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The role of relationship quality and loyalty between rice farmers and food companies in supply chain

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C H R O N I C L E

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A B S T R A C T

Relationship quality plays a key role in maintaining the connection among parties in a supply chain. Relationship quality promotes loyalty of the supply chain's factors. This study applies structural equation modeling (SEM) to point out factors affecting the relationship quality and loyalty between farmers and food companies in the rice supply chain. The research data were collected by stratified sampling with a sample size of 232 farmers associating with food companies in the rice supply chain in the Mekong Delta. The four impacting factors that the study has found out include trust, perceived benefit, support policy, and payment terms. Most importantly, the study has demonstrated that relationship quality has a positive correlation with loyalty among parties in the regional rice supply chain.

1. Introduction

A supply chain is a tool helping its elements achieve economic, environmental, and society's sustainable development requirements (Normansyah & Matteo, 2012). The cooperation in the supply chain improves product value and exploits competitive advantages gradually (Loc, 2008). Participating in the agricultural supply chain supports parties to cooperate smoothly in both the input and output process. Moreover, this limits the disadvantages of nature, thereby increasing the competitiveness of products on the market (Thanh & Nghi, 2019). Many types of research have proved that relationship quality plays a significant role in maintaining the linkage between producers and buyers. An improved relationship contributes to increasing the operational efficiency of stakeholders (Hendrick, 1995; Schulze et al., 2006). Rice is one of the strengths of Vietnam's agricultural industry, especially the Mekong Delta region. This region is known as the largest rice bowl in Vietnam. The rice industry in the region is important for the development of Vietnam's agriculture, especially ensuring national food security. Recently, linkage risks in rice supply chains have become more and more popular. In particular, the linkage contract cancellation between farmers and food companies occurs frequently which harms the sustainable development of the rice industry. Besides, to limit the impacts of climate change, strict requirements of markets, etc., and ensure food security, the industry should develop supply chains towards sustainability. Therefore, it is necessary to identify factors affecting the relationship quality and loyalty of elements in the rice supply chain, especially farmers and food companies in the rice supply chain in Mekong Delta, Vietnam.

2. Theoretical framework and research hypotheses

2.1 Theoretical framework

A supply chain is a network of organizations that includes upstream and downstream linkages. Through processes and activities, a supply chain creates value for provided products and services (Lambert and Stock, 1993; Martin, 2005).

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According to Bechtel and Jayaram (1997), supply chain linkages include (1) functional linkages (among businesses and departments); (2) logistics activities; (3) inside and outside information flows; and (4) operational processes among businesses in the supply chain. Relationship quality is a buyer's perception of the relationship between that buyer and the seller (Smith, 1998; Javerlin, 2001; Walter et al., 2003). The quality of a relationship is assessed by stakeholders' perception, expressed in three aspects closely related to each other, including satisfaction, trust, and commitment (Smith, 1998; Walter et al., 2003, Athanasopoulou, 2009). Relationship quality is formed through several stages and in each stage, customers focus on different values of it (Ravald & Grönroos, 1996). Loyalty is influenced by the quality of the relationship between buyers and sellers (Morgan & Hunt, 1994). Loyalty is the result of a high-quality connection between buyers and sellers, the higher the quality of the connection, the higher level of loyalty in the relationship (Lemke, 2003; Lin & Ding, 2005).

2.2 Research hypotheses

The relation between trust and relationship quality

Trust is the foundation for a sustainable cooperative relationship (Monczka et al., 1998; Kwon and Suh, 2004; Morton et al., 2006). A high level of trust motivates supply chain members to collaborate in decision-making and problem-solving (Fawcett et al., 2012). The level of trust positively influences cooperation in a supply chain (Yen, 2020). Hence, hypothesis H1 is proposed as follows *"The level of trust is positively correlated with the relationship quality between farmers and food companies in the rice supply chain."*

The relation between perceived benefit and relationship quality

Considering the production cost, if the producer is satisfied with the buyer's price, they are more likely to continue to cooperate in the future (Ulaga & Eggert, 2006; Barry et al., 2008). Price and received benefits affect the quality of the cooperative relationship between producers and collectors (Phuong et al., 2015; Loc & Nghi, 2018). Therefore, the study proposes hypothesis H2 as *"Perceived benefit positively affects the relationship quality between farmers and food companies in the rice supply chain."*

