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Determinants of Successful Cooperation in Agricultural Markets: Evidence from Tea Producer Groups in Thai Nguyen City, Viet Nam

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Abstract Farmers' cooperative play an important role to help members increase their access to supports of information, technology, capital and marketing, enhance productivity, and increase income. This paper ultilized the theoretical foundation and empirical evidence on percieved of farmers and identifies factors that affect their decisions to join associations (cooperative or enterprise). The reseach examines the impact of joining farmers' associations farmers in Thai Nguyen city, Vietnam by using the data from the survey of 381 farms. The study was be applied the following statistical treatment: Exploratory Factor Analysis (EFA); Confirmatory Factor Analysis (CFA); Structural equation model (SEM) to identify the factors that influence the decision of tea farms to join farmers' organizations. The findings show that the farmers are more cosideration joint cooperative than enterprise, because of helpful in the ability to access better market services and more tea prices, and are more likely to earn a higher average income. The research results also show that other factors, including: Psychological factor, Social factor, Organizational factor, Formal structures and rules, Member characteristic affect the farmer's decision.

Keywords: *tea value chain, tea production, successful cooperation, economic factors*

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1. Introduction

Economic linkages are very popular in the economic sectors including agriculture sector. In agriculture forms of linkage popularity and is the most important linkage between businesses and farmers in coordinating the production and consumption of agricultural products. Tran Van Hieu [1] suggested that the linkage between farmers and enterprises that process together, intrusion, mutual coordination between farmers and businesses in the form of voluntary rural locality economic contracts to promote the intrinsic capacity of actors linkages ensure reproducible process to expand the breadth and depth, stability improving the lives of farmers and performance of the state-owned enterprises. According to Ho Que Hau (2012) [2] suggest that the economic integration between enterprises and farmers is part of economic integration in the national economic in which parties are enterprises and farmers, implementing a vertical integration between agriculture and industry, to stabilize and improve economic efficiency Quyen Manh Cuong (2006). [3]

In fact, in Thai Nguyen province, the link between growers and processors, consumption of tea products is not strict, mainly the tea growers themselves to process and sell. The business associated with tea growers is not popular; The number of cooperatives producing, processing and consuming tea is not much. In order to overcome this limitation, enterprises, cooperatives and tea producers in the province need to work closely together to develop the tea chain. Forms of linkage in tea production, processing and consumption should have a clear mechanism to define the roles, responsibilities and interests of each party and effectively exploit the synergistic effects of the linkage. To help farmers grow their income sustainably. The province needs to have specific support policies such as: advance capital for production, support interest rate loans ... to attract enterprises to invest in tea production and trading, create links to promote industry Tea grows.

Based on the research framework and the primary data collected from the farmers engaging in tea production linkage at Thai Nguyen city, Viet Nam. This research identifies which factors affects the successful cooperation in agriculture markets. Results of the study will help to indentify the barriers to improving the effectiveness of the economic linkages betweet farmer and actors in value

chain with the appropriate policies for speeding up, improve the economic – social efficiency and sustainable agricultural development.

2. Literature Review

Becoming a member of associations can be considered as one of the important factors to help farmers increase their access to supports of information, capital, and technology and bring benefits to farmers and partly promote production and enhance productivity [4,5] (Hung 2019; Thai 2014).

In general, benefits of the association's membership to farmers are often researched in terms of creating opportunities for their members to gain access to agricultural credit schemes and support services, market information, and management knowledge [21]. Baah [6] proved that associations from the cocoa industry in Ghana could help farmers to strengthen possibilities to access credit loan and market information, as well as gain awareness of policies and services. These helpful supports enable farmers to free from the cycle of low productivity and income. Besides, associations encourage farmers to join programs of agricultural and rural development; consequently, these can bring significant benefits for farmers in Loko region, northern Sierra [22].

In Vietnam, to evaluate the role of association to the household's income, some studies have used the linear regressive model; however, they only examine one aspect of impacts from membership [1,7]. To the best of our knowledge, there are few studies used three OLS and probit, tobit models to estimate the impact of memberships to the income of tea farmers. Therefore, in this study, we apply different Structural equation modeling (SEM) models to examine determinants of successful cooperation in tea production. Specifically, SEM is used to identify determinant factors for farmer's decision of joining cooperative or enterprise.

3. Research Methodology

3.1. Research Design and Framework

The mixed-method research is the most appropriate approach to collect and analyze data of the research. By combining quantitative and qualitative method, researcher qualified data from quantitative raw materials from respondents. Qualitative method was utilized to explain levels and relationships between quantitative variables.

