Microinsurance for fishermen: addressing risk perception and participation challenges

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Abstract. Fishermen are highly vulnerable to economic and occupational risks, yet participation in microinsurance remains low. This study analyzes the effects of financial literacy, saving motives, and risk perception on fishermen's interest in microinsurance using a quantitative approach with SEM–PLS on 165 fishermen in North Jakarta. The results show that financial literacy ($\beta = 0.100$; $p = 0.156$) and saving motives ($\beta = 0.079$; $p = 0.275$) do not significantly influence interest. In contrast, risk perception has a positive and significant effect ($\beta = 0.354$; $p < 0.001$). The model explains 19.6% of the variance in interest ($R^2 = 0.196$). Descriptive results indicate that 75.76% of respondents have sufficient financial literacy, that saving motives are very high (83.29%), that risk perception is high (77.77%), and that interest in microinsurance is high (77.62%). However, only 9.09% of respondents have used microinsurance. These findings suggest that interest in microinsurance is primarily driven by risk perception rather than financial capability or saving behavior. Therefore, strengthening risk awareness through targeted education is essential to increase fishermen's participation in microinsurance programs.

1 Introduction

Indonesia is the largest archipelagic country in the world, with more than 17,500 islands and a total sea area of approximately 6.4 million km². It has enormous marine potential, including marine biodiversity such as fish, coral reefs, seagrass beds, mangrove forests, and other biological resources of high economic value. Approximately 37% of the world's fish species inhabit Indonesian waters, including key commodities such as tuna, shrimp, and lobster [1]. In 2022, global fishery production reached 223.2 million tons, with Indonesia contributing 7%, making it the third largest producer globally after China and India [2].

However, the abundance of these resources has not significantly improved the welfare of fishermen. The number of Indonesian fishermen has continued to increase, from 2.8 million in 2020 to more than 3.2 million in 2023 [3], but most still live in poverty. Measured against the national poverty line of Rp590,000 per capita per month, approximately 18% of fishermen fall below it. Using the World Bank's global poverty standard of Rp1.5 million per capita per month, this figure jumps dramatically to 62% [4].

Researchers identify fishing as a high-risk occupation, marked by a very high incidence of fatal workplace accidents. Data from the US Bureau of Labor Statistics [5] shows that the

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fishing industry has a mortality rate of 87 deaths per 100,000 full-time workers per year. In Indonesia, during 2020–2021, 42 marine accidents claimed the lives of 142 fishermen [6]. The main factors contributing to this high accident rate include a low level of understanding of occupational safety and limited access to protective equipment [7].

One approach to reducing the economic and social risks faced by fishermen is microinsurance. The Indonesian government, through Government Regulation No. 7 of 2016, has promoted the protection of fishermen through a fisheries insurance scheme. The number of fishermen receiving insurance protection increased significantly from 40,759 people in 2020 to 308,858 people in 2022 [8]. However, compared to the total number of fishermen, this level of protection remains relatively low.

In this context, financial literacy is an important factor that can encourage fishermen to take advantage of financial products, such as insurance. The National Survey of Financial Literacy and Inclusion found that Indonesia's financial literacy index reached 65.43%, but farmers, ranchers, planters, and fishermen scored 57.97%, well below professionals' 83.22% [9]. Low financial literacy, high consumption patterns, and unstable incomes make it difficult for fishermen to save money and often leave them lacking long-term risk protection [10].

Despite the growing body of literature on insurance adoption, several important gaps remain. Previous studies have produced mixed results regarding the role of financial literacy and saving motives in influencing insurance demand, with some finding significant effects and others reporting weak or insignificant relationships. Moreover, most existing research focuses on general populations or formal-sector workers, with limited attention to high-risk informal groups, such as fishermen, particularly in developing countries like Indonesia. In addition, prior studies often examine economic and financial factors separately, without adequately integrating behavioral aspects such as risk perception, which may play a more dominant role in high-risk occupations.

