured with indicators, namely Efficiency of Cash Management, Efficiency of Receivables Management and Efficiency of Inventory Management (Nyamao et al., 2015). Several studies investigating the relationship between *mental accounting* and investment decisions have shown inconsistent results. This study investigates self-control as a moderating variable in the relationship among the effects of *loss aversion*, *mental accounting*, and investment decisions.

Traditional financial theory bases the rationality aspect on the financial decision-making process. On the other hand, investors act irrationally because they are influenced by the state of mind, emotions, beliefs, and interpretation of information(Virigineni & Bhaskara Rao, 2017). Behavioural bias affects the actual investment decision-making process. The development of behavioural finance has provided insight and explained how psychological biases affect investors during the decision-making process (Kahneman & Tversky, 1979).

Some known researchers have used psychological theory and other social sciences to explain financial market efficiency and stock market anomalies. They explain the root causes of many stock market anomalies such as bubbles, depressions, scams, and market crashes. These researchers have revolutionized the perspective of financial decision making and the factors that influence it. Behavioural finance studies human psychology and the rationality of making financial decisions minus the traditional assumption of maximizing expected utility in efficient markets (Kapoor & Prosad, 2017). Behavioural finance examines human behaviour in investment decision making and explains various anomalies and market inconsistencies(Virigineni & Bhaskara Rao, 2017). Several researchers have carried out studies on behavioural biases that affect decision-making. This paper reviews loss aversion and mental accounting affect decision-making by moderated self-control.

The subjective view of individual well-being assumes that rewards are more important than the status quo position. This view is in line with the understanding that individuals adjust to income changes rather than income levels (Armansyah, 2021). There is a reluctance to take losses to enjoy the same level of profit (Kahneman & Tversky, 1979). It encourages *loss aversion*, i.e., when individuals judge outcomes including

comparative gains and losses because individuals avoid losses to gain profit. It encourages loss avoidance where individuals assess comparative advantages and disadvantages because they prefer to avoid losses rather than enjoy benefits.

*Loss aversion tend*s to *prefer avoiding losses* to *acquiring equivalent gains*. Loss aversion prefers avoiding losses rather than gaining an equivalent gain (Pompian, 2006). Loss aversion refers to the fact that a person tends to be more sensitive to loss than gain. A person is said not to want to experience a loss. It can be seen from the awareness that the loss is greater than the gain. Lamptey & Marsidi (2020) said that *loss aversion* behaviour in real estate could affect household mobility. Homeowners tend to avoid losses to make a profit, so they will not sell their homes at a loss.

(Kahneman & Tversky, 2019) showed that the phenomenon of *loss aversion* through an interesting experiment. One group is given a beautiful mug, then asked to write down how much they are willing to take off the mug (X). Another group sees the mug and then is asked to determine its appropriate price (Y). The experimental results show that (X) is greater than (Y). This result illustrated that the feeling of being annoyed at losing something that has been owned is more than the pleasure of getting it. The emergence of the loss aversion concept implies prospect theory, where investors do not avoid risk but avoid losses. Some researches that support the relationship between *loss aversion* and investment decisions is research (Cherono et al., 2019); (Hunguru et al., 2020); (Hallale & Gadekar, 2019); (Jain et al., 2020). Researchers showed that loss-averse people generally judge financial outcomes regarding losses and gains when faced with under-risk decisions. In addition, highly loss-averse fund managers generate lower returns on mutual fund investments than fund managers with low aversion. (Lamptey & Marsidi, 2020).

Mental accounting refers to the tendency of people to separate their money into separate accounts based on the various purposes of each account (Thaler, 1999). *Mental accounting* refers to the tendency of investors to categorize their finances in different accounts based on subjective criteria, such as the source of income and the purpose for which the funds are used. The allocation of different functions to each account can have an irrational impact on the decisions taken. Irrational behaviour is based on the perception of the value placed by each individual on their assets. (Hidayati et al., 2014). It includes three components - The first captures how outcomes are perceived and experienced, and how decisions are made and subsequently evaluated; second, the assignment of activities to specific accounts and tracking the inflows and outflows of funds from each particular activity; and third, concerning the frequency with which accounts are evaluated (Hidayati et al., 2014). Investor behaviour related to mental accounting for each group or account is reflected in the tendency of investors to divide their finances into different accounts based on subjective criteria, such as sources of funding and revenue utilization. (Widyastuti (2011).