Research hypotheses

This research identifies which factors affecting successful cooperation in agricultural markets. The research had 8 hypotheses was stated:

H1: Economic factor positive affect the Satisfaction of farmer in linkage

H2: Psychological factor positive affect the Satisfaction of farmer in linkage

H3: Social factor positive affect the Satisfaction of farmer in linkage

H4: Organizational factor positive affect the Satisfaction of farmer in linkage

H5: Formal structures factor positive affect the Satisfaction of farmer in linkage

H6: Member characteristic factor positive affect the Satisfaction of farmer in linkage

H7: Satisfaction of farmer in linkage positive affect the Farmer loyalty

H8: The moderator variable have effect the relationship between Satisfaction of farmer in linkage positive and Farmer loyalty.

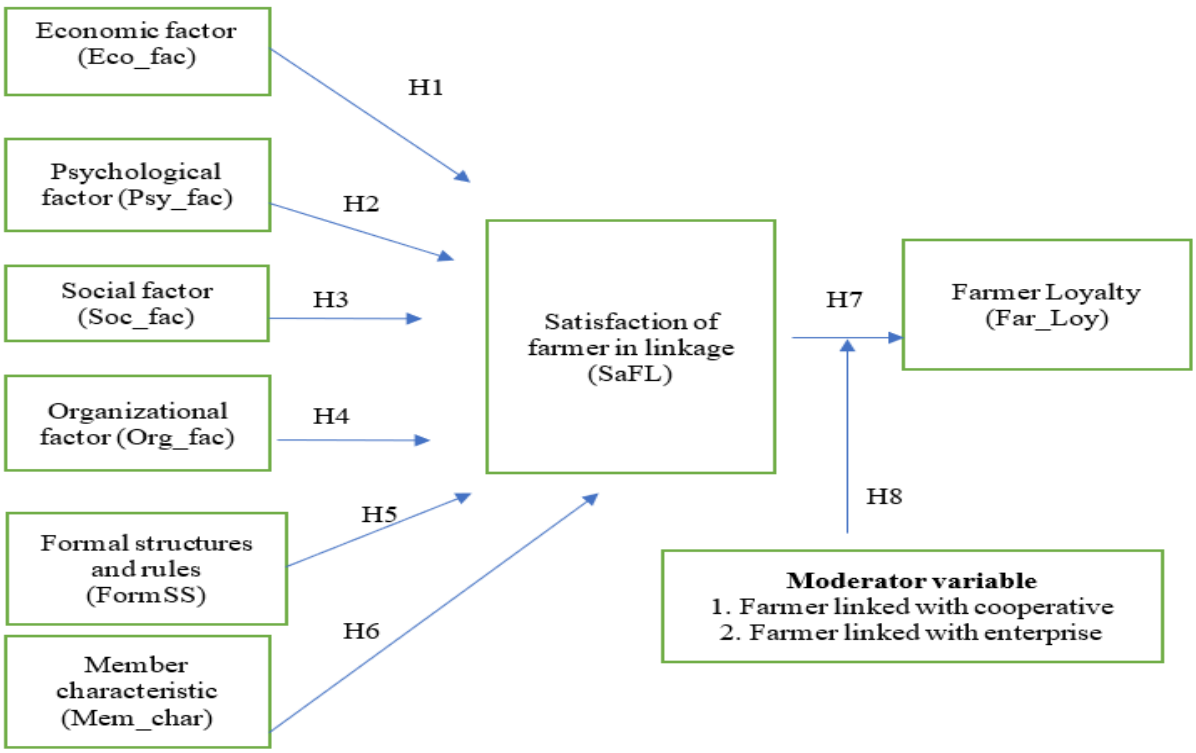


Figure 1. Research Framework

3.2. Population, Sample and Sampling Technique

The sample for this study was drawn from all actors involved along tea value chain such as producers, rural collectors, wholesalers, retailers and consumers. Three stages random sampling procedure was used for the selection of sample household heads. In the first stage, Thai Nguyen city, Dai Tu and Dong Hy district was selected purposively based on the potential it has for tea production and LIVES project interest.

The sample size was taken by determining the population proportion in studies. Specifically, McClave et al. [8] stated that the use of the population proportion was presented to determine the amount of a sample size to preset the whole group of population which can be used for unknown population. In this research, it is impossible to get the number of proportion exactly. For this reason, the formula developed by Smith [9] is referred to calculate the sample size.

$$N = \frac{pqz^2}{E^2} = \frac{(0.5)(1-0.5)(1.96)^2}{0.05^2} = 384.16.$$

3.3. Statistical Treatment

The study was be applied the following statistical treatment: Exploratory Factor Analysis (EFA); Confirmatory Factor Analysis (CFA); Structural equation model (SEM).

