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ARTICLE

Financial Worry, Financial Literacy, Trust and ROSCA Participation of Farmers in Rural Vietnam

Dung Hai Dinh [1*] **, *Thi Minh Dang Nguyen*** [2]

[1] *Faculty of Economics and Management, Vietnamese-German University, Ben Cat City, Binh Duong Province 823000, Vietnam*

[2] *SEAMEO Regional Training Center in Vietnam, Ben Nghe Ward, District 1, Ho Chi Minh City 700000, Vietnam*

ABSTRACT

Rotating savings and credit associations (ROSCAs), serving the needs of people in many countries, are often considered a key financing tool for farmers and rural households. Researchers have addressed various aspects of ROSCAs in the last decades, yet the identification of factors influencing ROSCA participation is still ignored. This paper aims to explore key determinants of the farmers' participation in ROSCAs. To evaluate the proposed hypotheses, Structural Equation Modeling is employed using SmartPLS 3.2.9 with data from farmer households in Vietnam. The findings revealed interesting insights, showing that financial worry, financial literacy, and fundraiser trust can be used to predict farmers' intention to participate ROSCAs, in which financial worry and fundraiser trust had significant, positive impacts on participation intention, whereas financial literacy had significantly negative impacts. Although the relationship between trust in financial association and ROSCA participation intention was found statistically insignificant, trust in financial association indirectly influenced ROSCA participation intention through fundraiser trust. More importantly, financial literacy exhibited a direct and positive impact on risk perception, which in turn negatively influenced ROSCA participation behavior, emphasizing the mediating role of risk perception. Furthermore, this study contributes to the existing body of literature by exploring the intention-behavior gap on financial investment decisions. The theoretical and practical implications as well as contributions of this study should be of concern to policymakers and practitioners in developing countries with similar ROSCA practices.

*CORRESPONDING AUTHOR:
Dung Hai Dinh, Faculty of Economics and Management, Vietnamese-German University, Ben Cat City, Binh Duong Province 823000, Vietnam; Email: dung.dh@vgu.edu.vn

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Keywords: Rotating Savings and Credit Associations (ROSCAs); Financial Worry; Financial Literacy; Risk Perception; Fundraiser Trust; Structural Equation Modeling

1. Introduction

Many people living in developing countries regularly find themselves trapped in a vicious cycle of poverty, where they spend almost all their earnings, save minimally, and have limited access to formal financial institutions due to their poor credit ratings [1]. To meet their basic need, people who are excluded from formal financial market are forced to look for alternative financial solutions. Emerging as a popular substitute for formal financial institutions, Rotating savings and credit associations (ROSCAs) play the role of important capital source for both essentials and income-generating activities such as starting small businesses or shops [2], where members make periodical contribution to a pot and receive payments from that pot in return [3]. Although exhibiting localized characteristic variations, ROSCAs maintain a consistent underlying structure: (i) regular meetings with a fixed maturity among a particular number of members, (ii) each member contributes a fixed amount of money, and (iii) the gathered pot is then distributed a member who has not received yet [4,5].

Depending on the pot allocation mechanism, ROSCA is classified into three different types, namely random, fixed, and bidding [6]. While fixed ROSCAs determine the orders of pot allocation before the cycle starts [7], random ROSCAs have order accidentally in each meeting and bidding ROSCAs prioritize members who have the highest contributing amounts for earlier access to the pot [3,8]. Based on allocation strategies, each type of ROSCAs poses different risks and levels of access. In terms of random ROSCAs, since the payout timing is not aligned with members' financial needs due to the uncertainty in pot allocation timing, members face idiosyncratic risk and thus less efficient for risk hedging [9,10]. However, random ROSCAs require minimal financial and are highly most accessible due to the simplicity in their structure and regulatory framework shortage, appealing to homogeneous communities with similar savings goals and risk tolerance level [11]. Although fixed ROSCAs are more secure than random ROSCAs drawing to the predictable time of fund receiving, they are similar to random ROSCAs in lacking flexibility to adapt to stochastic income shocks, thus are more suitable for those with planned expenditures [12]. From bidding ROSCAs perspective, although they gain an advantage in addressing urgent needs and functioning as a form of insurance against income shocks [13], they are less accessible to individuals with limited financial resources or bargaining skills and thus are the least inclusive ROSCA type [9,11]. Regardless of the type, ROSCAs provide funds to financially disadvantaged individuals, filling the gap left by formal financial institutions [14].

Vietnam is a developing country in Southeast Asia with a long history of informal financial systems. Despite government efforts to expand formal financial inclusion, previous research indicates that informal finance has deeply rooted, in which approximately one-third of all credit transactions take place outside of formal channels, and ROSCAs are one of the three most common types of informal credit [15]. ROSCAs are referred to by a number of names in the cultural and social context of Vietnam, such as "họ," "hụi," "biểu," and "phường" [16]. Bidding and fixed ROSCAs are the two main forms practiced in Vietnam, in which bidding ROSCAs are primarily found in the south and fixed ROSCAs are more popular in the north [1].

The Vietnamese agriculture, which accounts for nearly half of Vietnamese workforce, is characterized by small scale production with approximately 70% of farms operating on less than 0.5 ha [17]. Smallholder farmers often lack collateral, professionalism, and skills that prevent their access to formal credit [18], and expose them to credit rationing (known as supply-side constraint) [17]. Credit rationed farmers have difficulty purchasing production inputs or investing in farm-related projects, thus leading to lower farm outputs, household income, and financial well-being [17]. To promote Vietnam's agricultural development, rural housholds' credit demand must be met [19]. Although may decrees on credit-related policies for agricultural and rural de-

velopment were issued by Vietnamese government, typical Decree 55/2015/ND-CP that allows unsecured lending in agricultural sector, farm households still suffer from credit rationing dramatically [18]. Furthermore, many Vietnamese farmers in rural areas of Mekong River Delta are found to self-select out of formal credit markets, which refers to their choice of not applying for loans from formal credit sources despite their need of external funds [20]. This self-selection decision (known as demand-side constraint) stems from farmers' subjective perception regarding complex loan application procedures of banks, famers' fear of an inability to repay the loan and their easy access to preferred informal source of funds. Both supply- and demand-side issues drive farmers' decisions to rely on informal mechanisms like ROSCAs instead of formal credit institutions. ROSCAs serve as an alternative financial support that helps alleviate capital constraints, enabling farmers to purchase inputs, adopt labor-saving technologies, and thus increase productivity, product quality and income [21–23].

While previous studies have mainly concentrated on the nature and evolution aspects of ROSCAs, the determinants driving ROSCA participation have received insufficient attention, as shown in **Table 1**. This research aims to address the following question: What factors influence farmers' participation in ROSCAs in Vietnam? This research question is important because the insights gained will enrich the existing literature.

Table 1. Literature Review [1,2,4,6,14,15,17,20,24–42].

Authors	Country	Research subjective	Research objective	Methodological approach	Research findings
Ullah et al. (2024) [26]	Pakistan	▪ Determinants of farmers' access to informal credit ▪ Farmers' use of informal credit in agriculture	Famers	Mathematical model	▪ The positive relationships with neighbors/relatives, social capital, along with lower perceived risk played an important role in determining farmers' access to and usage of informal credit in agriculture
Ninh (2024) [20]	Vietnam	▪ Determinants of self-selection behavior	Rice farmers	Mathematical model	▪ Self-selection is found to be influenced by factors such as household head age, income per capita, farm size, social connections to banking staff, previous borrowing history, and perceived risks from natural disasters and market volatility.
Zambrano et al. (2023) [6]	N/A	▪ ROSCA benefits to their members ▪ ROSCA evolution in terms of structure, rules, use of technology over time	Articles relating to ROSCAs	PRISMA-ScR protocol	▪ The common benefits of ROSCAs include easy access to credits, saving commitment, business investment improvement, free interest rate, and social capital. ▪ ROSCA structure, rules, and use of technology are different based on the context of place where it is replicated.
Amaroh et al. (2023) [24]	Indonesia	▪ The mediating role of social relations in the association between financial attitudes and trusts	Females	PLS-SEM	▪ Financial attitudes and trust did not directly influence member commitment but positively affected social relations, which in turn played important role in determining member commitment. Moreover, the mediating effect of social relations on the relationship between financial attitudes, trust and member commitment was also highlighted.
Maitra et al. (2023) [27]	India	▪ The impacts of ROSCA participation on household welfare	ROSCA members	Mathematical model	▪ ROSCA participation increased household assets, consumption, energy efficiency and school expenditure in rural communities.
Pambekti et al. (2022) [25]	Islam	▪ The effect of ROSCA motives and benefits on entrepreneurship and household wealth	ROSCA members	CB-SEM	▪ ROSCA motives and benefits directly influenced entrepreneurial intention. ROSCA benefits had a direct impact on household wealth. The mediating role of community commitment in the relationship between ROSCA motives and benefits and their effect on entrepreneurial intention and household wealth was also emphasized.
Lukwa et al. (2022) [28]	N/A	▪ The role of ROSCAs and Accumulating Savings and Credit Association (ASCAs) in reducing food insecurity, socioeconomic inequality, promoting health and agency among women in urban sub-Saharan Africa	Articles relating to ROSCAs and ASCAs	Narrative systematic review	▪ ROSCAs and ASCAs played an important role in promoting healthy eating, skill development, social and financial empowerment.
Anh et al. (2022) [17]	Vietnam	▪ Factors influencing agricultural credit rationing in Vietnam's formal, semi-formal, and informal credit markets ▪ The impacts of credit rationing on agricultural performance	Farm households	Mathematical model	▪ Human, social, and physical capital factors support farm households to ease credit rationing, while a bad credit history and time to travel to credit sources increase the farm households' likelihood of being credit rationed.