Therefore, this study addresses these gaps by examining the combined effects of financial literacy, saving motives, and risk perception on fishermen's interest in microinsurance using a quantitative SEM–PLS approach. By focusing on a vulnerable and underrepresented group, this study is expected to provide more context-specific insights into the determinants of microinsurance participation and contribute to the development of more effective policy interventions.

2 Literature review

2.1 Financial literacy and microinsurance interest

Financial literacy refers to an individual's ability to understand and use financial information in decision-making. Prior studies generally suggest that higher financial literacy increases the likelihood of using financial products, including insurance. However, empirical findings remain inconsistent. Some studies report a positive, significant relationship between financial literacy and insurance demand, while others find no significant effect, suggesting that knowledge alone may not translate into actual participation. This inconsistency suggests that additional behavioral factors may influence insurance decisions.

2.2 Saving motives and insurance demand

Saving motives reflect individuals' intentions to allocate resources for future needs, such as precautionary, life-cycle, and wealth accumulation purposes. Previous research indicates that stronger saving motives are associated with higher demand for insurance, as individuals seek

financial protection and long-term security. However, other studies find that saving motives do not always lead to insurance adoption, particularly among low-income groups with limited financial capacity. This suggests that saving motives may not be a dominant driver in all contexts.

2.3 Risk perception and insurance behavior

Risk perception refers to individuals' subjective assessment of the likelihood and consequences of uncertain events. In high-risk occupations, risk perception plays a crucial role in shaping protective behavior. Empirical studies consistently show that individuals with higher risk perception are more likely to purchase insurance. Unlike financial literacy, risk perception is often a stronger and more direct determinant of insurance demand, particularly in contexts characterized by uncertainty and vulnerability.

2.4 Research gap and hypothesis development

Although prior studies have examined financial literacy, saving motives, and risk perception, their findings remain inconclusive and are rarely integrated into a single analytical framework. Moreover, limited research focuses on fishermen, who face unique occupational risks and economic constraints. This study addresses these gaps by examining the combined effects of these variables on interest in microinsurance.

3 Hypotheses

This study examines financial literacy, savings motives, and risk perception, which are expected to influence the variable of interest regarding the use of microinsurance. The research model is adapted from the following study:

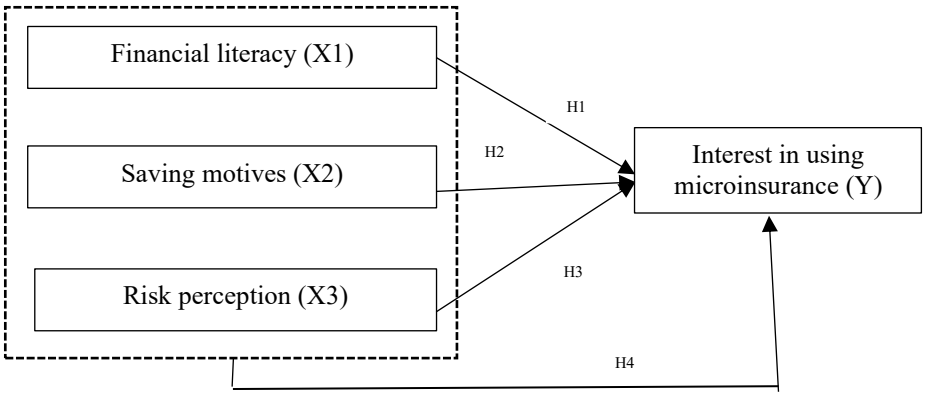

Fig. 1. Research model

3.1 The effect of financial literacy on interest in microinsurance

Research shows that financial literacy is significantly associated with interest in microinsurance. Increased financial literacy can be a way out of "growing pains." Meanwhile, financial literacy positively influences interest in non-life insurance. The higher the public's

understanding of financial concepts and risks, the more likely they are to purchase insurance products.
H1: There is a significant relationship between financial literacy and interest in microinsurance.