Exploratory Factor Analysis (EFA) was employed to remove unqualified statements in the questionnaire and to group correlated statements (components) into factors for further analysis. It aimed to find out statistically significant factors from existing variables by using rotation and extraction techniques.

Confirmatory Factor Analysis (CFA): is one of the statistical techniques of linear-structure model (SEM). The CFA allows us to test how well measured measure variables represent constructs. CFA is the next step in EFA because CFA is only used appropriately when the researcher has some background in underlying underlying structure in which the relationship or hypothesis (acquired from theory or experiment) Between observation and elementary variables, the researcher implicitly acknowledges it before conducting a statistical test. The CFA method is used to reassert the univariate, multivariate, convergent and discriminant values of the scale that gauge the relationship between perception of farmer about effective of linkage and their loyalty.

Structural equation model (SEM): Structural equation modeling is the comprehensive statistical approach for representing, estimating, and testing a theoretical network of linear relationships between variables [10,11,12,13] (Hoyle, 1995; Rigdon, 1998; MacCallum & Austin, 2000; Suhr, 2006). In other words, SEM is used to test hypotheses about relations among observed and latent variables. Besides, applying SEM is to understand the patterns of correlation/covariance among a set of variables and to explain as much of their variance as possible with the model specified [14] (Kline, 1998).

4. Results and Discussions

4.1. Exploratory Factor Analysis (EFA)

In this research, the factor analysis process is repeated in 2 rounds due to the cross-factor loading of the variables. In all 2 rounds of the factor analysis process, KMO is about 0.928 (>0.5) with statistical significance (sig = .000) and each Total Varian Explained is over 70% (>50%) which prove the appropriateness of factor analysis.

In the first round, 8 initial components are converted into 8 components. Item SaFL4 is deleted because of cross-loading factor and 37 remaining items are kept for the next step. Finally, these 37 variables are tested again in the final round. The result of the final round is described in the following table.

4.2. Confirmatory Factory Analysis (CFA)

Confirmatory Factory Analysis is a better method to assess the validity and reliability of measures. The goodness-of-fit of CFA is used to further assess the unidimensional and convergent validity among the constructs.

Therefore, these evidences which are GFI = 0.898, TLI = 0.979, CFI = 0.981 (>0.9), Chi-square/df = 1.374 (<2), RMSEA = 0.031 (Good) prove the validity and reliability of measurements (CFA result in appendix E). Additionally, the result of Figure 2 demonstrates the unidimensional among the constructs. According to Steenkamp & Van Triijp [15] (1991), as the goodness-of-fit are good, then the constructs are unidimensional except for the correlation between variable errors.

Measure	Threshold
Chi-square/df (cmin/df)	< 3 good; < 5 sometimes permissible
p-value for the model	> .05
CFI	> .95 great; > .90 traditional; > .80 sometimes permissible
GFI	> .95
AGFI	> .80
SRMR	< .09
RMSEA	< .05 good; .05 - .10 moderate; > .10 bad
PCLOSE	> .05

Table 1. EFA result

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.928
Bartlett's Test of Sphericity	Approx. Chi-Square	11964.948
	df	666
	Sig.	.000

Pattern Matrix

	Factor							
	1	2	3	4	5	6	7	8
FormSS2	.916							
FormSS5	.906							
FormSS3	.837							
FormSS1	.831							
FormSS4	.829							
Eco_fac5		.939						
Eco_fac4		.890						
Eco_fac1		.869						
Eco_fac3		.852						
Eco_fac2		.845						
Org_fac6			.918					
Org_fac3			.891					
Org_fac5			.874					
Org_fac4			.873					
Org_fac1			.831					
Soc_fac1				.907				
Soc_fac5				.890				
Soc_fac3				.888				
Soc_fac2				.820				
Soc_fac4				.752				
Mem_char1					.841			
Mem_char2					.829			
Mem_char3					.744			
Mem_char5					.742			
Mem_char4					.706			
Far_Loy1						.897		
Far_Loy2						.852		
Far_Loy3						.851		
Far_Loy4						.819		
SaFL5							.933	
SaFL2							.797	
SaFL1							.738	
SaFL3							.728	
Psy_fac1								.865
Psy_fac3								.846
Psy_fac5								.823
Psy_fac4								.732

Extraction Method: Principal Axis Factoring.
Rotation Method: Promax with Kaiser Normalization.
a. Rotation converged in 7 iterations.