Table 1. *Cont.*

Authors	Country	Research subjective	Research objective	Methodological approach	Research findings
Dinç et al. (2021) [29]	Turkey	▪ A two-person saving-based finance (SBF) model ▪ A Mudarabah-Wakalah hybrid model	SBF companies	Mathematical model	▪ The increasing demand for financing of durables (especially housing) was the main reason attracting individuals to participate in ROSCAs.
Sedai et al. (2021a) [14]	India	▪ The impacts of ROSCA participation on women's socio-economic freedom and autonomy	Females	Mathematical model	▪ ROSCA membership increased the likelihood of women's cash in hand, major purchase decisions, and fertility choices.
Ibrahim (2020) [30]	United States	▪ The relationship between ROSCA savings and participants' asset ownership	African immigrants	Mathematical model	▪ ROSCA participation increased asset ownership.
Shoaib and Siddiqui (2020) [2]	Pakistan	▪ Determinants of ROSCA participation	Lower-class and middle-class	Interviews	▪ The determinants of ROSCA participation varied between lower-class and middle-class communities. Particularly, the lower-class community participated in ROSCA for their existence needs, relatedness needs, and social obligations, whereas middle-class community relied on ROSCA to achieve growth needs, relatedness needs, economic stability, and social status maintenance.
Altuntas et al. (2019a) [31]	Indonesia	▪ The effects of ROSCA participation on microinsurance purchase	ROSCA members	Mathematical model	▪ A negative relationship between ROSCA participation and microinsurance uptake was found, suggesting that ROSCA members were less likely to purchase microinsurance.
Bonan et al. (2019) [32]	Benin	▪ The effects of time preferences on ROSCA and funeral membership	ROSCA members	Mathematical model	▪ Women who displayed time preferences were more likely to join funeral groups, rather than ROSCAs
Sato et al. (2019) [33]	Japan	▪ The effect of ROSCA participation on the maintenance of higher-level functional capacity of older adults	Older adults	Mathematical model	▪ ROSCAs can help older adults maintain their independence in a higher-level functional capacity
Bauchet and Larsen (2018) [34]	Taiwan	▪ The influence of social relationships on contribution behavior and ROSCA failure	ROSCA members	Mathematical model	▪ The less socially connected participants were found to have higher incentive to default due to their early pot receiving in the cycle
Acquah and Dahal (2018a) [35]	Indonesia	▪ The lending capacity of ROSCA institutions after the financial crisis in Indonesia in 1998	ROSCA institutions	Mathematical model	▪ The lending capacities, which were determined by ROSCA size and the diversity in employment sectors of ROSCA members, increased threefold after crisis
Ojong (2018) [36]	Cameroon	▪ The trust development between formal financial institutions (FFI) and their clients, and between informal financial institutions (IFI) and their members	Clients and non-clients of FFI, members and non-members of IFI	Interview	▪ The important role of cultural values and beliefs in shaping trust.
Alpay and Kahyaoglu (2016) [4]	Turkey	▪ Motivations for ROSCA participation	ROSCA members	Exploratory factor analysis (EFA)	▪ Factors identified include feeling of economic freedom, second-order needs, need of being prestigious, avoiding from interest, economizing, avoiding possible economic loss, investment, basic consumption, not researching to formal financial markets, intrafamilial dynamics of income and expenses, socialization. The 11 sub-dimensions mentioned above determined ROSCA participation. Furthermore, individual's socioeconomic and demographic characteristics were also found to have impacts on ROSCA participation.
Reito and Spagano (2014) [37]	Italy	▪ The comparison of establishing conditions of ROSCAs and Rotating Savings and Collateral Association (ROSCoA)	Entrepreneurs	Mathematical model	▪ ROSCoAs required a lower individual savings flow to join compared to that of ROSCAs.
Lainez (2014) [15]	Vietnam	▪ Three types of informal credit in Chau Doc	Farmers	Interview	▪ Informal financial market in Vietnam includes loans from friends and relatives, credit from pawnshops, and savings from ROSCAs.
Benda (2013) [38]	Rwanda	▪ The contributions of ROSCAs to human well-being and community development in underprivileged areas	ROSCA members	Interview	▪ ROSCAs were found to enhance the economic capacity of their members, provide a foundation for intra-community trust building, and reduce inequalities.
Bisrat et al. (2012) [39]	Ethiopia	▪ ROSCA benefits ▪ Determinants of ROSCA participation	ROSCA members	Descriptive statistics	▪ For large ROSCAs, the financial motives outweighed other motives, while the social motives were found the most important motivation for members of small ROSCAs

Table 1. *Cont.*

Authors	Country	Research subjective	Research objective	Methodological approach	Research findings
Etang et al. (2011) [40]	Cameroon	▪ The relationship between trust and ROSCA membership	ROSCA members and non-members	Mathematical model	▪ A significant difference between trust among ROSCA members and non-ROSCA members was found.
Kedir and Ibrahim (2011) [41]	Ethiopia	▪ Determinants of households' ROSCA participation and the amount of saving mobilized through these informal institutions	ROSCA members and non-members	Mathematical model	▪ The amount of ROSCA savings was significantly affected by the characteristics of the members rather than that of the informal saving institutions, and that women account for high proportion of ROSCA members.
Tanaka and Nguyen (2009) [1]	Vietnam	▪ The impacts of trust, risk aversion, reciprocity, and time discounting on shaping ROSCA participation	ROSCA members	Mathematical model	▪ Fixed ROSCAs' members were found to be less present-biased, more aware of the self-control problem when saving alone, more trustworthy, and to have lower discount rates. On the other hand, bidding ROSCA participation was not related to time preferences and self-control problems.
Kimuyu (1999) [42]	East Africa	▪ ROSCA's role in improving household welfare	ROSCA members	Secondary data analysis	▪ ROSCA participation in ROSCAs was partly driven by the need to raise school fees, meet medical expenses, buy food, start or promote small businesses and acquire assets, including livestock.

Source: Authors' own study.

First, although ROSCA has been widely researched with over a hundred published articles, most studies used mathematical modelling techniques [6], with very few employing structural equation modelling (SEM). Conventional mathematical modeling focuses exclusively on direct and linear relationships between a limited set of factors, thus oversimplifying the research findings. In contrast, SEM allows researchers to construct a network of direct and indirect relationships among various variables by its ability to integrate latent variables as a game-changer. For example, Amaroh et al. (2023) employed PLS-SEM to explore the role of social relationships in meditating the association between financial attitudes and trust [24], thus providing a layered understanding that a simpler regression model might underestimate. Moreover, some pyschological and social dimensions, which are so abstract to be directly measured through proxies in regression model, can be explicitly modelled as latent constructs and observed from indicators in SEM to reduce measurement error. In the case of Pambekti et al. (2022), CB-SEM revealed that ROSCA motives and benefits directly influenced household wealth and entrepreneurship [25]. Finally, unlike traditional methods that examine variables' relationships separately and thus risk fragmented insights, SEM tests theoretical frameworks comprehensively at once through proposed paths. Therefore, the limited application of SEM in ROSCA research deters researchers' understanding of complex relationships between multiple variables simultaneously, leads to oversimplified conclusions that hinder the ability to generalize research findings across different contexts, and consequently results in inadequate evidence for policy development aimed at enhancing financial inclusion and well-being.

Second, very few research exploring determinants of ROSCA participation from a quantitative perspective, with Alpay & Kahyaoglu (2016) as an exception [4], who used exploratory factor analysis (EFA) to investigate motivations for ROSCA participation. Most of existing studies on this topic has been qualitative, utilizing either interviews or scoping reviews based on the PRISMA-ScR protocol [2,6]. Therefore, exploring factors driving and deterring ROSCA participation, this study fills an important gap in the literature by responding to the calls by researchers for studies on financial literacy which plays a vital role in sustainable economic development in rural communities [43–45]. Furthermore, this study distinguished itself from prior studies in the operationalization of risk perception as a mediator in the association between financial literacy and farmers' behaviour to participate in ROSCAs. Previous studies have posited risk perception as a one-dimensional construct, concentrating on traditional measures of risk [46]. This study has significantly contributed to a better understanding of this construct by classifying it into two

dimensions (risk-bearing and risk knowledge), which will provide valuable insights for future exploration in the field of financial decision-making behaviours.

