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Collaboration in the Tea Supply Chain in Phu Tho Province, Vietnam

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Abstract:
The study's objective is to study the factors affecting the supply chain cooperation of tea in Phu Tho province. The study used Partial Least Squares Structural Equation Modeling (PLS-SEM) to test the 258 data and hypotheses. Data are collected from tea producers, wholesalers, and retailers in Phu Tho province, Vietnam. Research has given five factors affecting cooperation:

- *Information sharing,*
- *Policies,*
- *Collaborative culture,*
- *Collaborative strategies, and*
- *Trust*

From there, the study proposes several solutions to strengthen the collaboration of all components in the tea supply chain in Phu Tho in particular and in Vietnam in general.

Keywords: *Collaboration, tea supply chain, supply chain management, Vietnam*

1. Introduction

Manufacturing businesses recognize that in today's globalized and highly competitive business environment, they must give the highest customer value at the lowest feasible cost to establish and maintain a competitive edge. Customers increasingly expect faster reaction times, shorter product cycles, and customized goods and services. Because product life cycles are shortening and global competitiveness is expanding, corporate organizations' specialized skills and knowledge are becoming increasingly vital in new product creation. Firms have been searching outside their organizational boundaries for chances to work with supply chain partners to ensure the supply chain's efficiency and responsiveness and use their suppliers' and customers' resources and knowledge (Cao & Zhang, 2011).

In dynamic market conditions, this partnership would result in faster product development procedures, lower development costs, more substantial technological breakthroughs, and improved product quality (Walter, 2003). Supply chain partners must be more active and responsive to offer customer value through extended business entities. Individual firms may need help to reach the business aim, but it is readily accomplished through collaborative supply chain connections. As a result, collective behavior and actions in supply chain management have grown in relevance (Koçoglu et al., 2011). The cooperative relationship between organizations has gotten much attention recently (Samaddar & Kadiyala, 2006). Collaboration in the supply chain leads to improved performance (Vereecke & Muylle, 2006). Firms collaborate with their supply chain partners to gain efficiency, flexibility, and long-term competitive advantage (Nyaga et al., 2010). According to Dyer and Singh (1998), cooperating enterprises can produce relational rents through relational assets, knowledge-sharing routines, complementary resource endowments, and good governance.

In the world, the supply chain is a concept that has been introduced previously, but for Vietnamese businesses, the supply chain is still relatively new and strange. Practice shows that many companies need to fully understand the importance of supply chains in today's competitive global environment. Therefore, to maintain their position, improve competitiveness, expand market share, reduce costs, and take the initiative in production and business, enterprises must understand better than anyone else about the role of the supply chain. Establishing the proper supply chain is a matter of vital importance for every business and industry. Still, it is necessary to identify the entities in the supply chain and make them cooperate. Sustainability in the journey of existence and development of enterprises and the industry. Regardless of the start, size, and industry, improving your competitiveness is more important than ever. There are many ways for businesses to enhance their competitiveness, one of which is that companies should cooperate with suppliers and distributors in their supply chain. Because a business, no matter how big it is, operating individually, without cooperative relationships with other partners, cannot develop sustainably in the current global market context now

2. Literature Review and Hypothesis

2.1. Supply Chain Collaboration

From the above evidence, it is proved that cooperation in the chain is essential because supply chain cooperation not only solves how the members of the chain share the responsibilities and benefits derived from the supply chain. Improve the common good, but also solve the inflexibility in management. Close cooperation helps supply chain members effectively balance demand and increase mutual benefits for the entire chain. However, conflicts arise because the chain members come from different independent organizations and work primarily for their interests. Conflict resolution and cooperation will bring many benefits, including reduced inventory, improved customer service, more efficient use of people, better distribution by reducing cycle times, increased market of new products faster, with a stronger focus on core competencies, and improved overall image. However, research on supply chain structure shows that supply chain cooperation depends on the culture and strategy of chain members (software) rather than the existing structure of the chain (hardware).

Supply chain collaboration facilitates chain members to improve performance. The benefits of supply chain collaboration include increased revenue, reduced costs, and flexibility in operations to cope with increased demand uncertainty.

For enterprises, once the supply chain is deployed, the higher the cooperation, the higher the partnership means that the members in the chain are always closely linked with each other towards sharing the benefits achieved. Collaboration to help businesses with the same function in the chain will help increase competitiveness (horizontal linkage) to improve their position in negotiating to buy raw materials - hire outside services, and find significant distributors. At the same time, it would be great if you quickly grasp market demand and fluctuations due to information sharing and be proactive in input and output activities.