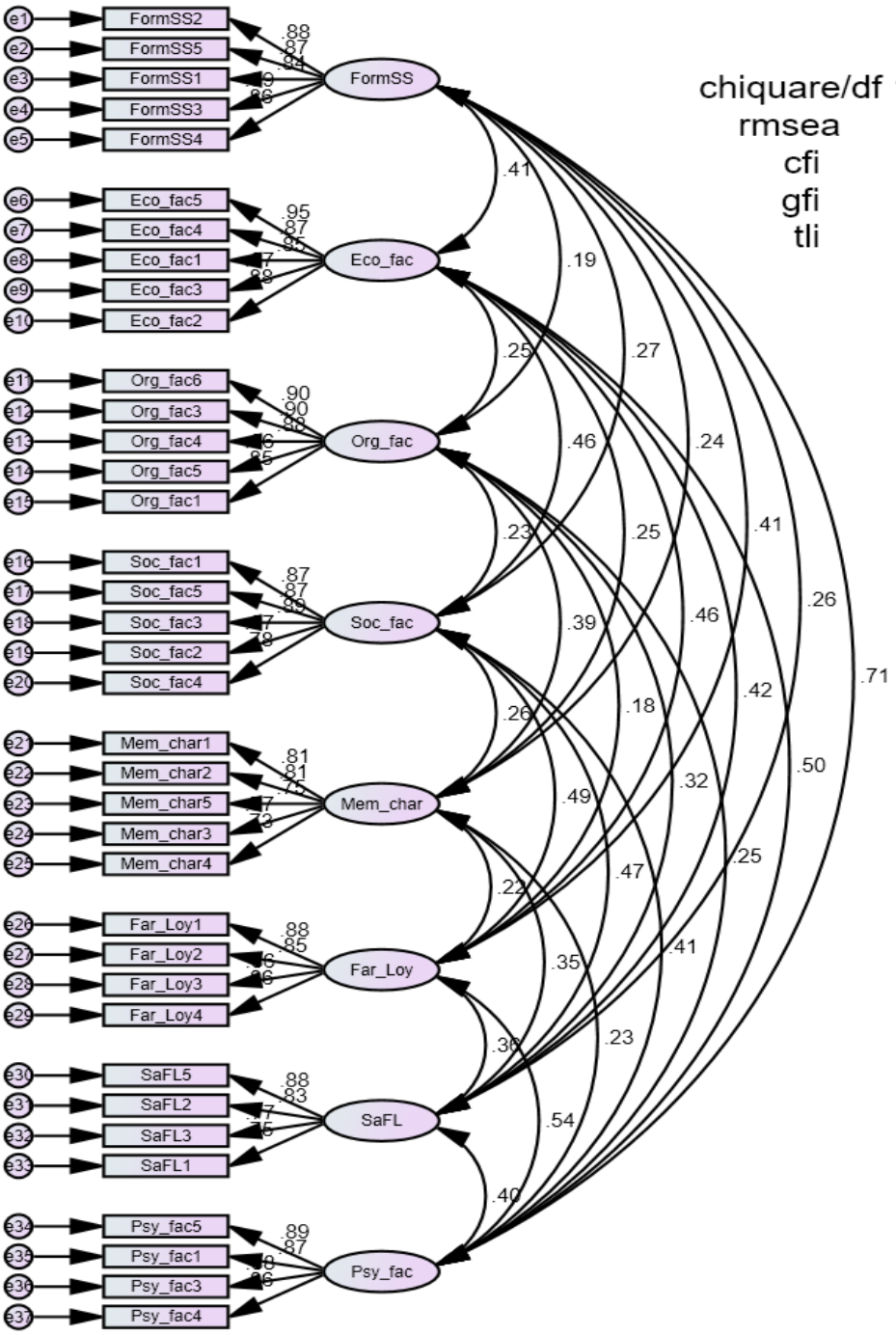


Figure 2. CFA Result

4.3. Structural Equation Modeling (SEM)

Structural Equation Modeling is applied to test hypotheses above.

In SEM, Chi-square, Chi-square/df, Comparative Fit Index (CFI), Tucker & Lewis Index (TLI), and Root Mean Square Error Approximation (RMSEA) are used to test the model. Based on these indexes, a model well fits the sample data if GFI, TLI and CFI are equal or above 0.9; Chi-square/df is equal or lower 2 (Chi-square/df ≤3 can be accepted in some cases); and RMSEA is equal or lower 0.08 (RMSEA ≤ 0.05 is excellent) [16] (Steiger, 1990).