Lastly, this study explores and validates the determinants of ROSCA participation in the financial context of Vietnam, which has received little attention compared with Sub-Sahara African (such as Cameroon, Rwanda, Ethiopia) and other Asian nations (such as Japan, India, and China), where most previous research has concentrated on [6]. Lainez (2014) stated that knowledge regarding informal finance and credit in Vietnam remains fragmented [15]. In addition, evidence on why farmers join ROSCAs is somehow scant. Therefore, by employing PLS-SEM as the analytical method in identifying the factors influencing farmers' participation in ROSCAs in rural areas of Vietnam, this study addresses the mentioned research gaps.

2. Theoretical Framework and Hypothesis Development

2.1. Financial Worry

Financial resources are an important means of acquiring the essentials for survival. Many individuals also desire financial resources for comfort and enjoyment, and these resources are perceived as an indicator of personal accomplishment and a source of satisfaction and positive self-image [47–49]. When individuals become concerned about their financial resource status and when resources are at risk, financial worries arise [47,50]. Financial worries are a widespread issue of concern and one of the most extensive sources of stress mainly for individuals with low income [51,52]. Drawing upon the conservation of resources (COR) theory, which states that individuals try to find ways to prevent resource loss and conserve remaining resources [48,53], this study focuses on the retention and conservation of financial resources in the context that financial worries implies a motivational element by potentially prompting farmers to participate in ROSCAs to cope with and improve their financial situations.

Prior literature has indicated that household conflict arising from financial distress due to constraint budget allocation is the main driver of ROSCA participation [39,54]. Most ROSCA members are low-income and financially disadvantaged people who are unbanked [55], due to their failure to meet the requirements imposed by formal financial institutions for credit applications [4]. These individuals often rely on informal associations to meet their financial needs. ROSCAs have a comparative advantage in monitoring and enforcing financial agreements over traditional banking services given the challenges of executing formal financial contracts [56], and have thus become an important alternative financial mechanism in providing credit access to economically vulnerable populations [4,6]. Therefore, we conceptualize ROSCAs' participation as a behavioural response to financial worries in underprivileged and underrepresented communities.

H1. *Financial worry is positively related to ROSCA participation intention.*

2.2. Trust in Financial Association and Fundraiser Trust

Trust is a psychological state consisting of the intention to accept risks based upon positive assumptions of the motives or behaviour of another [57], in which the trustee is supposed to be honest, trustworthy, and benevolent and will perform his or her commitment; hence, the trustor will obtain positive results in the future [58]. Regarding the role of trust, trust is a salient dimension for every single relationship between parties, and it determines almost all economic exchange [59], especially in the capital market since trust improves the willingness to participate [60,61]. In the investment industry, trust played a more nuanced role than in other industries because of the uncertainty of markets [62].

There are two types of trust explored in this research: trust in financial association and fundraiser trust. First, trust in financial association is defined as the individual's confidence in the financial association's integrity and dependability, and the belief that the financial association has attributes that are beneficial to consumers [63]. Association trust is considered a significant element that enhances investor behaviour [64]. Second, fundraiser trust was hypothesized in this research as confidence that the fundraiser will perform cooper-

atively to satisfy the member's expectations [65]. Fundraiser trust is vitally necessary for funding achievements, since fundraisers who are explicit about their obligations and good standing will reduce the probability of fundraiser failure [66]. ROSCA participation is considered a high-risk investment since investing in a ROSCA, whose fundraiser and members they are not accustomed to dealing with, makes people subject to risk, information asymmetry and uncertainty in their investment decisions. Although ROSCAs have a comparative advantage in monitoring and enforcing financial agreements over formal financial institutions, their sustainability is threatened if participants default after receiving the pot [1]. Such risks arise when members who receive funds early in the cycle stop contributing, and/or the ROSCA fundraiser deliberately embezzles and absconds without disbursing the collected funds on the scheduled day, causing losses for other members. Thus, people must thoroughly assess the fundraisers and members in all aspects to ensure their honesty and reliability. Consequently, a high degree of confidence and trust among members and fundraisers is necessary for ROSCAs to function effectively [67,68]. People are more likely to invest in reliable ROSCAs where the fundraisers and members are perceived as credible [2]. The previous literature has extensively shown the significance of institutional and interpersonal trust in influencing financial investment behavior [63,69]. According to the explanation above, the hypotheses of this investigation are:

H2. *Trust in financial association is positively related to ROSCA participation intention.*

H3. *Fundraiser trust is positively related to ROSCA participation intention.*

Furthermore, we adopted the theory by Stewart (2003) on trust transfer and Meyerson et al. (1996) on swift trust, arguing that trust in financial association is a crucial factor that builds confidence for the potential investor's trust in the fundraiser [70,71]. Adil et al. (2023) explored a strong effect of trust in platform on the trust in the fundraiser [63]. Correspondingly, this research posits that:

H4. *Trust in financial association is positively related to fundraiser trust.*

2.3. Financial Literacy

Financial literacy is the ability to evaluate various complex financial instruments to make important investment decisions in their best interest [72]. Most ROSCA members have low levels of education and financial literacy [4]. Previous literature has explored the significant negative impact of education on ROSCA participation, particularly the higher the level of education, the more an individual prefers formal finance [73–75]. Hence, although prior studies have identified a positive impact of financial literacy on investor participation in financial markets, such as the stock market [63,76], selection of mutual funds [77], and wealth management [78], this research predicts that financial literacy has a negative influence on ROSCA participation, in which those with higher financial literacy may be more inclined to not participate in ROSCAs than those with lower financial literacy due to their perceived risks such as default risk or lack of regulatory framework. We thus expect:

H5. *Financial literacy is negatively related to ROSCA participation intention.*

ROSCA participation intention and behavior

Although the Theory of Planned Behavior (TPB) is widely recognized as a preferred choice across many fields in addressing complexities of human social behaviour [79,80], there is a dearth of research in financial markets employing the TPB as a research framework, especially regarding investment decision-making [81]. The existing studies [63,82,83] often assume that intention and behavior are either equivalent or exhibit a very strong correlation. However, this assumption has sparked debate. Despite strong intentions, many individuals fail to make actual financial investment behavior. This unexplained phenomenon points to an existing intention-behavior gap. Sheeran & Webb (2016) highlight that intentions account for only 28% of the variance in behavior, emphasizing the two variables are far from perfectly aligned [84]. In the context of financial investments, this gap can be attributed to factors such as risk aversion, lack of financial literacy, procrastination,

and limited access to investment opportunities [85]. Understanding and bridging the intention-behavior gap is crucial for promoting healthier financial behaviors and improving long-term financial well-being [86]. We thus expect:

H6. *ROSCA participation intention is positively related to ROSCA participation behavior.*

2.4. Risk Perception

Risk perception refers to the subjective judgment that individuals make about the characteristics and severity of a risk [46]. Prior literature has highlighted risk perception's multifaceted nature, influenced by various factors including individual psychological characteristics, market conditions, and cognitive biases [87,88]. An individual's financial literacy level influences their risk perception, in which the more well-literate they are, the better their risk perception will be regarding future investment uncertainty [46]. The positive impact of financial literacy on risk perception has also been elucidated by Forlani & Mullins (2000) who stated that risk perception is related to how individuals understand the level of uncertainty and possible losses associated with specific actions, which refers to the level of financial literacy [89]. Therefore, the study hypothesizes:

H7. *Financial literacy is positively related to risk perception.*

A nuanced understanding of risk is important, since it facilitates the navigation of the complex dynamics of financial options, balancing opportunities and potential threats [90]. Previous studies have explored the negative impact of risk perception on investment decision-making. Worawachtanakul et al. (2018) found that higher environmental risk perception was associated with fewer investment decisions [91]. This aligns with Wattanasan et al. (2020)'s finding that individuals with high risk perception were more likely to exhibit cautious investment behaviour [92]. Moreover, the mediating role of risk perception in the relationship between financial literacy and investment decisions has been discovered in prior literature [46,93,94]. In ROSCA context, enhancing financial literacy and cultivating risk awareness is considered important in enabling individuals to make informed investment decisions. We thus expect:

H8. *Risk perception is negatively related to ROSCA participation behaviour.*

In accordance with the foregoing hypotheses, we provide the research model in **Figure 1**.