For the industry: Good supply chain cooperation in the sector will help it improve its competitive position and develop sustainably and effectively. The members cooperate closely on the division of labor, from which each member will find the stage where he participates most effectively and actively. Thus, if there is apparent cooperation in an industry when deploying a supply chain, there will undoubtedly be a process of restructuring that industry in many aspects, such as scale, production methods, distribution, and consumption. Aiming at sustainability and fully exploiting the comparative advantages of each member of the chain, through which the industry will regularly come into operation, step by step, profoundly participating in the global chain.

2.2. Information Sharing

A supply chain is a dynamic process that involves the continual flow of information, resources, and cash within and between chain members (Jain, Wadhwa & Deshmukh, 2009). Manufacturing enterprises frequently demand that their supply chain partners, such as subcontractors or suppliers, execute standard practices that often need information sharing to enhance supply chain coordination and product quality (Cheng, 2013). Sharing information saves supply chain costs and provides a competitive advantage (Cheng, 2013; Jain, Wadhwa & Deshmukh, 2009). The market of today is technologically connected and dynamic. As a result, businesses are increasing their agility to be more adaptable and responsive to changing market demands. To do this, many companies have dispersed their value-added operations through outsourcing and the development of virtual organizations. This emphasizes the significance of information technology (IT) in integrating suppliers/partner businesses in virtual organizations and supply chains (Jain, Wadhwa & Deshmukh, 2009). Information is viewed as the "glue" that ties together the corporate structures that allow supply chains to adapt to competitive threats agilely (Sanders & Premus, 2002). With IT, it is easier to build an effective supply chain.
Because suppliers are situated worldwide, it is critical to integrate operations both inside and outside of a business. This necessitates an integrated information system for exchanging data on diverse value-added activities throughout the supply chain. It is a supply chain nervous system (Gunasekaran & Ngai, 2004). An organization's sensing and reaction skills must be enabled (Ngai, Chau & Chan, 2011). The existing literature on information sharing in collaborative supply chain management has been reviewed in this section.

- *Hypothesis 1: Information Sharing Directly Impacts Tea Supply Chain Collaboration.*

2.3. Policies

Policies from the Government include many different aspects; depending on each industry, the Government's policy will specify other business laws. According to Brown, in the past five years, governments have issued more than 40 policies, such as energy, environment, sustainable development, and production standards. Product quality, tariffs and non-tariffs have been announced with different purposes to directly or indirectly affect economic activities, including supply chain actors. In the complex and extensive operation of the supply chain, there is a need to improve cooperation between businesses and the Government, nationally and internationally, to control and manage risks in the supply chain. Global supply chain If the government's policies in the field of tariffs and non-tariffs of partners are suitable, it will encourage and open up many transaction opportunities between partners. Tariff barriers, such as import tax increases that limit trade, and non-tariff barriers include technical standards that a partner must meet, such as production design, traceability origin, packaging, labels, and food hygiene and safety inspection. According to Mentzer, any actor who wants to participate in the supply chain in the industry but needs to respond better to national and international policies and laws will find it difficult to cooperate.

- *Hypothesis 2: Policies directly impact tea supply chain collaboration*

2.4. Collaborative Culture

Collaborative culture is the set of specific capabilities, voluntariness, and business awareness in cooperation with partners to provide customer-oriented solutions. The following seven factors influence collaborative culture in an enterprise:

- Sharing the same goal, that is, the cooperative partners strive to pursue a common cooperative goal,
- There are agreements on an appropriate management method to put the staff in positions of cooperation with partners, encouraging teamwork,
- The division of labor between partners in the chain will reduce the workload for the parties in the cooperation process,
- Collaborative culture based on trust between enterprises and other partners in the supply chain,
- If partners have access to information related to cooperation without loss of ISO, slowness and distortion, then there is transparency in communication in the chain,
- An understanding of the existing business and partnership situation will promote the success of the partnership,
- The benefits and problems of previous cooperation will prompt the parties to plan the next cooperation soon.

Sharing the same view, Handfield and Bechtel also pointed out that businesses only agree to join the association when they see the benefits they expect in the future. This is because businesses often have to invest much time and spend it on the potential benefits of working together and, more importantly, having a positive attitude towards working together. Mentzer argues that members must establish a high-level relationship and often strengthen it.