The Chi-Square (CMIN or χ2) value is the traditional measure for evaluating overall model fit and assesses the magnitude of discrepancy between the sample and fitted covariance matrices (Hu, L., & Bentler, P. M. 1999). If the discrepancy mentioned above is equal to zero, it means the research model fits well with the data. The null hypothesis postulates that the discrepancy is equal to zero and the higher p-value is obtained, the better research model fit with data. While the Chi- Squared test retains its popularity as a fit statistic, there exist a number of severe limitations in its use [17] (Hooper at al, 2008). Researchers have addressed the χ 2 limitations by developing goodness-of-fit indices that take a more pragmatic approach to the evaluation process (Barbara, 2010). One example of a statistic is Wheaton et al's (1977) relative chi-square (χ2/df) with recommended value as high as 5.0 [17] (Hooper at al, 2008).

Table 2. Fit Indices - Measurement Model

Fit Index	Value	Cut-off Value
CMIN (χ^2)	940.540	-
CMIN/DF	1.549	<5
GFI (Goodness of Fit Index)	0.887	<0.9
TLI (Tucker-Lewis Index)	0.969	>0.95
CFI (comparative fit index)	0.972	>0.95
RMSEA (root mean square error of approximation)	0.038	< 0.05

Source: data analysis with N = 381.

According to Table 2, the CMIN/DF statistic of the research model received the value of 1.549, greater than 1 and smaller than 5 then should be considered as good fit.

GFI (Goodness of Fit Index) is absolute fit index that estimate the proportion of variability in the sample covariance matrix explained by the model [14] (Kline, 2005). The goodness-of-fit index (GFI) was the very first standardized fit index (Jöreskog & Sörbom, 1993 [18] cited in Kline, 2005 [13]). GFI = 1.0 indicates perfect model fit, GFI > .90 may indicate good fit, and values close to zero indicate very poor fit [14] (Kline 2005). In this model, GFI = 0.887, indicated that the measurement model fit well with data.

Tucker-Lewis Index (TLI) yields values ranging from zero to 1.00, with value close to 0.95 (for large samples) being indicative of good fit (Hu & Bentler, 1999 [19] cited in Barbara, 2010). As this research model, TLI received the value of 0.969, thus can reveal the fitness of the measurement model to data.