Jahanzeb et al. (2012) defined *mental accounting* as a person's behaviour when separating income and expenditures funds and the accounting model. In the real estate context, Seiler & Seiler (2010) stated that investors who experience losses on their assets would minimize their regrets by thinking that the portfolio returns are more significant than the losses. Without thinking about the losses that have just been experienced, investors will feel calmer in the short term. *Mental Accounting* is the behaviour of individuals who always use mental counting in making investment decisions by weighing the costs and benefits of all actions taken by the individual. Previous research that supports the relationship between *mental accounting* and investment decisions are(Cherono et al., 2019); (Hunguru et al., 2020); (Hallale & Gadekar, 2019) (Hidayati et al., 2014) in their study revealed that there is a significant effect of *mental accounting* variables with cash, accounts receivable, and inventories indicators on investment decisions (placement of funds for working capital).

Self-control refers to an individual's ability to control thoughts, emotions, pressures and even behaviour (Tangney et al., 2004)). Self-control is an individual's ability to read the situation of oneself and the environment. In addition, it is also the ability to control and manage behavioural factors according to situations and conditions to present themselves in socializing the ability to control behaviour. Tangney et al. (2004) identify the four main domains of self-control, namely controlling thoughts, emotions, impulses, and performance. Self-control is one of the personal competencies that every individual needs to have. Good behaviour, constructive, and harmony with others are influenced by the individual's ability to control himself. Self-control in individuals will help individuals resist behaviour contrary to social norms. Tendency to attract attention, desire to change behaviour to suit others, please others, always conform and cover up feelings.

Pritazahara dan Sriwidodo (2015) said that each individual has a strategy to prevent waste in allocating his/her finances with good self-control during the financial management process. The final result of this study is that self-control is not a moderating variable on the relationship between financial knowledge and financial experience with behavioural investment planning. Self-control does not moderate the relationship between

financial knowledge and financial experience on investment planning behaviour (Pritazahara & Sriwidodo, 2015).

Self-control can be in the form of family initiative to save, unexpected expenses, the intention to save, feeling uncomfortable without financial planning, and making unnecessary expenses. Several self-control attitudes from families at Tokelan Village, Panji District, Situbondo Regency is not moderating variable of the relationship between financial knowledge and financial experience in behavioural investment planning. (Subaida & Hakiki, 2020) Self-control also affects financial behaviour (Sekścińska et al., 2021). People with high levels of self-control tend to have more significant savings and accumulate more wealth. Research on past-focused strategies has shown that a person's past successes and failures in self-control affect the performance of tasks requiring self-control.

H1: Loss aversion affects investment decisions
H2: Mental Accounting affects investment decisions
H3: Self-control moderates the effect of loss aversion on investment decisions
H4: Self-control moderates the effect of mental accounting on investment decisions.

Method

This research was quantitative approach-based research, with the type of *explanatory research* that analyzed the effect of one variable on other variables. This study analyzed the effect of *behavioural finance* on business performance through working capital management at *Small and Medium Footwear Industries* in Mojokerto City. The population in this study was the *Small and Medium Footwear Industries* in Mojokerto City, with 413 business units (Department of Industry and Commerce of Mojokerto City, 2019). The research sample was *Small and Medium Footwear Industries* in Mojokerto City. The sampling technique was carried out by *probability sampling*, namely, using *simple random* sampling.

The research analysis unit was 137 *Small and Medium Footwear Industries* in Mojokert City. Respondents in this study were the owners of each *Small and Medium Footwear Industries.*. The research variables consisted of exogenous variables: loss aversion, mental accounting, and self-control. For the endogenous variable was investment decisions on working capital. The Likert scale was used to measure the *loss aversion, mental accounting, self-control* and investment decisions (placement of working capital funds) variables. The variable measurement adopted from research (Kartini & Nahda, 2021) with a Likert scale as outlined in a questionnaire answer: a. Strongly disagree (score 1); b. Disagree (score 2); c. Neutral (Score 3); d. Agree (score 4); e. Strongly agree (score 5).