The relation between support and relationship quality

Support policies reflect what the buyer helps and shares with the producer to create higher quality products (Ulaga & Eggert, 2006). The buyer's willingness to cooperate maintains their relationship with the producer in a long-term direction (Bhagat and Dhar, 2014). The more the buyer supports the farmer, the stronger their linkage becomes (Loc & Nghi, 2018). The higher the level of support, the lower the possibility of linkage risks (Thanh & Nghi, 2019). Thus, hypothesis H3 is as *"Support policy is positively correlated with the relationship quality between farmers and food companies in the rice supply chain."*

The relation between payment condition and relationship quality

Payment terms are an essential factor that governs the relationship between sellers and buyers (Zhang & Hu, 2011). According to Thanh and Nghi (2019), the binding terms and conditions in payment strongly influence linkage risks between producers and buyers. On other hand, clear payment conditions and full compliance improve the quality of the relationship between manufacturers and collectors (Nhan & Hoang, 2013; Loc & Nghi, 2018). As a result, hypothesis H4 is as follows *"Payment terms positively impacts the relationship quality between farmers and food companies in the rice supply chain."*

The relation between relationship quality and loyalty

Relationship quality has a key role in maintaining the linkage between producers and buyers (Morgan and Hunt, 1994; Hendrick, 1995; Schulze et al., 2006). The higher the quality of the association, the higher the loyalty in a relationship (Lemke, 2003; Lin and Ding, 2005). Relationship quality is beneficially correlated with loyalty between producers and collectors (Loc and Nghi, 2018). Therefore, hypothesis H5 is suggested as *"The relationship quality positively impacts loyalty between farmers and food companies in the rice supply chain."* Based on the literature review and above research hypotheses, the study applied the group discussion (qualitative research) with 9 households expressing the linkage with food companies in the rice supply chain in the Mekong Delta region. The group discussion result helps identify the appropriate scales for the research model. The proposed research model is as below.