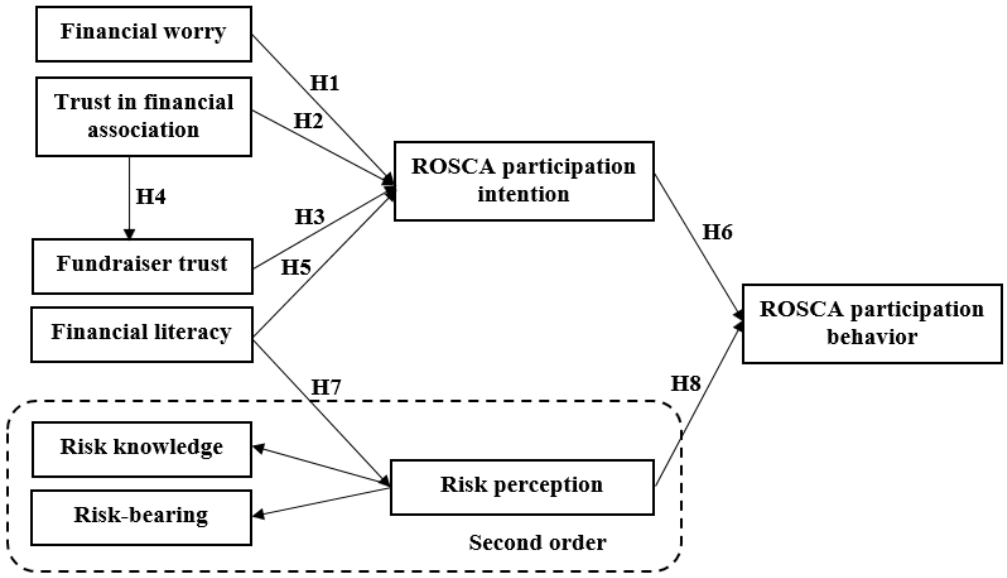

Figure 1. Research Model.

Source: Authors' own work.

3. Research Methodology

By employing the convenience sampling method, this study conducted in-person survey to collect information from the respondents. The questionnaires were handed directly over to the farmers in Hoc Mon and Cu Chi, two popular rural agricultural settings in Vietnam. During the survey, the respondents were informed about the study's aims and that their information and answers would not be shared and only be used to fulfil the study objectives. From an initial sample of 283 respondents collected within 8 weeks, 250 valid responses were retained after removing incomplete submissions. This sample size exceeded Cohen's (1992) minimum requirements for 0.80 statistical power at 0.05 significance level [95], with maximum of four arrows pointing at a latent variable and minimum R^2 values of 0.10 and 0.25 (requiring minimum samples of 113 and 41, respectively). Our total sample size of 250 responses exceeds the threshold, thereby forming an adequate sample size (see **Table 2**).

All constructs were adapted from previously validated studies, as shown in **Table 3**. The questionnaire underwent a careful translation process from English to Vietnamese using a collaborative, iterative approach. Face and content validity were established through pre-testing with 20 farmer households, leading to refinements in question wording, sequence, and clarity. The final questionnaire contained 33 questions covering 7 constructs and 7 demographic questions. Five-point Likert scale (1=strongly disagree to 5=strongly agree) was used to rate each items' level of agreement.

Table 2. Demographic Characteristics of the Sample (n=250).

Demographic		Frequency	Percent (%)
Gender	Female	131	52.4
	Male	119	47.5
Age	<25 years	28	18.1
	25–35 years	38	24.6
	36–45 years	42	27.2
	46–55 years	29	18.8
	>55 years	17	11.0
Marital status	Married	95	61.6
	Unmarried	59	38.3
Children	Yes	84	54.5
	No	70	45.4
Highest educational degree	No degree	18	11.6
	Primary school	14	9.0
	Secondary school	33	21.4
	High school	70	45.4
	University/college	19	12.3
Monthly household net income (million VND)	< 5	56	36.3
	5–10	65	42.2
	11–20	19	12.3
	21–30	11	7.1
	>30	03	1.9

Source: Authors' own data (processed in 2025).

Table 3. Constructs and Measurement Items [49,81,96–99].

Item	Statement		Source
	Financial literacy (FL)		
FL-1	Compound interest	If I have 100.000VND in my savings account, and the bank provides an interest of 10% per annum, I will have more than 150.000VND in my account after 5 years, provided that I do not withdraw any	Akhtar and Das (2018) [81]
FL-2	Risk diversification	I like investing my money into multiple business or investments	
FL-3	Simple interest (numerical)	If I borrow 100.000VND. It is lower to pay 105.000VND than to pay 100.000VND plus 3% ®	
FL-4	Inflation	If the prices of products that I buy today doubles over the next ten years and my income also doubles, I will be able to buy the same product in the same quantity	
	Financial worry (FW)		
FW-1	I have often been worried about my financial situation		Meuris and Leana (2018b) [49]
FW-2	I have often felt satisfied with my financial situation ®		
FW-3	I have often felt overwhelmed by my financial obligations		
FW-4	I often feel that I do not have enough money		
	Trust in financial association (TFA)		
TFA-1	I am confident that existing rules and regulations of ROSCAs protect their members		Moin et al. (2017) [96]
TFA-2	I have faith and confidence in ROSCA systems		
TFA-3	I generally trust ROSCA members to act honestly and ethically		
TFA-4	I trust ROSCA members to stick to rules and regulations		
TFA-5	I trust that ROSCAs will manage their members responsibly and professionally		
	Fundraiser trust (FT)		
FT-1	I am confident that ROSCA fundraisers will fulfill their obligations		McKnight et al. (2002) [97]
FT-2	I would call ROSCA fundraisers honest		
FT-3	I believe that ROSCA fundraisers have the competence and efficiency to successfully achieve the goals and keep all promises made to me		
	Risk perception (RP)		
RK-1	Risk knowledge	I have enough knowledge to assess the risks involved in participating in a ROSCA	Weber et al. (2002) [98]
RK-2		I use past experiences to guide my ROSCA participation decisions	
RK-3		I understand the risks associated with different ROSCA structures	
RK-4		I am knowledgeable about the financial risks of my ROSCA participation	
RB-1	Risk-bearing	I am ready to bear the consequences if my participation in ROSCAs turns out poorly	
RB-2		I accept full responsibility for the outcomes of my decisions to participate in ROSCAs	
RB-3		I am confident in managing the consequences of financial risks associated with my ROSCA participation	
RB-4		I believe that I can handle financial risks of participating in ROSCAs effectively	

Table 3. *Cont.*

Item	Statement	Source
	ROSCA participation intention (RPI)	
RPI-1	I intend to participate in ROSCAs shortly	Hasan et al. (2024) [99]
RPI-2	I am actively considering allocating a portion of investment portfolio to ROSCAs	
RPI-3	I am confident in my ability to make informed investment decisions in ROSCAs	
RPI-4	I believe participating in ROSCAs aligns with my long-term financial goals	
	ROSCA participation behavior (RPB)	
RPB-1	I have a strong urge to participate in ROSCAs	Hasan et al. (2024) [99]
RPB-2	I suggest others use a diversified investment portfolio that includes ROSCAs	
RPB-3	I actively monitor and track the performance of ROSCAs I participate in	
RPB-4	I have a long-term participation strategy for ROSCAs and suggest others participate in them	
RPB-5	I believe that participating in ROSCAs in Vietnam is a profitable opportunity	

® Reversed items.
Source: Authors' own study.

4. Data Analysis and Results

Using SmartPLS 3.2.9 software, structural equation modelling (SEM) was performed to investigate the proposed research model paths [100]. Because this study sought to explore the impact of key constructs on participation intention and behaviour of ROSCA, partial least squares PLS-SEM was considered a better choice than covariance-based SEM [101]. To employ PLS-SEM, two steps were followed, namely assessment of the measurement and structural models [102]. The measurement model allowed examining the validity and reliability of the variables, whereas the structural model assisted in determining the relationships among the proposed hypotheses.

4.1. Measurement Model

4.1.1. Convergent Validity Test

Convergent validity was assessed using an individual item or component score and the total score of a conceptual construct provided by the standardized loading factor, which is indicative of the strength of the correlation between each measurement item and a conceptual construct. A high convergent validity measure should have a correlation higher than 0.708 with the construct it is said to be measuring [101]. Except FL-4, RPB-4, and RPB-5, the first-order convergent validity testing results of financial worry, trust in financial association, fundraiser trust, financial literacy, and risk perception with the reflective measurement model indicated a factor loading of all the indicators higher than 0.78, which means that each indicator has converge-criterion validities. **Table 4** shows the result of factor loading analysis after FL-4, RPB-4, and RPB-5 are excluded. Likewise, the outputs of the second-order convergent validity test of risk perception using a reflective measurement model revealed factor loading values larger than 0.708, indicating that this variable has met convergent validity. Furthermore, convergent validity was examined by calculating the value of average variance extracted (AVE) for each construct. **Table 4** shows that all AVE values are larger than 0.5, indicating all constructs were valid [101].

Table 4. Construct Reliability and Convergent Validity.