- *Hypothesis 3: Collaborative Culture Directly Impacts Tea Supply Chain Collaboration*

2.5. Collaborative Strategies

The collaborative strategy covers all aspects that supply chain partners can bring together to achieve a seamless understanding; all partners can implement supply chain strategies and related effects. The chain cooperation strategy includes basic activities such as planning, forecasting, and supplementing the contents of supply chain cooperation. According to Muckstadt et al., when studying collaborative supply chains, the cooperation strategy includes four essential contents: acquisition and merger, capital rationalization and optimization of production mixes, and new product introduction strategies.

- *Hypothesis 4: Collaborative strategies directly impact tea supply chain collaboration.*

2.6. Trust

Credibility displays trust in a partner and includes any flaws or uncertainties in the trusted partner (Joyce & Mattow, 2002). Another school of thought says that trust is based on perception and the type of influence (McAllister, 1995). According to a previous study, trustworthiness primarily depends on evidence of consistent performance, cultural-ethical compatibility, and professional skill. Later research suggests that civic relations activities and regular contacts influence trust. Both of the preceding studies underline the need for trust between organizations to reduce the cost of administrative operations. Handfield and Bechtel argue that tangible assets may play an essential role in creating trust among intermediary partners. Handfield then indicated that trust is a simple concept that is challenging to quantify. One finding, in particular, highlights the emergence of trust in industrial economics, organizational behavior, marketing, and organizational theory. Trust is one of the most often mentioned aspects in supply chain management but is also one of the most difficult to quantify.

- *Hypothesis 5: Trust directly impacts tea supply chain collaboration.*

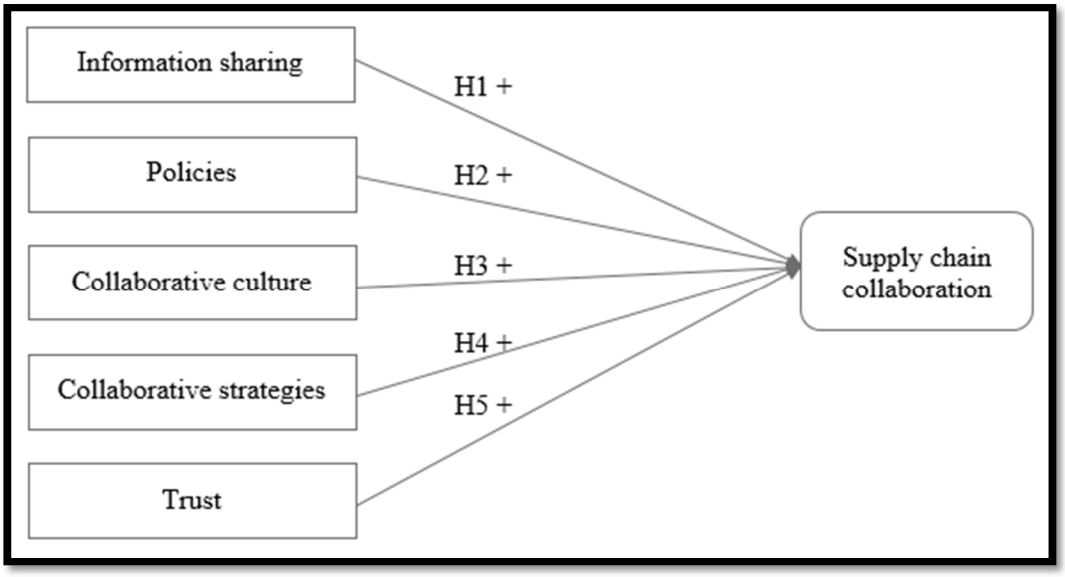

Figure 1: Model Research

3. Medolothogy

3.1. Measurement

The study created a questionnaire with measuring scales based on the study model and an extensive analysis of the pertinent literature. To the greatest extent possible, previously published materials were modified to meet our study. A 5-point Likert scale, with "strongly disagree" being worth 1 point and "strongly agree" being 5, was used to create this quiz.

3.2. Sample and Data Collection

Data is collected from tea producers, wholesalers, and retailers in Phu Tho province, Vietnam. 286 questionnaires were collected, and 258 were used in this study after excluding 17 incomplete questionnaires.

Demographic Characteristics		Frequency	Percent
Gender	Male	143	55,4
	Female	115	44,6
Age	Under 25	7	2,7
	21–30	42	16,3
	31–40	86	33,3
	41–50	63	24,4
	Over 50	60	23,3
Supply chain components	Producers	67	25,9
	Wholesalers	77	29,8
	Retailers	114	44,3

Table 1: Sample Demographics

4. Results

4.1. Measurement Model

Table 2 indicates that all Cronbach's alpha values were more significant than 0.7. Furthermore, all matters of the average variance extracted (AVE) of the constructs were higher than 0.5, and all the composite reliability (CR) values were more significant than 0.7, so the trustworthiness was good.