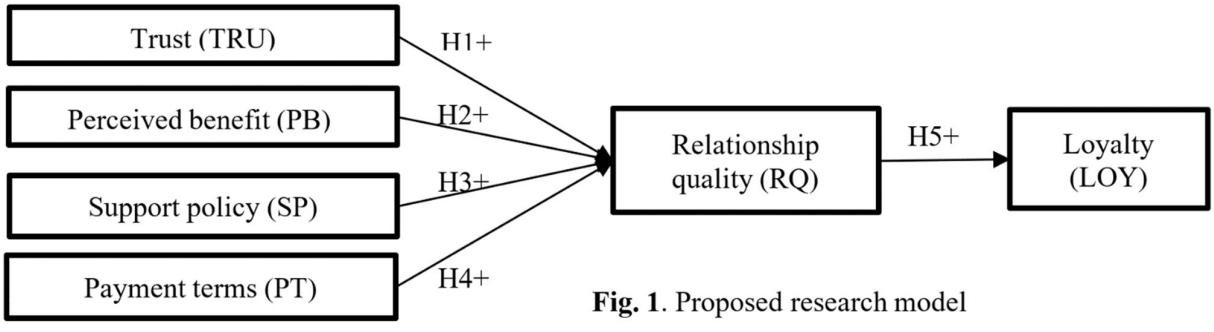

Fig. 1. Proposed research model

Table 1
Interpretation of observed variables in the research model

Factor	Observed variables	Sign	Scale	Reference resources
Trust (TRU)	The food company (X) shows respect to farmers.	TRU1	Likert 1-5	Monczka et al., (1998), Kwon and Suh (2004), Morton et al., (2006), Yen (2020)
	The food company (X) shows honesty to farmers.	TRU2	Likert 1-5	
	The food company (X) has positive attitudes in cooperation agreements.	TRU3	Likert 1-5	
	The food company (X) creates trust for farmers.	TRU4	Likert 1-5	
Perceived benefit (PB)	The rice purchase price of the food company (X) ensures benefits for farmers.	PB1	Likert 1-5	Ulaga and Eggert (2006), Barry et al. (2008), Phuong et al. (2015), Loc and Nghi (2018)
	The rice purchase price of the food company (X) is in line with market fluctuations.	PB2	Likert 1-5	
	Compared with other food companies, the purchase price of the food company (X) is more beneficial.	PB3	Likert 1-5	
	The rice purchase price of the food company (X) meets the expectations of the farmers.	PB4	Likert 1-5	
Support policy (SP)	The food company (X) supports farmers with raw material sources that meet quantity and quality requirements.	SP1	Likert 1-5	Ulaga and Eggert (2006), Bhagat and Dhar (2014), Loc and Nghi (2018), Thanh and Nghi (2019)
	The level of support of the food company (X) is higher than other food companies.	SP2	Likert 1-5	
	The food company (X) is flexible in supporting farmers.	SP3	Likert 1-5	
Payment terms (PT)	The payment rules and principles are detailed and clear.	PT1	Likert 1-5	Zhang and Hu (2011), Thanh and Nghi (2019), Nhan and Hoang (2013), Loc and Nghi (2018)
	The food company (X) pays money on time as in the contract.	PT2	Likert 1-5	
	The food company (X) is flexible in payment terms according to farmers' requests.	PT3	Likert 1-5	
Relationship quality (RQ)	The relationship with the food company (X) meets my goals and expectations.	RQ1	Likert 1-5	Smith (1998), Walter et al. (2003), Athanasopoulou (2009)
	I believe that the relationship with the food company (X) will be stable and long-lasting.	RQ2	Likert 1-5	
	The commitment between me and the food company (X) is guaranteed.	RQ3	Likert 1-5	
	I am satisfied with the relationship with the food company (X).	RQ4	Likert 1-5	
Loyalty (LOY)	I will continue to cooperate with the food company (X).	LOY1	Likert 1-5	Lemke (2003), Lin and Ding (2005), Loc and Nghi (2018),
	I will continue to sign a long-term contract with the food company (X).	LOY2	Likert 1-5	
	I will recommend the food company (X) to other partners.	LOY3	Likert 1-5	
	The food company (X) is my first choice.	LOY4	Likert 1-5	

3. Methdology

3.1 Analytical method

The study used qualitative together with quantitative research to test research hypotheses. In the qualitative research step, the participatory rural appraisal (PRA) technique is applied to identify appropriate scales for the research model. In quantitative research, analyses used to test the research hypothesis include testing the reliability of the scale by Cronbach's Alpha, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and structural equation modeling (SEM).

3.2 Data collection method

According to Raykov and Widaman (1995), the SEM method requires a large sample size because it is based on sample distribution theory. Hoelter (1983) argued that the limit sample size in SEM is 200. Testing the model by SEM, the sample size from 100 to 200 is satisfactory (Hoyle, 1995). In this study, stratified sampling is used to survey 232 households involved with food companies in the rice supply chain. The survey was conducted from April 2020 to June 2020. The study area is mainly concentrated in Can Tho City (80 farmers), An Giang Province (82 farmers), and Kien Giang Province (70 farmers).

4. Research results and discussion

4.1 Scale reliability test

Cronbach's alpha analysis

The study used Cronbach's alpha to test the reliability of scales and the internal correlation among observed variables. The test result proves that all the scales are reliable with Cronbach's alpha values greater than 0.6 (Nunnally, 1978; Peterson, 1994). The corrected item-total correlation of variables is all greater than 0.3, so no variable is excluded from the research

model (Slater, 1995; Hair et al., 1998). Therefore, all observations are satisfactory and can be included in the exploratory factor analysis.

Table 2
Cronbach's alpha testing result

Scale	Number of observed variables	Cronbach's alpha	Min corrected item-total correlation
Trust (TRU)	4	0.768	0.521
Perceived benefit (PB)	4	0.787	0.568
Support policy (SP)	3	0.736	0.510
Payment terms (PT)	3	0.812	0.645
Relationship quality (RQ)	4	0.821	0.633
Loyalty (LOY)	4	0.871	0.711

Exploratory factor analysis (EFA)

EFA is used to test the convergent and discriminant validity of the scales (Hair et al., 1998). After testing the scale reliability, the study conducted the EFA with the following results (1) Reliability of observed variables (Factor loading > 0.5); (2) Testing the suitability of the model (0.5 < KMO = 0.855 < 1.0); (3) Bartlett's test on the correlation of observed variables (Sig. = 0.00 < 0.05). The cumulative variance test = 67.45% > 50%. These numbers show that the observed variables included in the model have a high explanatory level (Anderson & Gerbing, 1988; Hair et al., 1998). Thereby, 6 factors are formed from 22 observed variables and there is no disturbance among variables, so the names of the factors remain the same.