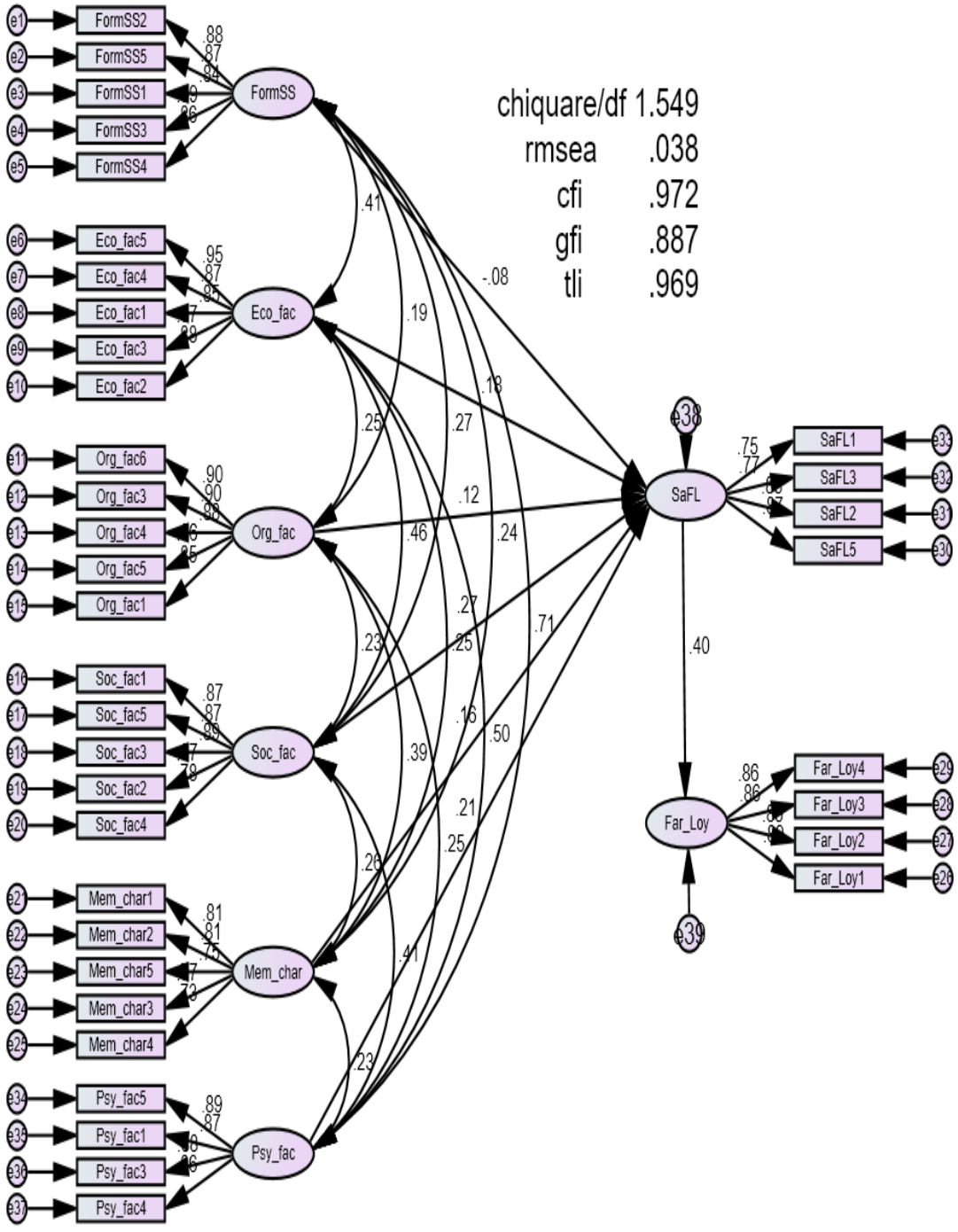


Figure 3. SEM Model

Kline [14] (2005) argued that comparative fit index (CFI) is one of a class of fit statistics known as incremental or comparative fit indexes, which are among the most widely used in SEM. Common rules of thumb for the CFI is that values greater than roughly 0.90 may indicate reasonably good fit of the researcher's model (Hu & Bentler, 1999 [19] cited in Kline, 2005 [14]). As this research model, CFI received the value of 0.974 greater than recommended, thus can indicate reasonably well fit.

Browne and Cudeck (1993 [20], cited in James 2011) argued that empirically, a value of the root mean square error of approximation (RMSEA) of about 0.05 or less would indicate a close fit; a value of about 0.08 or less indicate a reasonable error of approximation and greater than 0.1 is should not be employed. The value generated from research model is 0.038, support the model well fit.

Figure 3 demonstrate that research model fits the sample data 1, and the relationships between 5 factors which impact Satisfaction of farmer in linkage are not only positive but also statistically significant at the 0.001 level.

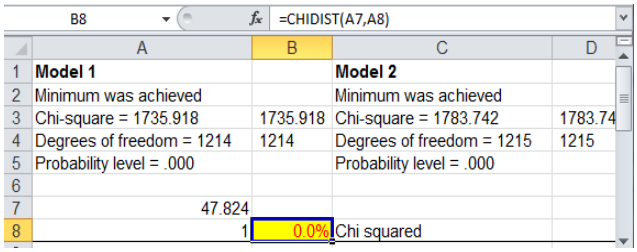
Table 3. Regression Weights of Mode

			Estimate	S.E.	C.R.	P	Label
SaFL	<---	FormSS	-.088	.077	-1.143	.253	
SaFL	<---	Eco_fac	.182	.060	3.032	.002	
SaFL	<---	Org_fac	.114	.050	2.263	.024	
SaFL	<---	Soc_fac	.262	.054	4.856	***	
SaFL	<---	Mem_char	.153	.052	2.974	.003	
SaFL	<---	Psy_fac	.216	.080	2.701	.007	
Far_Loy	<---	SaFL	.314	.043	7.240	***	

According to Table 3, the relationship between Social factor and Satisfaction of farmer in linkage has the highest Regression Weight. However, the factor Formals structure and Rules no statistically significant because P-value>0.05 (0.253).

In sum, it is concluded that the hypotheses including H1, H2, H3, H4, H6, H7 was accepted because P – value < 0.05 and H5 Rejected because P – value >0.05 (0.253).

4.4. Test Moderator Variable can Affect Relationship between Farmer and Cooperative or Enterprise



The result of chi square test shown p value < 0.05 that mean model 2 was be accepted.