Construct	Item	Factor Loading	ITC
Information sharing (IS) Alpha = 0.823 AVE = 0.773 CR = 0.765	IS1	0.763	0.712
	IS2	0.783	0.745
	IS3	0.712	0.672
	IS4	0.742	0.632
	IS5	0.821	0.732
Policies (P) Alpha = 0.798 AVE = 0.743 CR = 0.729	P1	0.719	0.646
	P2	0.735	0.698
	P3	0.752	0.692
	P4	0.754	0.683
Collaborative culture (CC) Alpha = 0.814 AVE = 0.652 CR = 0.781	CC1	0.842	0.723
	CC2	0.862	0.752
	CC3	0.815	0.713
	CC4	0.831	0.745
Collaborative strategies (CS) Alpha = 0.803 AVE = 0.761 CR = 0.714	CS1	0.755	0.632
	CS2	0.765	0.617
	CS3	0.721	0.696
	CS4	0.732	0.713
Trust (T) Alpha = 0.805 AVE = 0.764 CR = 0.713	T1	0.744	0.704
	T2	0.713	0.638
	T3	0.845	0.794
	T4	0.720	0.701
Supply chain collaboration (SCC) Alpha = 0.808 AVE = 0.712 CR = 0.732	SCC1	0.742	0.697
	SCC2	0.753	0.715
	SCC3	0.821	0.732
	SCC4	0.802	0.749
	SCC5	0.788	0.715

Table 2: Factor Analysis Result

The factor loadings of all items were more significant than 0.7, and all item-total correlations (ITC) were more important than 0.3, so the convergent validity was good. In the correlation matrix (Table 3), the diagonal line of the correlation matrix represents the square roots of the AVE, which are greater than the inter-construct correlation coefficients. The results suggest that the desired discriminant validity was also achieved. As table 4 indicates, the variance inflation factor (VIF) of Information sharing (IS), Policies (P), Collaborative culture (CC), Collaborative strategies (CS), and Trust (T) were all lower than 10, which means that there was no collinearity.

	IS	P	CC	CS	T	SCC
IS	0.709					
P	0.702	0.663				
CC	0.638	0.425	0.786			
CS	0.623	0.343	0.512	0.658		
T	0.632	0.532	0.638	0.451	0.784	
SCC	0.432	0.411	0.422	0.532	0.432	0.753

Table 3: Correlation Matrix

Construct	VIF
Information sharing (IS)	1.254
Policies (P)	1.238
Collaborative culture (CC)	1.645
Collaborative strategies (CS)	1.545
Trust (T)	1.943

Table 4: Variance Inflation Factor Analysis Results
Dependent Variable: Supply Chain Collaboration

4.2. Testing of the Research Model and Hypothesis

This study used SmartPLS with a PLS bootstrapping algorithm (number of resamples = 5000). We used the two-stage approach to estimate the model because we focused on the relationships between higher-order constructs. The results of all path coefficients and explained variances are shown in figure 2. Table 5 summarizes the hypothesis testing results. The results of the direct relationship analysis from table 5 indicate that the hypothesis (all hypotheses are accepted).