3.2 The effect of savings motives on interest in microinsurance

According to Nomi *et al.* [11], saving motives have a significant positive impact on consumer intentions toward insurance. It can be assumed that individuals who are motivated to save to secure their retirement, for emergencies, and to ensure continued income after their death, tend to prefer life insurance policies that offer these benefits. Research conducted by Mahdzan and Victorian [12] shows that savings motives have a positive and significant influence on the intention to purchase life insurance. These savings motives are linked to efforts to ensure the family's financial security after their death. Life insurance not only provides protection but also encourages savings through policy-related investment products.
H2: Savings motives significantly influence interest in microinsurance.

3.3 The effect of risk perception on interest in microinsurance

Research by Yang *et al.* [13] shows that risk perception has five factors: experience, unfamiliarity, controllability, probability, and fear. The factors of experience, unfamiliarity, controllability, and probability have a positive effect on the decision to purchase insurance, whereas fear does not. Meanwhile, research by Rapi *et al.* [14] shows that risk aversion positively affects interest in life insurance. This study found that the higher the level of risk aversion, the higher the demand for life insurance.
H3: There is a significant influence between risk perception and interest in using microinsurance.

3.4 The influence of financial literacy, savings motives, and risk perception on interest in microinsurance.

Based on research Swee *et al.* [15], financial literacy does not have a significant effect, either directly or through persuasion, on people's interest in purchasing life insurance. This indicates that a person's level of financial understanding is not sufficient to encourage the decision to purchase an insurance policy. Conversely, savings motives have a positive, significant effect on demand for life insurance. People with a savings orientation toward future goals, such as education, retirement, or emergency needs, are more likely to see insurance as a means of protection and long-term savings. Meanwhile, risk avoidance does not directly affect demand for life insurance, but it does so through persuasion mediation. Meanwhile, financial literacy, savings motivation, and risk avoidance positively influence people's intention to purchase life insurance [11].

Financial literacy has been shown to improve individuals' understanding of insurance benefits and mechanisms, so that the higher a person's level of financial literacy, the more likely they are to have an insurance policy. Furthermore, the motive to save emerges as an important factor in encouraging individuals to purchase insurance, particularly because life insurance is perceived not only as an instrument of protection but also as a means of accumulating funds for long-term goals such as retirement and emergency needs. This saving

motive also acts as a mediator, strengthening the influence of financial literacy and risk avoidance on the intention to purchase insurance. Individuals with a high level of risk avoidance tend to avoid uncertainty and prefer financial instruments that provide certainty, so life insurance is seen as a rational choice to protect themselves and their families.
H4: There is a significant influence of financial literacy, savings motives, and risk perception on interest in using microinsurance.

4 Methodology

This research adopted a quantitative approach. Data were collected through the distribution of offline questionnaires to fishermen located in Muara Angke, Muara Baru, and Kampung Nelayan Cilincing during May 2025. The study utilized both primary and secondary data sources. Primary data were gathered through field observations, interviews, and structured questionnaires administered to fishermen residing in North Jakarta using instruments specifically developed for this study. Secondary data were obtained from relevant literature and online sources to support the analysis.

The measurement instruments used in this study were developed based on previous literature and adapted to the research context. Financial literacy was measured using 3 items, saving motives using 3 items, risk perception using 4 items, and interest in microinsurance using 3 items. All variables were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Each item was designed to capture respondents' perceptions and attitudes toward financial knowledge, saving behavior, perceived risks, and interest in microinsurance.

The sampling method used in this study was purposive sampling, a nonprobability sampling method. This technique is used when the population size cannot be precisely determined. Purposive sampling was employed with clearly defined inclusion criteria. Respondents were selected based on the following conditions: (1) actively engaged in fishing activities, (2) possessing a minimum of one year of fishing experience, (3) directly involved in fishing operations as either boat owners or crew members, and (4) having basic awareness of insurance or financial protection mechanisms. These criteria were intended to ensure that respondents had adequate experiential and contextual knowledge relevant to the study variables. The minimum sample size followed the rule-of-thumb with 5–10 observations per indicator. The minimum number of respondents required for this study is 165.