Table 3
Factors from the EFA result

Sign	Observed variables	Factor
F_1	4 variables: TRU1, TRU2, TRU3, TRU4	Trust
F_2	3 variables: PB1, PB2, PB3	Perceived benefit
F_3	3 variables: SP1, SP2, SP3	Support policy
F_4	4 variables: PT1, PT2, PT3, PT4	Payment terms
F_5	4 variables: RQ1, RQ2, RQ3, RQ4	Relationship quality
F_6	4 variables: LOY1, LOY2, LOY3, LOY4	Loyalty

Confirmatory factor analysis (CFA)

The CFA shows guaranteed values as follows: Chi-square/df = 1.587 < 2 with P = 0.00 ≤ 0.05. The TLI and CFI coefficients have the value of 0.932 and 0.943, all are higher than 0.9; RMSEA = 0.05 < 0.08. This proves the model is consistent with the market data. Besides, standardized coefficients are all greater than 0.5 and the unstandardized coefficients are statistically significant, so the model achieves convergent validity. Also, the correlation coefficients among factors are all less than 1 with standard deviations less than 0.05. Therefore, the model acquires discriminant validity. The results of composite reliability (Pc) and average variance extracted (Pvc) in Table 4 show that Pc is satisfactory. Meanwhile, the Pvc value of some scales are low (< 0.5). The Pvc can accept the value of 0.4 or higher provided that the Pc is greater than 0.6 (Fornell & Larcker, 1981). From the above argument, all the factors meet the requirements of value and reliability, so the model is suitable for the SEM analysis.

Table 4
Scale testing result

Factor	Number of observed variables	Composite reliability (P_c)	Average Variance Extracted (P_{vc})	Value
Trust (TRU)	4	0.77	0.46	Accepted
Perceived benefit (PB)	4	0.78	0.47	
Support policy (SP)	3	0.73	0.48	
Payment terms (PT)	3	0.81	0.59	
Relationship quality (RQ)	4	0.82	0.53	
Loyalty (LOY	4	0.87	0.63	

4.2 Research hypothesis test

After the CFA step, structural equation modeling (SEM) is used to test the research hypotheses. The results of the analysis are presented in Table 5. Based on the test result above, all hypotheses are accepted with a significance level of 1%. This means the relationship quality between farmers and food companies is influenced by the following factors: trust, perceived benefits, support policies, and payment conditions. In which, trust has the greatest influence on the quality of this relationship. The truth is, farmers are concerned about the trust and the purchasing price of the food company to ensure that their received benefits are commensurate with their effort. Thus, if the food company creates a high trust level, brings benefits and support, provides reasonable payment conditions for farmers, the relationship quality between rice farmers and that company is improved. In addition to this, the study has demonstrated that the relationship quality is positively correlated with loyalty

between farmers and food companies in the rice supply chain in the Mekong Delta. This means if the quality of the relationship is enhanced, the loyalty in the cooperation between the two parties will be better. The results of the study are consistent with the findings of Lemke (2003), Lin and Ding (2005), Loc and Nghi (2018).

Table 5
Test the relationship among factors

Relationship	Unstandardized			Standardized estimated value	Significance level	Hypothesis
	Estimated value	Standard error S.E	Critical ratios C.R			
RQ ←TRU	0.263	0.091	2.900	0.298	***	H1: accepted
RQ ← PB	0.275	0.079	3.500	0.264	***	H2: accepted
RQ ← SP	0.242	0.086	2.819	0.262	***	H3: accepted
RQ ← PT	0.228	0.081	2.804	0.237	***	H4: accepted
LOY ← RQ	0.443	0.095	4.664	0.361	***	H5: accepted

5. Conclusion and Recommendation

The study has pointed out four factors that positively affect the quality of the relationship between rice farmers and food companies in the rice supply chain, which are trust, perceived benefits, support policies, and payment terms. In which, the level of trust has the strongest impact on the relationship quality. Also, the study has shown that the quality of the relationship positively affects the loyalty between farmers and food companies. From the above findings, the study suggests some recommendations to improve the relationship quality and loyalty between rice farmers and food companies in the rice supply chain. Firstly, food companies and farmers should build mutual trust, show respect, and show a positive attitude in cooperation agreements. Secondly, food companies should pay attention to the perceived benefits of farmers, especially the reasonable rice purchasing price. Thirdly, food companies need to share with farmers in difficult times, regularly exchange market information, and transfer modern technologies to help farmers achieve the most optimal production. Finally, payment terms in transaction contracts should be detailed and clear ensuring the correct implementation of commitments.

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