Construct	Item	Outer Loading	Cronbach's Alpha	Composite Reliability (rho_a)	Composite Reliability (rho_c)	Average Variance Extracted (AVE)
Financial worry	FW-1	0.834	0.843	0.851	0.895	0.680
	FW-2	0.785				
	FW-3	0.840				
	FW-4	0.838				
Trust in financial association	TFA-1	0.840	0.884	0.900	0.914	0.681
	TFA-2	0.783				
	TFA-3	0.875				
	TFA-4	0.818				
	TFA-5	0.809				
Fundraiser trust	FT-1	0.818	0.809	0.819	0.887	0.723
	FT-2	0.860				
	FT-3	0.872				
Financial literacy	FL-1	0.844	0.817	0.819	0.891	0.732
	FL-2	0.859				
	FL-3	0.863				
	FL-4	*				
Risk knowledge	RK-1	0.841	0.846	0.854	0.897	0.685
	RK-2	0.854				
	RK-3	0.847				
	RK-4	0.765				
Risk-bearing	RB-1	0.838	0.860	0.861	0.905	0.704
	RB-2	0.851				
	RB-3	0.833				
	RB-4	0.833				
Risk perception	RK	0.879	0.746	0.753	0.887	0.797
	RB	0.906				
ROSCA participation intention	RPI-1	0.844	0.845	0.849	0.896	0.683
	RPI-2	0.795				
	RPI-3	0.849				
	RPI-4	0.817				
ROSCA participation behavior	RPB-1	0.895	0.822	0.864	0.892	0.733
	RPB-2	0.846				
	RPB-3	0.827				
	RPB-4	*				
	RPB-5	*				

* Item deleted.
Source: Authors' own data (processed in 2025).

4.1.2. Reliability and Discriminant Validity Test

Composite reliability was used as an assessment factor of the constructs from the perspective of latent variable coefficients, and Cronbach's Alpha is a reliability test that strengthens the results of composite reliability. The reliability of the constructs is ensured when the values of composite reliability (rho_a and rho_c), and Cronbach's Alpha (α) are greater than the 0.70 threshold [103]. **Table 4** revealed that the test criteria were met, thereby ensuring that all variables satisfied the construct reliability criteria.

The discriminant validity of the constructs was assessed using multiple approaches. As presented in **Table 5**, an AVE root value greater than the correlation value by latent variables indicates that financial worry, trust in financial association, fundraiser trust, financial literacy, and risk perception perceive it as a margin to discriminate investing in all those constructs [104]. Additionally, the Heterotrait–Monotrait (HTMT) ratio was employed to further evaluate discriminant validity. As shown in **Table 6**, all HTMT ratios were below the threshold value of 0.9, providing additional evidence of discriminant validity [105,106].

Table 5. Fornell-Larcker Discriminant Validity Test.

	FL	FW	FT	RPB	RPI	RP	TFA
FL	**0.856**						
FW	−0.347	**0.824**					
FT	−0.363	0.344	**0.850**				
RPB	−0.322	0.329	0.271	**0.856**			
RPI	−0.432	0.516	0.524	0.428	**0.827**		
RP	0.513	−0.450	−0.473	−0.319	−0.426	**0.893**	
TFA	−0.439	0.392	0.310	0.498	0.343	−0.622	**0.825**

Source: Proceed data 2025.

Table 6. Heterotrait–Monotrait Test.

	FL	FW	FT	RPB	RPI	RP	TFA
FL	-						
FW	0.409	-					
FT	0.439	0.407	-				
RPB	0.388	0.389	0.319	-			
RPI	0.518	0.602	0.627	0.496	-		
RP	0.652	0.569	0.612	0.392	0.537	-	
TFA	0.510	0.456	0.358	0.578	0.390	0.765	-

Source: Authors' own data (processed in 2025).

4.2. Structural Model

4.2.1. Inner Model Test

Lateral multicollinearity was assessed using variance inflation factor (VIF) analysis. All independent variables demonstrated VIF values below 3, meeting Becker et al.'s (2015) threshold and indicating no multicollinearity concerns in the model (see **Table 7**) [107]. In addition, the pairwise correlation coefficients in the correlation matrix of indicators were tested to further assess multicollinearity. As shown in **Appendix A Table A1**, all coefficients were below the threshold of 0.7, providing additional evidence of no multicollinearity [108].

Table 7. Evaluation of VIF, f^2, R^2, Q^2.

Construct	VIF				f^2				R^2	Q^2_predicts
	RP	FT	RPI	RPB	RP	FT	RPI	RPB		
FW			1.294		-	-	0.144	-	-	
TFA		1.000	1.366		-	0.106	-	-	-	
FT			1.246		-	-	0.161	-	0.096	0.066
FL	1.000		1.365		0.357	-	0.044	-	-	
RP				1.222	-	-	-	0.029	0.263	0.205
RPI				1.222	-	-	-	0.131	0.434	0.286
RPB					-	-	-	-	0.206	0.138

Source: Authors' own data (processed in 2025).

The predictive power of the research model can be evaluated using the coefficient of determination (R^2) for the dependent construct. R^2 coefficients of 0.25, 0.50, and 0.75 are considered weak, moderate, and substantial, respectively [101]. The R^2 value of ROSCA participation intention was 0.434, indicating that 43.3% of the variance in ROSCA participation intention can be attributed to financial worry, financial literacy, and fundraiser trust. The R^2 value of ROSCA participation behaviour was 0.206, suggesting that 20.6% of the variance in ROSCA participation behaviour could be explained by risk perception and ROSCA participation intention. The R^2 value of fundraiser trust was 0.096, revealing 9.6% of the variance in fundraiser trust could be attributed to trust in financial association. The R^2 value of risk perception was 0.263, indicating 26.3% of the variance in the risk perception could be attributed to financial literacy. Furthermore, **Figure 2** demonstrates that in the first-order model, risk

bearing (0.894) exhibits a higher coefficient value than risk knowledge (0.892) in measuring risk perception.

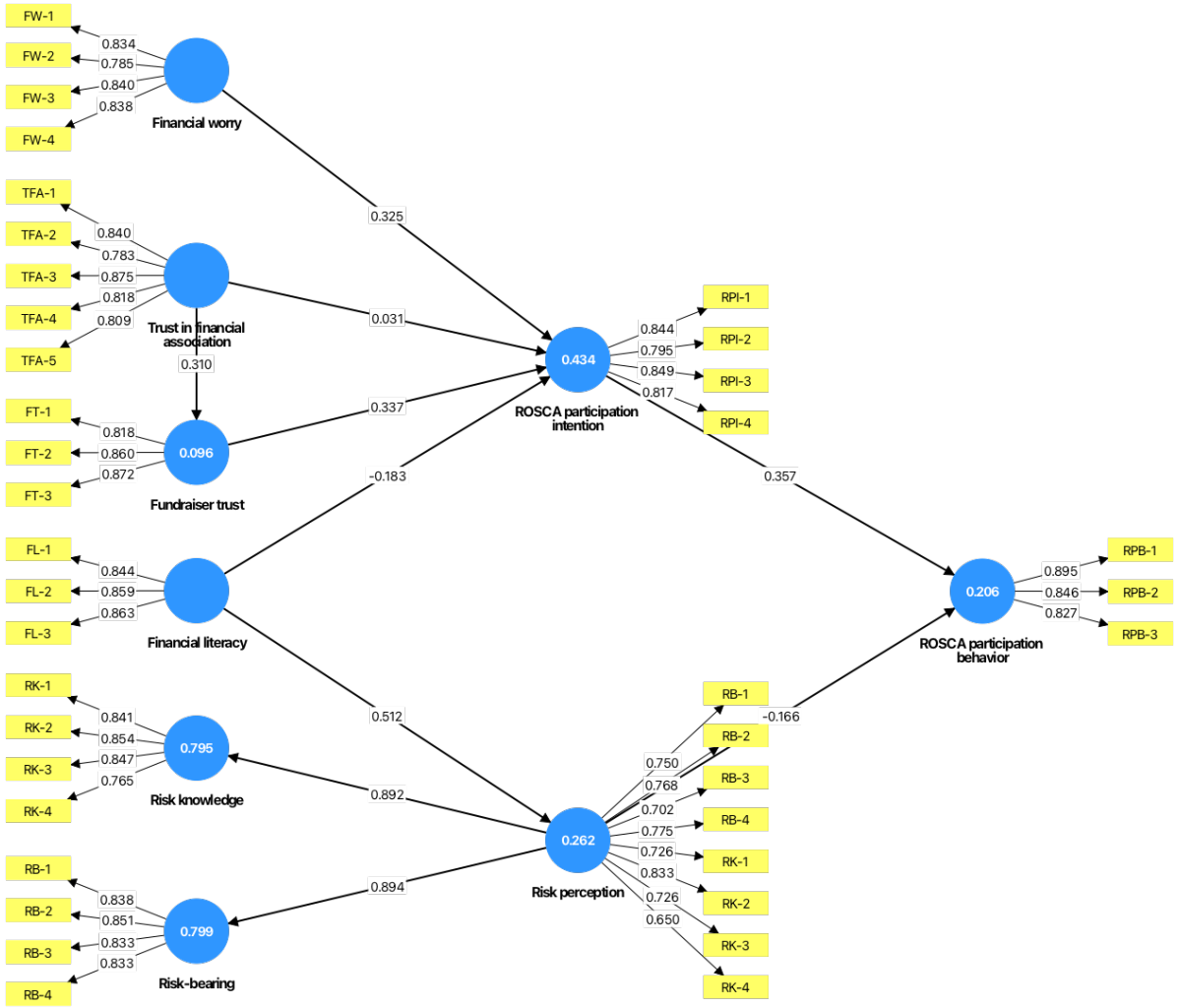

Figure 2. The First-Order Research Model Diagram.