The data processing and analysis methods used in this study include descriptive analysis and SEM-PLS. Descriptive analysis is an approach used to describe data collected without the intent to draw generalizations or comprehensive conclusions. This analysis does not involve significance testing or error rate determination.

In this study, financial literacy levels were categorized according to the classification established by the Financial Services Authority, which distinguishes four levels: not literate (0–24), less literate (25–49), sufficiently literate (50–75), and well literate (76–100). Descriptive analysis for saving motives, risk perception, and interest in microinsurance was conducted by grouping the data into class intervals. The interval range was determined by calculating the difference between the maximum and minimum values and dividing it by the number of categories. Based on this approach, these variables were classified into five levels: very low (0–19), low (20–40), moderate (41–60), high (61–80), and very high (81–100).

Furthermore, data analysis was performed using Structural Equation Modeling–Partial Least Squares (SEM–PLS) with SmartPLS 4.0 software. This technique was employed to

assess the validity and reliability of the measurement model (outer model) and to evaluate the relationships among constructs in the structural model (inner model).

5 Results and discussion

There were 165 respondents in this study, all male fishermen residing in North Jakarta (100%). Based on age distribution, 41.82% of respondents were in the 41-45 age group. Regarding the highest level of education, 76 respondents (46.06%) completed elementary school. In terms of monthly income, the majority of respondents, namely 98 people (59.39%), had an income ranging from IDR 2,000,000 to IDR 3,000,000. Regarding marital status, 147 respondents (89.09%) reported being married. Regarding the number of dependents, 139 respondents (84.24%) had 1 to 2 dependents.

5.1 Descriptive analysis results

Based on the descriptive analysis results, it was found that 125 respondents (75.76%) were categorized as having sufficient financial literacy. Financial literacy in this study comprised three main dimensions: financial knowledge, financial behavior, and financial attitude. Regarding financial knowledge, 86 respondents (52.12%) were in the sufficient literacy category. In the financial behavior dimension, the majority of respondents (89, 53.94%) were in the less literate category. Meanwhile, regarding financial attitude, 91 respondents (55.15%) were categorized as well-literate.

The level of fishermen's savings motivation is very high, with an average percentage of 83.29%. This is reflected in several main sub-motives, such as prudence, inheritance, and wealth accumulation, each with a percentage above 82%. Fishermen recognize the importance of purchasing or saving for microinsurance as a form of self-protection against the risk of income loss due to disability or inability to work, as a means of preparing for difficult times, and as a way to leave an inheritance for their families. In addition, they are interested in long-term benefits, such as returns on investment and dividend payouts from insurance policies. Thus, fishermen have a strong awareness of the importance of financial planning and self-protection, thereby demonstrating a high motivation to save through microinsurance instruments.

Fishermen's perception of risk, on average, is at 77.77% in the "High" category. This shows that fishermen have a relatively high level of awareness and concern about the threat of natural disasters. However, there is still room for improvement in understanding and more active risk mitigation. This risk perception comprises five main factors: probability, fear, uncertainty, control, and experience. In terms of probability, the majority of fishermen believe that in the next 10 years, natural disasters will occur around their homes or work areas (76.97%), and they are also beginning to recognize increasingly evident signs of disaster (76%).

On the other hand, the fear factor indicates that fishermen feel anxious and worried when they consider the impact of disasters such as mudslides and landslides on their families and villages (80.36%). Regarding the unknown factor, fishermen tend to view disasters as fate or God's punishment (80.48%) and adopt a resigned attitude of acceptance if a disaster ever happens to them (80.73%). However, most fishermen still do not fully understand how natural disasters can occur (79.64%).