Table 1. Identity of Respondents

Profil	Total	%
Age		
25-35	45	32.85
36-45	46	33.58
46-55	27	19.71
> 55	19	13.87
Education		
Junior High School	18	13.14
Senior/Vocational High School	73	53.28
Diploma/Bachelor	46	33.58
Working Length		
0-3	10	7.30
4-6	29	21.17
7-10	29	21.17
> 10	69	50.36
Size of Business		
0-5	48	35.04
6-15	52	37.96
16-25	27	19.71
> 25	10	7.30
Business Ownership		
Private	137	100

The type of data used in this study was qualitative data, such as *loss aversion, mental accounting, self-control*, attitudes of financial managers in making decisions related to and perceptions of financial managers on funding decisions and working capital investment and business performance. Sources of data used were primary data, namely data obtained directly from the object of research, in the form of answers to statements in the questionnaire. The data collection technique used in this survey research was a questionnaire, a list of all statements used to obtain data face to face. The data analysis method used the Partial Least Square (PLS) method with a covariance-based approach because of its flexibility to handle more complex models where moderating and mediating relationships were tested. (Lowry & Gaskin, 2014); (Hair et al., 2017). In addition, it weakens some binding assumptions, such as the normal distribution, which social science data rarely meet and its better handling of small sample sizes (Hair et al., 2017).

Based on table 1, it can be seen that the dominant age of footwear entrepreneurs (respondents) is 25-45 years (66%), with a high school/vocational education background (53%). The working length is more than 10 years (69%). Thus they have experience in business management. Ownership of the business as a whole is private. It means that the entrepreneur is the owner and manager of the business.

Results and Discussions

Measurement model

Quality of construct measurement through reliability and validity test. The constructs reliability use Cronbach's Alpha and Composite Reliability. Reliability test is to ensure that the construct is free from measurement bias. Further, the instrument validity test use combined loading and cross-loading method, namely average variance extracted (AVE) for convergent validity and square roots of AVE for discriminant validity. It checks for possible collinearity with variance inflation factor (VIF).

Table 2. Validity and Reliability

	LA	**MA**	**SC**	**ID**
Composite Reliability Coefficients	0.802	0.812	0.904	0.896
Cronbach's Alpha	0.767	0.749	0.867	0.826
AVE	0.506	0.597	0.653	0.742
VIF	1.924	1.323	3.086	2.868
Correlations among l.vs. with sq. rts. of AVEs				
	LA	MA	SC	ID
LA	*0.711*	0.419	0.609	0.635
MA	0.419	*0.773*	0.452	0.412
SC	0.609	0.452	*0.808*	0.677
ID	0.635	0.412	0.677	*0.861*

Italic items are the square root of average variances extracted (AVEs)
AVE =average variances extracted, *VIF*= variance inflation factor, *LA*= Loss Aversion, *MA,*=Mental Accounting , *SC*= Self-Control, ID=Investment Decision

As shown in Table 2, the Cronbach's alpha value of four latent variables is higher than the threshold value of 0.70 followings (Hair et al., 2017). Similarly, the Composite Reliability Coefficients of the four latent variables is more than the threshold value of 0.70 (Hair et al., 2017). Thus, the four latent variables meet the reliability requirements, and the latent variable has good internal consistency, and the indicator is a reliable construct measurement. For discriminant validity, it uses the square root of AVE. The results show that the items have good discriminant validity because the square root of the AVE is more than the coefficient of each correlation with other variables (Hair et al., 2017). The correlation coefficient value is also lower than the recommended standard of 0.71. (Hair et al., 2017). The VIF value of the construct is less than 5, which indicates that there is no collinearity problem. Table 2 shows that the estimated value of AVE is higher than the specified standard normal value of 0.50.

Table 3. Combined loadings and cross-loadings

	LA	MA	SC	ID	Type (a	SE	P-value
LA1	*0.727*	-0.14	0.232	-0.403	Reflect	0.078	<0.001
LA2	*0.606*	-0.065	-0.217	-0.434	Reflect	0.08	<0.001
LA3	*0.802*	0.101	-0.076	0.262	Reflect	0.076	<0.001
LA4	*0.695*	0.086	0.034	0.497	Reflect	0.078	<0.001
MA1	-0.058	*0.838*	-0.343	0.449	Reflect	0.075	<0.001
MA2	-0.161	*0.872*	0.149	-0.086	Reflect	0.075	<0.001
MA3	0.328	*0.575*	0.273	-0.524	Reflect	0.081	<0.001
SC1	-0.111	0.017	*0.812*	0.189	Reflect	0.076	<0.001
SC2	0.034	0.08	*0.848*	-0.154	Reflect	0.075	<0.001
SC3	-0.113	0.017	*0.822*	0.240	Reflect	0.076	<0.001
SC4	0.119	-0.117	*0.785*	-0.311	Reflect	0.076	<0.001
SC5	0.079	-0.005	*0.772*	0.031	Reflect	0.077	<0.001
ID1	0.041	0.109	0.086	*0.880*	Reflect	0.075	<0.001
ID2	-0.195	-0.011	0.03	*0.888*	Reflect	0.074	<0.001
ID3	0.169	-0.105	-0.127	*0.814*	Reflect	0.076	<0.001