Source: Authors' own work.

Additionally, the strength of the study constructs was evaluated through effect size (f^2) analysis, which reveals any changes in R^2 by an independent variable [95]. This study considered three values to determine effect size (f^2), namely, small (0.02), moderate (0.15), and substantial (0.35). **Table 7** shows that fundraiser trust has the largest effect size with the moderate value (0.161) in shaping ROSCA participation intention compared with financial worry (0.144) and financial literacy (0.044) with small effect sizes. Both risk perception and ROSCA participation intention has small effect sizes on ROSCA participation behaviour (0.029 and 0.131, respectively). Trust in financial association exhibited a small effect size on fundraiser trust (0.106), whereas financial literacy was found to have a substantial effect size on risk perception (0.357).

The model's predictive performance was further validated using PLSpredict algorithm with 10-fold cross validation and 10 repetitions. According to Hair et al. (2019), Q^2 prediction values exceeding zero indicate the structural model has predictive relevance [101]. Our findings revealed Q^2 value of 0.066 for fundraiser trust, 0.205 for risk perception, 0.286 for ROSCA participation intention, and 0.138 for ROSCA participation behaviour, demonstrating robust predictive capacity of the research model.

4.2.2. Hypothesis Test

We evaluated the proposed hypotheses using path coefficients (β), *t*-values, and *p*-values through SmartPLS bootstrapping with 5000 resamples [101]. As indicated in **Table 8**, except H2, all hypotheses were supported with a *t*-value higher than 1.96 and *p*-value less than 0.05. Particularly, fundraiser trust exhibited the strongest positive influence on ROSCA participation intention (β = 0.337, *t*-value = 7.130, *p*-value = 0.000) and behaviour (β = 0.120, *t*-value = 4.944, *p*-value = 0.000). This indicates a one-unit increase in fundraiser trust leads to 33.7% and 12% increases in ROSCA participation intention and actual behaviour respectively, suggesting that higher level of trust in the fundraisers significantly contributes to more proactive ROSCA participation among farmers. Although the relationship between trust in financial association and ROSCA participation intention (β = 0.031, *t*-value = 0.533, *p*-value = 0.594) and behaviour (β = 0.011, *t*-value = 0.519, *p*-value = 0.604) were statistically insignificant, trust in financial association had a direct and positive effect on fundraiser trust (β = 0.310, *t*-value = 5.045, *p*-value = 0.000), which in turn mediated the effect of trust in financial association on both ROSCA participation intention (β = 0.104, *t*-value = 3.800, *p*-value = 0.000) and behaviour (β = 0.037, *t*-value = 3.041, *p*-value = 0.002). This means a one-unit increase in institutional trust is associated with 31%, 10.4% and 3.7% increases in fundraiser trust, ROSCA participation intention, and actual behaviour respectively. Therefore, as an farmers' trust in the financial market raised, their fundraiser trust is enhanced, and thus their ROSCA participation intention and actual behaviour are also facilitated. ROSCA participation intention (β = 0.325, *t*-value = 6.359, *p*-value = 0.000) and actual behaviour (β = 0.116, *t*-value = 4.325, *p*-value = 0.000) were found positively influenced by financial worry, in which a one-unit increase in financial worry corresponds to 32.5% and 11.6% increases in farmers' ROSCA participation intention and actual behaviour respectively. This suggests the more concerns farmers have about their financial capacity, the more willing they are to engage in ROSCAs.

Table 8. Structural Model Analysis.

Sig ($p < 0.05$)	Hypotheses	Path Coefficient	Sample Mean	Standard Deviation	*t*-value	*p*-value
S	H1: FW → RPI	0.325	0.325	0.051	6.359	0.000
R	H2: TFA → RPI	0.031	0.029	0.058	0.533	0.594
S	H3: FT → RPI	0.337	0.339	0.047	7.130	0.000
S	H4: TFA → FT	0.310	0.314	0.061	5.045	0.000
S	H5: FL → RPI	−0.183	−0.185	0.055	3.357	0.001
S	H6: RPI → RPB	0.357	0.360	0.054	6.562	0.000
S	H7: FL → RP	0.513	0.517	0.050	10.346	0.000
S	H8: RP → RPB	−0.167	−0.169	0.062	2.712	0.007

Note: S = Supported and R = Rejected.
Source: Authors' own data (processed in 2025).

On the other hand, financial literacy was found to have a direct and negative impact on ROSCA participation intention (β = −0.183, *t*-value = 3.357, *p*-value = 0.001), in which a one-unit increase in financial literacy is associated with 18.3% decrease in ROSCA participation intention. This suggests that financial literacy is an important hinder in diminishing farmers' intention to participate in ROSCAs. Financial literacy not only has a direct effect on ROSCA participation intention but also had a significantly direct and positive impact on risk perception (β = 0.513, *t*-value = 10.346, *p*-value = 0.000), which in turn influenced negatively and directly ROSCA participation behaviour (β = −0.167, *t*-value = 2.712, *p*-value = 0.007). This means for a one-unit increase in financial literacy, risk perception increases by 51.3%, which in turn leads to a 16.7% reduction in ROSCA participation behaviour. These findings reveal that the more financially literate farmers are, the more aware they are of the risks involved in ROSCA participation and the less likely they participate in ROSCAs. Finally, ROSCA participation intention influenced positively ROSCA participation behaviour (β = 0.357, *t*-value = 6.562, *p*-value = 0.000), in which actual behaviour increases by 35.7% for a one-unit increase in farmers' intention to participate in ROSCA. This finding posits intention is a strong predictor of behaviour, and that the

stronger a farmer's intention to join a ROSCA, the more like they are to actually participate.

The findings highlight the mediating roles of risk perception and behavioural intention in the relationship between financial literacy and financial behaviour. Particularly, for every unit increase in financial literacy leads to an 8.6% and 6.5% decrease in ROSCA participation behaviour mediated by increased risk perception (β = −0.086, t = 2.534, p = 0.012) and ROSCA participation intention (β =−0.065, t = 3.147, p = 0.002), respectively (**Table 9**). This suggests that higher financial literacy allows farmers to perceive more risk related to ROSCA participation, thereby reducing their likelihood to participate and actual behaviour.

As an overview, **Figure 3** provides the result with all path coefficients and interrelationships between the constructs in the second-order model.

Table 9. Evaluation of Indirect Effects.

Sig ($p < 0.05$)	Hypotheses	Path Coefficient	Sample Mean	Standard Deviation	t-value	p-value
S	FW → RPI → RPB	0.116	0.117	0.027	4.325	0.000
R	TFA → RPI → RPB	0.011	0.011	0.021	0.519	0.604
S	FT → RPI → RPB	0.120	0.122	0.024	4.944	0.000
S	FL → RPI → RPB	−0.065	−0.066	0.021	3.147	0.002
S	TFA → FT → RPI	0.104	0.107	0.027	3.800	0.000
S	TFA → FT → RPI → RPB	0.037	0.039	0.012	3.041	0.002
S	FL → RP → RPB	−0.086	−0.087	0.034	2.534	0.012

Note: S = Supported and R = Rejected.
Source: Authors' own data (processed in 2025).