Regarding control factors, although the majority of fishermen believe that humans can control disasters after they occur (70.18%), confidence in prevention and self-preparedness remains low, even though it has reached an average of 77.58%. The experience factor shows that many fishermen have directly experienced or heard of natural disasters in the last 10 years (76.97%), which has shaped their perception of risk.

Fishermen's interest in microinsurance is high, averaging 77.62%. This shows that, in general, fishermen respond positively to microinsurance as a means of protecting themselves and their families. Of the three indicators used, interest in using microinsurance as protection has the highest percentage, namely 85.09%, which falls in the very high category. Fishermen recognize the importance of financial protection amid the uncertainties of their work. In addition, the intention or plan to register for micro insurance in the future reaches 75.03%, which is in the high category. Although not as high as the first indicator, this shows that most fishermen are open to and interested in participating in microinsurance if they have adequate information and access.

The last indicator, the tendency to seek further information about micro insurance, was at 72.73%, which is also in the high category. This illustrates that fishermen are motivated to learn more about the benefits and mechanisms of microinsurance, although some are not yet actively seeking this information. Of the fishermen surveyed, only 15 fishermen, or 9.09% of the 165 fishermen, have ever had or currently have fishermen's insurance, while the rest of the sample does not have fishermen's insurance. This is because they do not know how to register for microinsurance and have irregular incomes, making it difficult for them to pay premiums.

5.2 SEM-PLS results

5.2.1 Measurement Model Evaluation (Outer Model)

An analysis of the measurement model (outer model) was conducted to assess the strength of the relationship between each indicator and the latent variables. In this study, there were three latent variables consisting of financial literacy, savings motivation, and risk perception. After conducting a two-stage convergent validity test, the results are shown in the following figure:

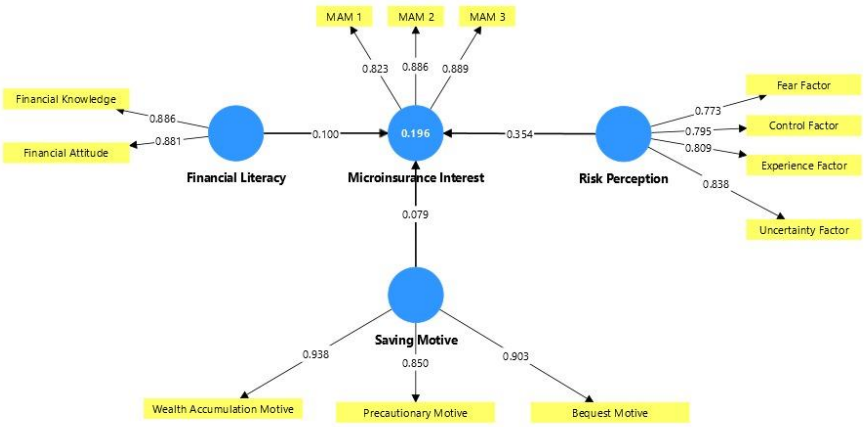

Fig. 2. Two-stage approach model after dropping

The outer loading values obtained after applying the two-stage approach are presented in Table 1.

Table 1. Outer loading value from the two-stage approach

Variable	Indicator	Outer Loading Values
Financial literacy	LK1	0.886
	LK3	0.881
Savings motivation	MM1	0.850
	MM2	0.903
	MM3	0.938
Risk perception	PR2	0.773
	PR3	0.838
	PR4	0.795
	PR5	0.809
Interest in micro insurance	MAM1	0.823
	MAM2	0.886
	MAM3	0.889

After conducting a convergent validity test based on outer loadings, the next test examined average variance extracted (AVE) values. The model is considered good if it produces an AVE value greater than 0.5. All latent variables in this study have AVE values greater than 0.5, and the model is construct valid. The AVE values in this research model are shown in table below.