Italic items are factor loadings
LA= Loss Aversion, *MA,*=Mental Accounting , *SC*= Self-Control, ID=Investment Decision

Table 3 illustrates that the factor load of each indicator has a greater value for each construct than the other constructs. It can be concluded that all items have a valid convergent validity, and based on the empirical results, this research model is free from potential measurement bias.

Structural model and hypothesis testing

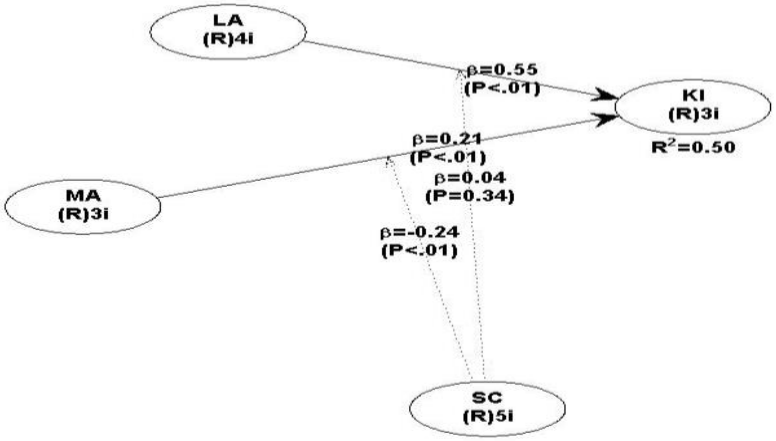

Figure 1. Structural Model and Hypothesis Testing

After getting information about the validity and reliability of the instrument, then testing to explain the moderator role of self-control is carried out. Figure 1 graphically depicts the path coefficient (βs) and the statistical significance (P-value) of each predictor, as well as the value of the coefficient of determination (R2). Table 4 shows that the path coefficient of Loss Aversion on Investment Decisions (LA, = 0.549), Mental Accounting (MA = 0.21) is a significant predictor at the 95% confidence level.

The results support accepting the suggested null hypothesis, namely H1 and H2. Similarly, the path coefficient of the moderator variable on the effect of loss aversion on investment decisions (LA, = 0.039) is non-significant at the 95% confidence level. The path coefficient of the moderating variable for the effect of *mental accounting* on investment decisions is significant at the 95% confidence level. The results support the rejection of the suggested null hypothesis, namely H3 and acceptance of H4. The value of the coefficient of determination (R2 = 0.50) indicates that the variation in investment decisions by 50% is explained collectively by the three independent variables.

Table 4. Hypothesis Test Results

No	Relationship between Variables	Path Coefficients	P-Values	Explanation
1	Loss Aversion → Investment Decision	0.549	<0.001	Significant
2	Mental Accounting → Investment Decision	0.214	0.009	Significant

Table 5. Hypothesis Test Results of the moderator variable

Exogenous Variable	Moderator Variables	Endogenous Variables	Path Coefficients	P-Values	Explanation
Loss Aversion	Self Control	Investment decision	0.039	0.336	0.336
Mental Accounting	Self Control	Investment decision	-0.235	0.004	0.004

Loss aversion tends to hold onto losses more than gain (Jain et al., 2020). It means someone will hold back the losses obtained rather than taking the opportunity to gain profits. *Loss aversion* is also a biased behaviour that cannot be tolerated because it contradicts investor expectations, such as increased risk and low *returns*. (Armansyah, 2021). The strong feeling from the entrepreneurs impulse to avoid losses rather than profits is based on the fact that the footwork business is a private or family business. It comes from the parents' business, so the owners or managers of SMIs feel that they have the mandate to manage the business well and realize business sustainability. Thus, the owner or manager of SMIs has the commitment and responsibility to keep the business from experiencing losses through various efforts made. In making business decisions, the owners or managers of SMIs will always be careful of any sudden changes that cause losses. The study results show that *loss aversion* has a significant effect on the investment decisions of footwear industry entrepreneurs in Mojokerto city. The results of other studies also found that *loss aversion* positively affects investment decisions (Cherono et al., 2019); (Hunguru et al., 2020). With these results, investors need to pay attention to the losses obtained. As a result, investors will lose the opportunity to make profits because of the impact of the losses.