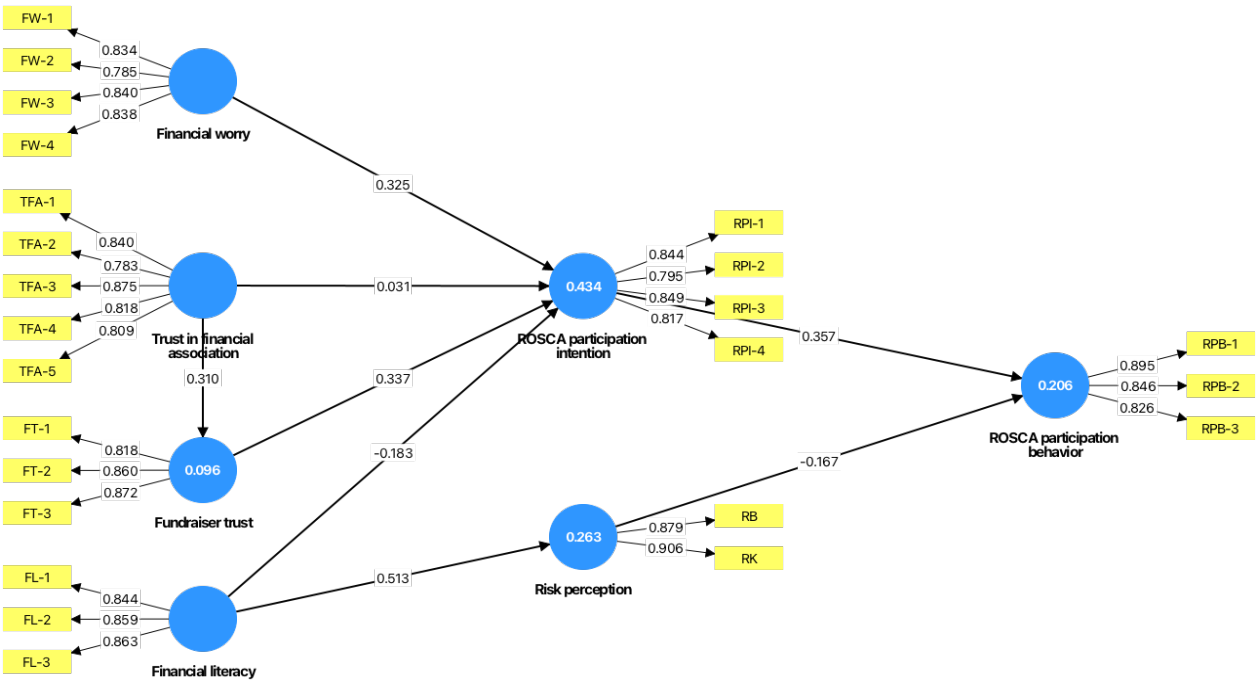

Figure 3. The Second-Order Research Model Diagram.

Source: Authors' own work.

5. Discussion and Implications

The findings offer useful information for Vietnamese policymakers to discourage farmer households from participating in ROSCAs. Firstly, the research findings showed that financial worries positively influenced farmers' intention to participate ROSCAs (H1), a position consistent with prior studies [39,54]. This confirmation indicated that farmers, who are more likely to experience heightened psychological distress due

to their struggles to manage daily financial obligations (making ends meet, a lower financial buffer, and higher over-indebtedness), tend to engage in short-term credit solutions such as ROSCAs rather than strategic long-term planning, leading to suboptimal financial decisions [109,110]. This aligns with Vietnam context, where rising living costs and increasing consumer debt [111], and economic instability [112] have placed many Vietnamese, especially those in middle- to lower-income groups, under financial pressure, causing them to suffer a heightened sense of financial security [113,114]. To discourage ROSCA participation, it is essential to address the root causes of financial worries and provide viable alternatives to manage financial instability. Increasing formal financial inclusion should be prioritized through the expansion of microfinance programs and subsidized loan schemes tailored to middle- to low-income groups, since higher financial worry scores are positively associated with lower income [113]. These services can help build financial resilience and provide safer and more reliable alternatives to ROSCAs for farmers in need of financial support, thus reducing their reliance on ROSCAs. In addition, the proliferation of financial technology such as e-wallets (e.g. Momo, PayPal), mobile banking (e.g. VCB Digibank, Agribank Plus), online investment platforms (e.g. Finhay, Mitrade) has the potential to accelerate national economic growth by broadening access to banking, investment, and credit facilities [115,116]. Therefore, formal financial institutions must continuously innovate digital financial services to expand their customers' segment and ensure their users make informed decisions without experiencing financial stress. Furthermore, enhancing social safety nets, such as unemployment benefits, healthcare subsidies, and disaster relief programs, can alleviate financial stress and reduce the need for individuals to participate in ROSCAs.

Consistent with prior studies [36,40], the study highlights the positive influence of trust in shaping ROSCA participation in rural communities. While trust in financial associations did not directly influence ROSCA participation (H2), it positively and directly affected fundraiser trust (H4), which in turn exhibited a positive impact on ROSCA participation intention (H3). This finding was consistent with previous literature [63,69], suggesting that trust in financial association indirectly facilitates ROSCA participation by enhancing trust in the individuals managing the ROSCA's funds, underscoring the interconnectedness of trust at different levels (institutional and interpersonal) and its role in shaping financial investment behavior. Members of ROSCAs must have the assurance that other members would not act opportunistically by putting an end to their membership once they are given a loan early in the sequence of meetings [36]. Therefore, by emphasizing the default risk of members and fundraisers, individuals' willingness to participate in ROSCAs will be diminished. In addition, building institutional and interpersonal trust in formal financial institutions can indirectly reduce ROSCA participation by promoting farmers' confidence in formal financial services [117]. Enhancing transparency and accountability in formal financial institutions (through regular audits, public disclosure of financial performance, and clear communications of terms and conditions for financial products) can encourage people shift away from ROSCAs.

Finally, financial literacy negatively influenced ROSCA participation directly (H5) and indirectly through risk perception (H7, H8). This suggests financially literate individuals are less likely to participate in ROSCAs due to their heightened awareness of the risks involved which force them to exercise greater caution when making investment decisions [46,118]. In this study, an individual's financial literacy is found to express itself in the practical financial decision-making process rather than through a deep understanding of complex financial concepts. Particularly, farmers are more literate in tangible metrics such as monthly contribution affordability than numeracy and compound interest rates, aligning with findings of Ogbemudia Benedict et al. [119]. This behavioural pattern implies that individual's financial decisions are guided by their perceived capacity to manage the payments, prioritizing short-term cash flow stability over long-term benefit optimization. This practical approach reflects the limited risk-knowledge dimension of financial literacy. Individuals might not fully understand the financial risk of participating in ROSCAs, while the significance of risk perception in shaping ROSCA participation is particularly relevant for the Vietnamese context, where the local informal

financial market is highly dynamic [15]. Factors such as market volatility, member defaults, and lack of regulatory framework contribute to the overall risk landscape of informal credit systems [6]. Therefore, Vietnamese government and financial authorities should prioritize implementing financial literacy programs embarking on (i) numeracy and compound interest where farmers are more deficient; (ii) informal financial systems' risks and formal financial services' benefits; (iii) digital financial management, investment strategies, and debt management to ensure that individuals can effectively navigate their financial decisions in an increasingly digital world.

6. Conclusions, Limitations, and Future Research

The limited access to formal financial institutions and increased financial stress have forced farmer households to rely heavily on ROSCAs to support their farming activities. By using PLS-SEM to analyze data from 250 respondents, this study contributes to our understanding of determinants of farmers' involvement in ROSCAs in rural Vietnam. The findings demonstrate that while financial literacy has a negative impact, ROSCA participation among farmers was positively influenced by financial worry, trust in financial associations, and fundraiser trust. More importantly, financial literacy was found to have an indirect impact on ROSCA participation, specifically discouraging farmers from participating by increasing the risks they perceive related to this type of informal credit. These findings have important implications for practitioners and policymakers in expanding financial inclusion and preventing ROSCA growth in developing countries, especially rural areas.

Although the paper is unique in terms of theoretical underpinnings and complex pathway analysis, it has some limitations that allow further investigation. First, although the research findings provide valuable insights into factors driving and deterring intention to participate in ROSCA, their generalizability is not straightforward due to several context-specific factors. In particular, rural households in Vietnam have much lower income level characterized by agricultural dependence [120], limited access to formal financial institutions [121,122], lower level of financial literacy but more robust community' ties compared to those in urban areas [123–125]. These socio-economic and cultural disparities either strengthen or weaken the intensity of impacts of identified factors (particularly reducing perceived economic usefulness and positive attitudes towards ROSCAs while reinforcing financial well-being and the ability to access formal credit services among urban counterparts' citizens). Extending this comparison to other countries with similar ROSCA traditions, such as Kenya's "chamas," India's "chit funds," or Indonesia's "arisan", introduces even more differences. For example, Vietnam has much lower formal financial inclusion than other countries in the region (see **Appendix A Table A2**), and the emphasis on familial and communal ties may differ from Turkey or Indonesia, where ethnic or occupational ties might dominate [126–128]. Prior literature has emphasized the case-specific characteristics of ROSCA studies, suggesting that determinants of ROSCA participation may not universally apply [6,14]. To further validate the model's practicality, future research might broaden the focus to other regions and compare across countries with more factors supplemented. The variations in collected sample size and examined factors can partly compensate the mentioned disparities by identifying common determinants and thus enhance generalizability of research findings. Second, the research used self-reported data, which could be biased by things like recollection errors or social desirability. A mixed-method approach integrating qualitative interviews may offer more profound understanding of the ROSCA participants' decisions-making processes. Third, the study examined a limited set of factors, calling for research into other constructs, especially the role of financial norms in framing ROSCA operation. Financial norms, referring to the values, standards, routine practices, and rules that individuals and communities reply on to navigate their daily financial lives, are developed through a financial socialization process [129]. Since ROSCAs rely heavily on social pressure rather than formal contracts or legal enforcement to sustain, for example, the norm of reciprocity ensures members contribute consistently, while the fear of social exclusion discourages defaulting, exploring the impacts of financial norms on ROSCA participation can effectively design interventions that

prevent ROSCA growth [6]. Lastly, longitudinal studies may be useful in evaluating the long-term effects of shifting economic conditions or financial inclusion policies on ROSCA membership.