Table 2. Value of average variance extracted

Latent Variables	AVE Values
Financial literacy (LK)	0.781
Savings motivation (MM)	0.806
Risk perception (PR)	0.647
Interest in micro insurance (MAM)	0.751

Discriminant validity was assessed by examining the cross-loadings of each indicator. The analysis results showed that each indicator had higher cross-loadings within its own construct than within other constructs. These results are shown in Table 3.

Table 3. Value of cross loading

Indicator	Financial Literacy	Savings Motivation	Risk Perception	Interest in Micro Insurance
LK1	**0.886**	0.299	0.309	0.229
LK3	**0.881**	0.395	0.316	0.224
MM1	0.371	**0.850**	0.428	0.192
MM2	0.332	**0.903**	0.382	0.233
MM3	0.360	**0.938**	0.356	0.284
PR2	0.312	0.479	**0.773**	0.271
PR3	0.328	0.472	**0.838**	0.340
PR4	0.166	0.249	**0.795**	0.276
PR5	0.311	0.215	**0.809**	0.428
MAM1	0.189	0.167	0.260	**0.823**
MAM 2	0.239	0.253	0.370	**0.886**
MAM 3	0.231	0.260	0.435	**0.889**

Reliability testing in this research model aims to ensure that the instruments used accurately measure the constructs. A variable is considered reliable if it has a composite reliability value > 0.7 and a Cronbach's Alpha value > 0.6.

Table 4. Value of composite realibility and cronbach's alpha

Variable	Cronbach's alpha	Composite reliability
Financial literacy	0.719	0.720
Savings motivation	0.880	0.916
Risk perception	0.821	0.845
Interest in micro insurance	0.837	0.871

5.2.2 Structural model evaluation (Inner Model)

The structural model describes the causal relationships among latent variables, indicating the direction and magnitude of effects between constructs within the proposed research framework. The coefficient of determination (R^2) reflects the extent to which the independent variables account for the variance in the dependent variable. This value ranges from 0 to 1, with higher values indicating greater model explanatory power. As a general guideline, R^2 values of 0.67, 0.33, and 0.19 are interpreted as substantial, moderate, and weak, respectively. The R^2 results obtained in this study are presented in the following table.

Table 5. R-Square

Latent Variable	R-Square
Interest in micro insurance	0.196

As presented in Table 5, the R^2 value for interest in microinsurance is 0.196, suggesting that financial literacy, saving motives, and risk perception collectively account for approximately 19% of the variance in the dependent variable. In comparison, the remaining 81% is attributable to factors not included in the model. Subsequently, path coefficient analysis was performed to evaluate the magnitude and direction of relationships among latent variables and to assess their statistical significance using a bootstrapping procedure. This analysis serves to test the proposed hypotheses within the research framework. A relationship is considered statistically significant when the t-statistic exceeds 1.96 at the 5% significance level. The outcomes of the bootstrapping analysis are presented in Figure 3 and Table 6.