Table 4. Regression Weights of Mode for moderator variable

			Estimate	S.E.	C.R.	P	Label
SaFL	<---	FormSS	-.152	.106	-1.435	.151	
SaFL	<---	Eco_fac	.250	.066	3.769	***	
SaFL	<---	Org_fac	.086	.061	1.424	.154	
SaFL	<---	Soc_fac	.225	.061	3.684	***	
SaFL	<---	Mem_char	.159	.062	2.581	.010	
SaFL	<---	Psy_fac	.246	.106	2.317	.020	
Far_Loy	<---	SaFL	.534	.049	11.001	***	beta

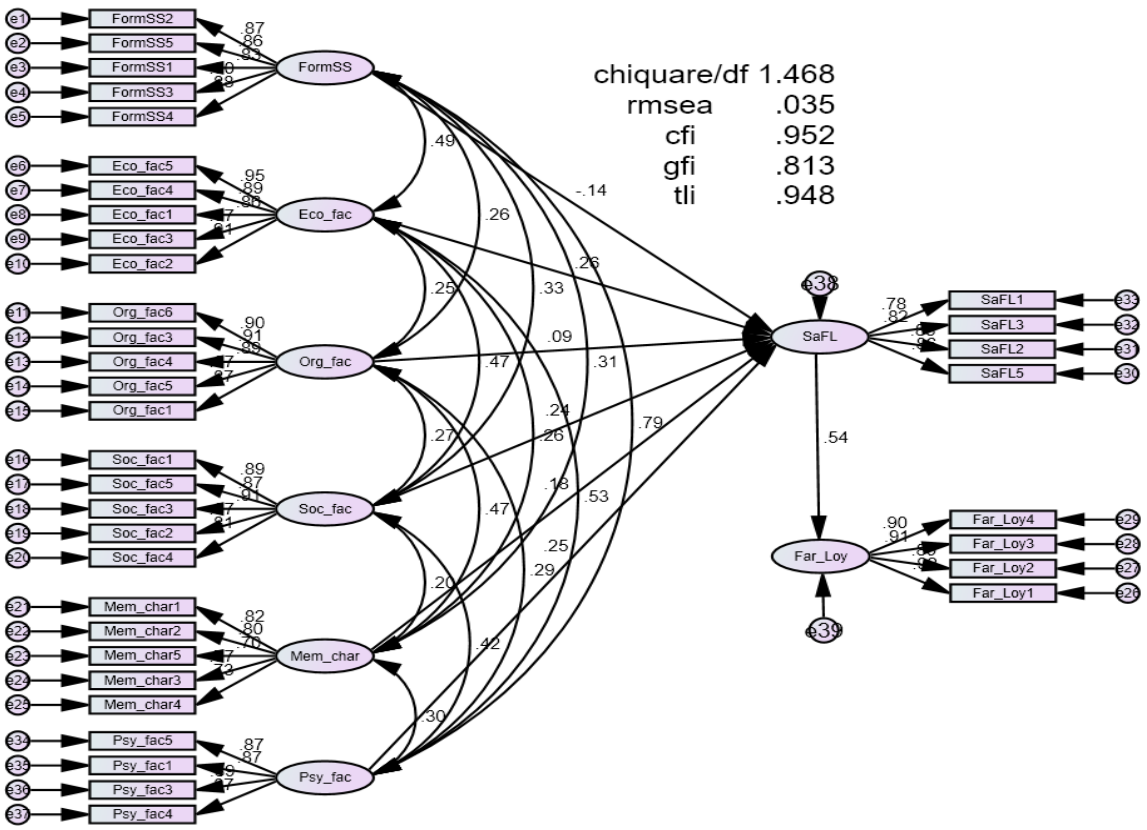


Figure 4. SEM model for moderator variable (option 1 – link with cooperative)