These results indicate that *mental accounting* significantly affects investment decisions (working capital placement) of entrepreneurs in Small and Medium Footwear Industries in Mojokerto City. These results also show that entrepreneurs tend to separate income and expenditures funds and always use *mental accounting* in making investment decisions or working capital placements by weighing the costs and benefits of all actions on the decisions taken. Based on prospect theory, *mental accounting* behaviour is possible because entrepreneurs are faced with real-life choice models and similar research conducted by (Cherono et al., 2019);); (Hallale & Gadekar, 2019); (Hunguru et al., 2020). This study also supports the research result (Shefrin & Thaler, 1981), which states that *mental accounting* is a person's behaviour when separate income and expenditures funds and the accounting model.

This study reflects the three indicators of *mental accounting*, namely cash, accounts receivable, and inventory. The cash indicator has not been carried out correctly. It is proven that not all owners or managers of SMIs determine cash inflows for the coming period, and they have not made reports of cash inflows and cash outflows. Accounts receivable management has not been carried out correctly. The owners or managers of SMIs make a list of bills and a list of receivables. The inventory indicator has not been appropriately implemented. It can be seen that the owners or managers of SMIs do not have inventory records of the products being sold. Completing the product in a long time will bring many losses, such as the product becoming defective (damaged), thus lowering the selling price. Thus, it can be said that the *mental accounting* owned by the entrepreneurs is rational, and they realize that the existing accounts receivable are the primary source of income for business sustainability.

The role of *Self-Control* as a moderating variable on the effect of Loss aversion and *mental accounting* on investment decisions shows that loss aversion is not moderated by *self-control* on investment decisions. It can be concluded that the behaviour of Small and Medium Industries (SMIs) entrepreneurs who are more sensitive to losses than profits in investment decisions are not determined by the encouragement of *self-control*. The business experience factor also contributes to shaping the behaviour of entrepreneurs in understanding business losses and profits. Thus, financial knowledge and good *self-control* are needed to increase the tendency of more positive thinking behaviour to utilize the information for financial planning and investment decisions. The results of this study are in line with the study.

The test results showed that *self-control* moderates the effect of *mental accounting* on investment decisions. The path coefficient is negative. It means that self-control weakens the effect of the *mental accounting* variable on investment decisions, with significant results. Thus, *self-control* can moderate the *mental accounting* of investment decisions. The results of hypothesis testing in this study revealed that entrepreneurs who have high or good *mental accounting* with good or high *self-control* encouragement would increase investment decision behaviour. The owners or managers of SMIs with low *self-control* can also implement investment planning. Experience implementing *mental accounting* in their business will make learning in planning investments. Having good *mental accounting* supported by good *self-control*, entrepreneurs will assess more profitable and detrimental. The individual will have a good attitude and understanding of the benefits and costs for considering investment decisions.

Conclusions

Based on the results and discussion, this research concludes: first, *loss aversion* and *mental accounting* significantly affect the investment decisions of owners or managers of Small and Medium Industries (SMIs). The strong feeling from the entrepreneurs' impulses to avoid losses rather than gains. In making business decisions, they will always be careful of any changes that cause losses. It is based on business sustainability. Second, entrepreneurs have considered their experience and ability in making investment decisions. Psychomotor aspects of *mental accounting* from owners or managers of SMIs is realizing that the existing accounts receivable is the primary source of income for the business. Thus they make a collection list of accounts receivable and receivable reports. Experienced entrepreneurs will make good decisions easier. In addition, the availability of information also has an essential role in the decision-making process. This study focuses on quantitative and explanatory designs on a specific Small and Medium Industries type. The results may be different if it is carried out in different industries. This study is also limited to three behavioural biases that affect investment decision making. The scope of the research can be increased by taking more behavioural biases and expanding the types of Small and Medium Industries and different geographic areas so that comparative analysis is possible. A mixed-method approach is recommended for further research to reveal more financial behaviour and investment decisions.

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