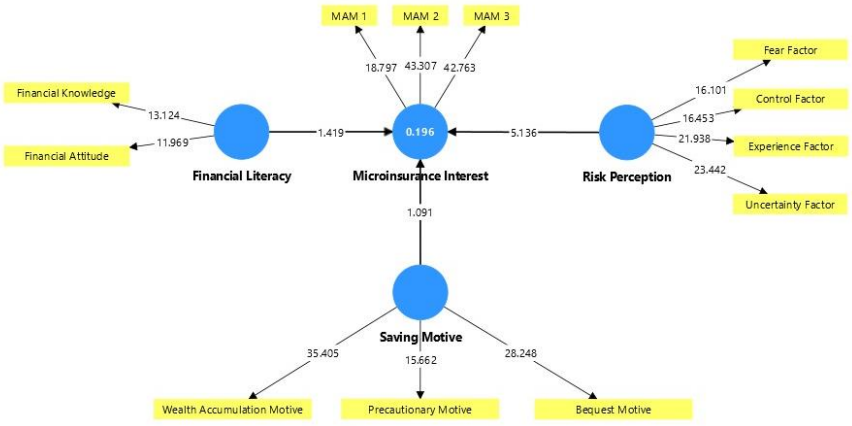

Fig. 3. Result of bootstrapping

Based on the bootstrapping results. it can be concluded that all variables have a positive effect on interest in micro insurance. This is evident from the positive values in the original sample. Interest in microinsurance is significantly influenced by the risk perception variable. whereas financial literacy and savings motives are not significant. This is because the T-statistic value is less than the t-table value of 1.96. In this study. having good knowledge of financial literacy and savings motives it does not necessarily mean the individual is interested in using micro insurance. This means other factors can influence interest in microinsurance.

Table 6. Results of bootstrapping process

Hypotheses	Original sample	T-statistics	P-value	Direction of Effect	Significance Level	Description
LK → MAM	0.100	1.419	0.156	Positive	Not significant	H1 Rejected
MM → MAM	0.079	1.091	0.275	Positive	Not significant	H2 Rejected
PR → MAM	**0.354**	**5.136**	**0.000**	**Positive**	**Significant**	**H3 Accepted**

H1: The effect of financial literacy on fishermen's interest in using micro insurance

The results of the H1 hypothesis test indicate a positive coefficient value; however, the relationship is not statistically significant, as evidenced by a t-statistic of 1.419 (below the critical value of 1.96) and a p-value of 0.156 (> 0.05). These findings suggest that financial literacy does not significantly influence interest in microinsurance. This result is consistent with previous studies, such as Swee *et al.* [15] and Mahdzan and Victorian [12], which also report no significant relationship between financial literacy and insurance demand. This implies that a higher level of financial knowledge does not necessarily translate into greater interest in microinsurance. One possible explanation is that respondents may consider other factors more important when deciding whether to participate, despite having an adequate level of financial literacy.

H2: The effect of savings motives on fishermen's interest in micro insurance

The results of the H2 hypothesis test indicate a positive coefficient; however, the relationship is not statistically significant, as reflected by a t-statistic of 1.091 (below the threshold of 1.96) and a p-value of 0.275 (> 0.05). This suggests that saving motives do not have a significant influence on interest in microinsurance. This finding differs from several prior studies that report a positive relationship between saving motives and insurance demand. The absence of a significant effect in this study implies that, although respondents exhibit strong saving intentions, these motivations do not necessarily translate into actual interest in microinsurance. This may be due to other constraints, such as limited accessibility, irregular income, or a lack of practical understanding of insurance mechanisms.

H3: The effect of risk perception on fishermen's interest in using micro insurance

The results of the H3 hypothesis test reveal a positive and statistically significant relationship between risk perception and interest in microinsurance, as indicated by a t-statistic of 5.136 (exceeding 1.96) and a p-value of 0.000 (< 0.05). This finding demonstrates that higher levels of perceived risk are associated with increased interest in microinsurance. The result is consistent with previous studies, which highlight risk perception as a key determinant of insurance adoption. Individuals who have a greater awareness of potential risks—such as uncertainty, probability of occurrence, and potential consequences—are more likely to seek financial protection through insurance products. This suggests that risk

perception plays a more decisive role than other factors in influencing fishermen's interest in microinsurance.

6 Conclusion

Based on the results of this study. it can be concluded that the level of financial literacy among fishermen classified as sufficiently literate is 75.75%. and the level of fishermen's motivation to save is 83.29%. which is classified as very high. The level of fishermen's risk perception is 77.77%. which is classified as high. The level of interest among fishermen in using microinsurance is high at 77.62%. but this is not reflected in high microinsurance usage. The results of this study show that only 15 fishermen (9.09% of the total respondents) are currently using or have used microinsurance. Based on the SEM-PLS analysis, financial literacy and saving motives were not found to significantly influence interest in microinsurance. In contrast, risk perception was found to have a significant effect on interest in microinsurance.

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