Author Contributions

Conceptualization, D.H.D. and T.M.D.N.; methodology, D.H.D.; software, T.M.D.N.; validation, D.H.D. and T.M.D.N.; formal analysis, T.M.D.N.; investigation, D.H.D.; resources, D.H.D.; data curation, T.M.D.N.; writing—original draft preparation, T.M.D.N.; writing—review and editing, D.H.D.; visualization, T.M.D.N.; supervision, D.H.D.; project administration, D.H.D.; funding acquisition, D.H.D.. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement

Ethical review and approval were waived for this study due to the authors' university non-requirement.

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Data Availability Statement

Further information relating to data supporting reported results can be found at: https://drive.google.com/drive/folders/1EZGJfGNa32j-0k_IGeBiShBH-VcMsk2IM?usp=sharing.

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Conflicts of Interest

The authors declare no conflict of interest and the funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

Appendix A

Table A1. Correlation Matrix.

	FL-2	FL-3	FT-1	FT-2	FT-3	FW-1	FW-2	FW-3	FW-4	RB	RK	RPB-1	RPB-2	RPB-3	RPI-1	RPI-2	RPI-3	RPI-4	TFA-1	TFA-2	TFA-3	TFA-4	TFA-5	FL-1
FL-2	1.000	0.655	−0.191	−0.205	−0.285	−0.181	−0.147	−0.196	−0.278	0.344	0.388	−0.228	−0.245	−0.227	−0.287	−0.266	−0.282	−0.269	−0.296	−0.259	−0.367	−0.282	−0.261	0.580
FL-3	0.655	1.000	−0.217	−0.246	−0.327	−0.214	−0.225	−0.314	−0.337	0.328	0.414	−0.301	−0.166	−0.226	−0.370	−0.308	−0.292	−0.366	−0.254	−0.219	−0.338	−0.272	−0.296	0.561
FT-1	−0.191	−0.217	1.000	0.582	0.548	0.218	0.150	0.230	0.262	−0.404	−0.353	0.148	0.179	0.131	0.249	0.331	0.387	0.355	0.250	0.182	0.211	0.133	0.241	−0.268
FT-2	−0.205	−0.246	0.582	1.000	0.627	0.228	0.150	0.274	0.221	−0.361	−0.335	0.199	0.155	0.109	0.347	0.261	0.342	0.433	0.217	0.172	0.238	0.185	0.244	−0.273
FT-3	−0.285	−0.327	0.548	0.627	1.000	0.239	0.220	0.357	0.280	−0.363	−0.352	0.286	0.265	0.235	0.402	0.348	0.410	0.511	0.297	0.162	0.263	0.166	0.233	−0.328
FW-1	−0.181	−0.214	0.218	0.228	0.239	1.000	0.575	0.585	0.633	−0.349	−0.359	0.272	0.215	0.222	0.374	0.186	0.338	0.319	0.271	0.278	0.328	0.285	0.262	−0.198
FW-2	−0.147	−0.225	0.150	0.150	0.220	0.575	1.000	0.572	0.496	−0.346	−0.288	0.253	0.180	0.192	0.335	0.301	0.336	0.284	0.295	0.249	0.366	0.322	0.273	−0.257
FW-3	−0.196	−0.314	0.230	0.274	0.357	0.585	0.572	1.000	0.581	−0.262	−0.280	0.303	0.178	0.227	0.448	0.318	0.333	0.409	0.191	0.197	0.312	0.241	0.165	−0.239
FW-4	−0.278	−0.337	0.262	0.221	0.280	0.633	0.496	0.581	1.000	−0.403	−0.369	0.269	0.195	0.245	0.416	0.342	0.465	0.339	0.211	0.266	0.309	0.299	0.243	−0.286
RB	0.344	0.328	−0.404	−0.361	−0.363	−0.349	−0.346	−0.262	−0.403	1.000	0.595	−0.288	−0.177	−0.220	−0.280	−0.335	−0.369	−0.285	−0.455	−0.378	−0.497	−0.459	−0.424	0.421
RK	0.388	0.414	−0.353	−0.335	−0.352	−0.359	−0.288	−0.280	−0.369	0.595	1.000	−0.338	−0.214	−0.175	−0.341	−0.306	−0.325	−0.276	−0.471	−0.431	−0.469	−0.490	−0.506	0.440
RPB-1	−0.228	−0.301	0.148	0.199	0.286	0.272	0.253	0.303	0.269	−0.288	−0.338	1.000	0.596	0.623	0.384	0.306	0.395	0.341	0.327	0.361	0.395	0.350	0.436	−0.279
RPB-2	−0.245	−0.166	0.179	0.155	0.265	0.215	0.180	0.178	0.195	−0.177	−0.214	0.596	1.000	0.599	0.305	0.312	0.347	0.250	0.344	0.310	0.380	0.302	0.363	−0.186
RPB-3	−0.227	−0.226	0.131	0.109	0.235	0.222	0.192	0.227	0.245	−0.220	−0.175	0.623	0.599	1.000	0.221	0.227	0.251	0.183	0.348	0.320	0.372	0.295	0.337	−0.243
RPI-1	−0.287	−0.370	0.249	0.347	0.402	0.374	0.335	0.448	0.416	−0.280	−0.341	0.384	0.305	0.221	1.000	0.529	0.602	0.643	0.191	0.193	0.315	0.186	0.158	−0.321
RPI-2	−0.266	−0.308	0.331	0.261	0.348	0.186	0.301	0.318	0.342	−0.335	−0.306	0.306	0.312	0.227	0.529	1.000	0.642	0.503	0.283	0.223	0.354	0.274	0.238	−0.313
RPI-3	−0.282	−0.292	0.387	0.342	0.410	0.338	0.336	0.333	0.465	−0.369	−0.325	0.395	0.347	0.251	0.602	0.642	1.000	0.545	0.277	0.239	0.343	0.198	0.256	−0.303
RPI-4	−0.269	−0.366	0.355	0.433	0.511	0.319	0.284	0.409	0.339	−0.285	−0.276	0.341	0.250	0.183	0.643	0.503	0.545	1.000	0.194	0.182	0.235	0.131	0.127	−0.279
TFA-1	−0.296	−0.254	0.250	0.217	0.297	0.271	0.295	0.191	0.211	−0.455	−0.471	0.327	0.344	0.348	0.191	0.283	0.277	0.194	1.000	0.548	0.678	0.607	0.579	−0.304
TFA-2	−0.259	−0.219	0.182	0.172	0.162	0.278	0.249	0.197	0.266	−0.378	−0.431	0.361	0.310	0.320	0.193	0.223	0.239	0.182	0.548	1.000	0.593	0.592	0.572	−0.320
TFA-3	−0.367	−0.338	0.211	0.238	0.263	0.328	0.366	0.312	0.309	−0.497	−0.469	0.395	0.380	0.372	0.315	0.354	0.343	0.235	0.678	0.593	1.000	0.648	0.605	−0.378
TFA-4	−0.282	−0.272	0.133	0.185	0.166	0.285	0.322	0.241	0.299	−0.459	−0.490	0.350	0.302	0.295	0.186	0.274	0.198	0.131	0.607	0.592	0.648	1.000	0.605	−0.340
TFA-5	−0.261	−0.296	0.241	0.244	0.233	0.262	0.273	0.165	0.243	−0.424	−0.506	0.436	0.363	0.337	0.158	0.238	0.256	0.127	0.579	0.572	0.605	0.605	1.000	−0.412
FL-1	0.580	0.561	−0.268	−0.273	−0.328	−0.198	−0.257	−0.239	−0.286	0.421	0.440	−0.279	−0.186	−0.243	−0.321	−0.313	−0.303	−0.279	−0.304	−0.320	−0.378	−0.340	−0.412	1.000

Source: Proceed data 2025.

Table A2. Percentage of People with a Financial Institution Account (%).

	2017	2021	2022
Vietnam	30.0	-	56.1
Thailand	81.0	92.4	-
Singapore	97.8	97.2	-
Philippines	31.8	46.0	-
Myanmar	25.6	36.1	-
Indonesia	48.4	50.5	-
Cambodia	17.8	32.6	-
Lao PDR	29.1	37.3	-
India	79.8	77.3	-
Malaysia	85.1	88.2	-
World	67.1	74.0	-

Source: Work Bank (2022).

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