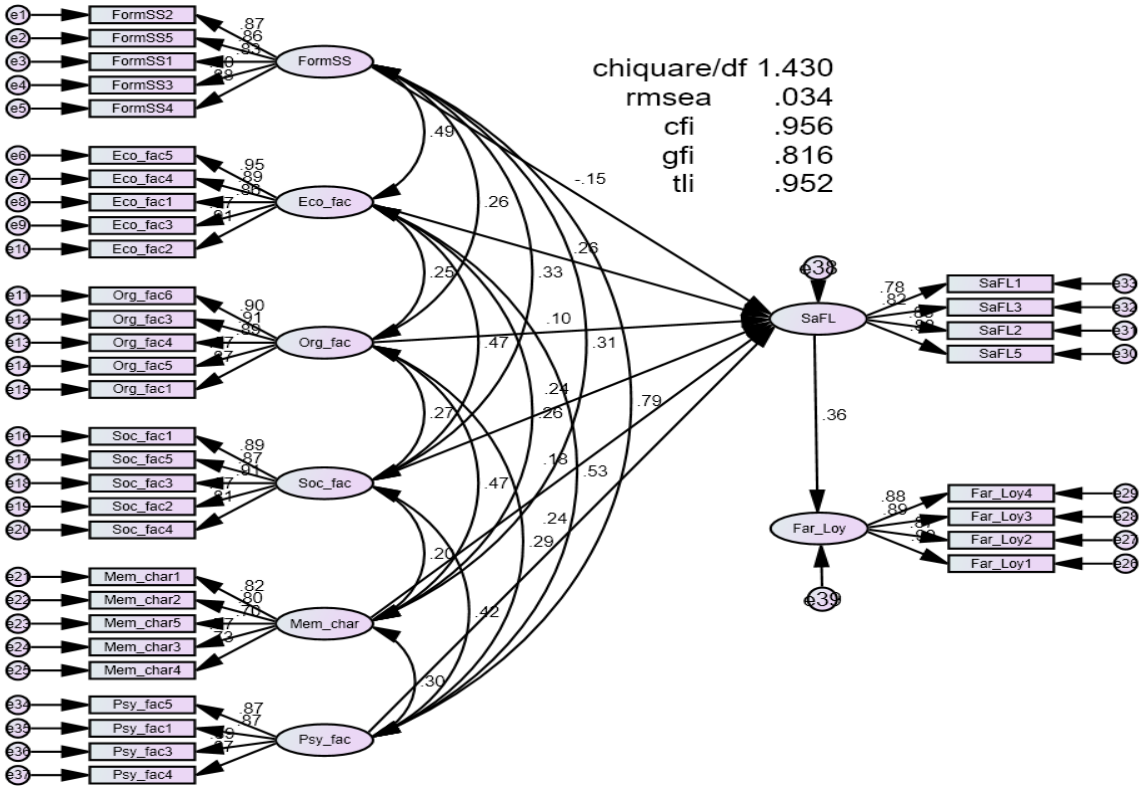


Figure 5. SEM model for moderator variable (option 2 – link with Enterprise)

According to Figure 4, Figure 5 and Table 4, Farmer perceived the linkage between them and cooperative better than enterprise (0.54 > 0.36). The relationship between Economic factor and Satisfaction of farmer in linkage has the highest Regression Weight (0.250) this mean when farmer chosen linkage between cooperative or enterprise they focus more in economic factor.

In sum, it is concluded that the hypotheses including H1, H2,H3, H6, H7, H8 was accepted because P – value < 0.05 however H4 and H5 Rejected because P – value >0.05.

5. Conclusions and Recommendations

5.1. Conclusion

The main question posed in the article investigated determinants of success of cooperative arrangements functioning in tea production. The question was investigated using empirical data collected on agricultural producer groups functioning in Thai Nguyen city, Viet Nam. The literature review resulted in 8 hypotheses. The hypotheses were operationalized into six independent variables. The study was be applied the following statistical treatment: Exploratory Factor Analysis (EFA); Confirmatory Factor Analysis (CFA); Structural equation model (SEM).

In summary, as can be seen from the model's results, cooperative play an essential role in helping tea farmers to gain access to agricultural support and credit services, which in turn enable to increase income for them. Therefore, cooperative can be considered as an important actor in the Tea value chain. From the research findings, it can be concluded that the impact factors of the decision to join cooperative of farmer including: Economic factor, Psychological, Social factor, Organizational factor, Member characteristic factor.

First, to evaluate determinant factors on satisfaction of farmer in linkage, the finding shows that economic factors has a statistic significance and positive impact on the satisfaction (0.250). Moreover, it also concludes that farmer is considerably influenced by tea price and share of tea sold and tea area when they choose link with cooperative. The estimation on impact factors of economic factor indicates that cooperative members can gain a higher net profit than the non-member. The findings correspond to the results obtained by Ho Que Hau [2].

5.2. Recommendation

As a result, in the next few years, there are more solutions need to be created to promote the efficiency of tea farmers' cooperative:

Cooperative should focus on providing up-skill training, enriched knowledge, the aim and objective of associations matching with characteristics, features of socioeconomic and job-related organizations rather than governmental agencies, especially for management levels. In terms of training contents, they might need to provide some courses or workshops related to methods of trade promotion, updated information on regulations and markets, market prices, and labor information to their members.

In the economic linkages between cooperative with farmers, the cooperative plays the roles of nuclear determine the success of this form of production under contract. Enterprise is the connection of relationships with other organizations such as the state, scientists, banks, offices of public information to provide the basis for establishing sustainable relationships associated with

agriculture people. In the relationship between businesses and farmers, policy concerning involved.

Establish commitments and tightly bound, sustainable towards long-term that binds farmers with agricultural produce has contracts with businesses. Promote the linkage model property relationships of the two closely linkages such as: Combining investment of enterprise with investments by farmers; encouraged to form agricultural processing; have incentives to encourage farmers to buy shares of companies and enterprises to contribute capital to the agricultural cooperatives.

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