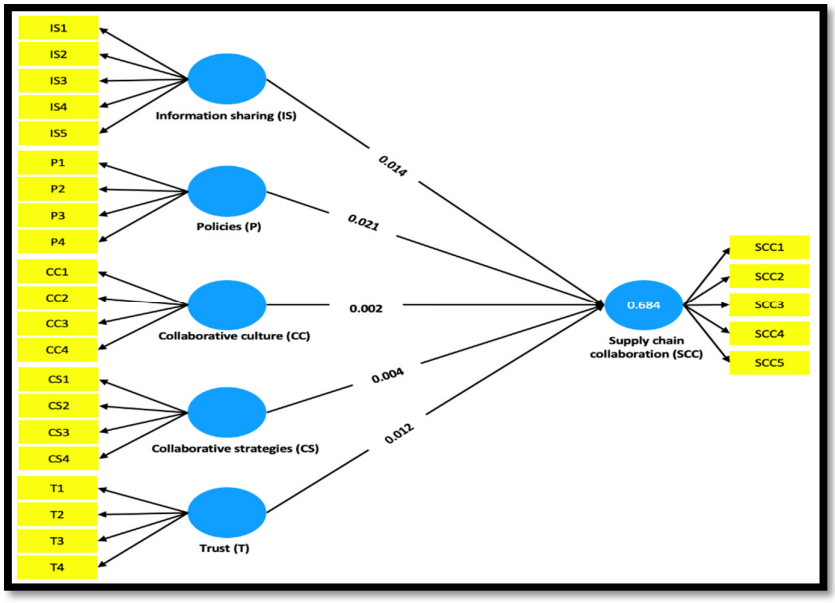

Figure 2: PLS Analysis of the Research Model

Hypothesis	Path Coefficient	T-Value	p-Value	Result
H1 IS -> SCC	0.127	1.083	0.014	Supported
H2 P -> SCC	0.087	1.072	0.021	Supported
H3 CC -> SCC	0.112	1.065	0.002	Supported
H4 CS -> SCC	0.124	1.042	0.004	Supported
H5 T -> SCC	0.089	1.062	0.012	Supported

Table 5: Results of the Structural Model

5. Conclusion

The tea supply chain of enterprises in the industry strengthens cooperation; first, processing enterprises must pay attention to the five new factors that have just been tested through the model; there must be measures to improve. This to-do and promote efficiency must first be due to the awareness of the factors in the supply chain. In addition, organizations and associations must clearly show their role as a bridge for businesses to meet and share information in the tea industry.

5.1. Building a Culture of Cooperation to Maintain and Establish Long-Term and Sustainable Trading Relationships Actively

Establish long-term, regular relationships with key critical suppliers and distributors. For foreign suppliers: Select domestic suppliers of raw materials. In selecting suppliers, remember whether they are actual manufacturers or trading companies. Limiting buying through too many intermediaries will reduce efficiency for businesses.

For suppliers in Phu Tho province, establish relationships to purchase raw materials, mainly raw teas. For distributors, proactively choose a reputable distribution channel in supermarket systems in Vietnam and leading distributors of each country such as Carrefour, Cosco, etc., combined supply to smaller chain stores but with solid brands and high-quality product requirements. Businesses must have a favorable view of the potential domestic market and supportive policies for agent stores or boldly consign goods through distributors. Enterprises also actively seek and select reputable and potential suppliers and distributors.

5.2. Planning Appropriate Cooperation Strategies for New Business Conditions to Contribute to Strengthening Tea Supply Chain Cooperation

Tea processing and exporting enterprises should be willing to link and cooperate, specifically assigning tasks in production stages to take advantage of technological equipment, reduce input costs, improve businesses' competitiveness, and create collective strength in the marketplace. Enterprises step by step and flexibly cooperate to bear against each other in aspects such as market, price, technology, non-tariff measures from import markets, etc. It is necessary to figure out what information is available to share and what information is part of your business strategy and needs to be kept. Businesses in the industry are not ready to share information with partners because this means they lose control of information, and companies themselves need to understand the nature of cooperation in the supply chain.

- Through local associations, organize seminars for each locality or combine them into a common forum. The regular organization will create opportunities for businesses to meet, share information, and sign agreements on sharing orders when receiving large orders or linking up to establish import focal points to negotiate with suppliers.
- Associations and trade promotion centers on behalf of the Government must regularly propagate and explain so that enterprises know the meaning of cooperation in production to reduce investment and production costs. Sales increase productivity and transparency to create high-quality, competitive products to serve customers ultimately. However, to implement it, the first factor is that businesses must unite and cooperate closely in the customers' value chain to jointly calculate and gradually organize new product development and manage development together.

5.3. Focusing on Building Corporate Image to Enhance Credibility in Transactions with Partners

To promote the building of a Vietnamese tea brand, businesses need to boldly master technology, be flexible, and catch up with tastes to design product designs according to market requirements and improve the marketing ability of the business to keep up with the constant changes in the market. To have a brand, companies must be proactive in designing to create Vietnamese tea products that are increasingly diverse in types; product quality must meet international standards and the source of raw materials used. It must have a clear origin, the price must be competitive, and it must take the initiative in delivery and sales without much dependence on commercial intermediaries. This means businesses must achieve FSC 22000 and ISO45001 certificates, bringing all production and business processes to scientific and practical standards. In addition, companies must pay attention to applying clean production technology, protecting the environment, and making the most of clean energy sources to save production costs. Enterprises need to develop in the direction of using advanced technology first, making in-depth investments towards diversifying and improving product quality to improve product competitiveness and build brands. To create a brand, businesses need to focus on quality and design. In addition, synchronous coordination is required in commercial promotion to promote the image of Vietnamese wooden products in the international arena.

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