

Review of agricultural value chain analysis

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ARTICLE INFO	ABSTRACT
DOI:10.46223/HCMCOUJS.econ.en.13.1.1963.2023 Received: June 25th, 2021 Revised: July 19th, 2021 Accepted: July 31st, 2021 JEL classification code: Q12; Q13 <i>Keywords:</i> actors; agriculture; profit distribution; value chain	Value chain analysis has a central role in determining the distribution of benefits of the participants to upgrade solutions to the value chain. This paper is based on an integrated approach of methods and results of research on agricultural product value chain analysis. Research focuses on analyzing value chain approaches commodity chain analysis, Porter's value chain model, Global value chain and GTZ organization, the number of actors in the value chain, profit distribution among actors participating in the chain, some popular tools in value chain analysis, and solutions to upgrade the chain. On that basis, the paper also points out the gaps in the current agricultural value chain research: 1) There is no combination of SCP analysis framework with other approaches; 2) Researchers have not analyzed the causes of the markup through the actors or the market power of the actors; 3) There are few studies combine all three models: Porter's five forces, PEST and SWOT to have a complete basis for proposing solutions to upgrade the value chain.

1. Introduction

The Value Chain (VC) concept has been mentioned very early by many authors worldwide and is still widely applied. The value chain describes the full range of activities which are products or services through the different stages of production, and delivery to final consumers (Kaplinsky & Morris, 2001). The principle-based VC approach considers each actor in the chain and the relationship as one step forward, and one step back, starting from producing raw materials to the final consumer. VC analysis has a central role in determining the distribution of benefits among the actors in the chain. Through analyzing margins on a product to determine who has benefited from participating in the chain and which participants could benefit from more organization and support.

There are many different approaches to analyzing VC: commodity chain analysis, Porter (1985), global value chain, and GTZ (2007). There are different tools for VC analysis in each approach. However, each VC approach has its advantages and is suitable for some specific VC. Therefore, it is not possible to have the most general or correct method for VC analysis. So, depending on each product and research objective, researchers will choose an appropriate approach or use multiple approaches simultaneously, even combining some other factors into the analysis. For the above reasons, the paper "Review of agricultural value chain analysis" was conducted to present VC approaches as well as indicators and tools in the agricultural products' VC analysis. Also, it points out the gaps in the current agricultural value chain research.

2. Methodology

Review of agricultural value chain analysis is based on an integrated approach of concepts and methods of research. This article compares the strengths and limitations to point out the gaps in the current research.

There are numerous content and tools used in value chain research. However, this article focuses on some critical contents and tools commonly used in agricultural value chain analysis as follows: 1) An overview of the value chain approach; 2) The number of actors in the value chain; 3) Profit distribution among actors in the value chain; 4) Some tools in value chain analysis; 5) Solutions to upgrade the value chain; 6) Gaps in value chain analysis.

3. Review of the agricultural value chain

3.1. An overview of the value chain approach

According to D. T. Vo (2016), there are many different approaches to analyzing VC. However, there are four popular approaches today: Commodity Chain Analysis (CCA) or “Filière”, Porter (1985), global value chain, and GTZ (2007). Specifically, these approaches are presented as follows:

3.1.1. Commodity chain analysis approach

The concept of “Filière” or commodity chain analysis, has been developed since the 1960s in France. This method is an analytical tool for agricultural sector research, two main directions of commodity chain analysis. The first direction focuses on an economic and financial assessment. That is mainly concentrating on analyzing how income is generated and distributed in the industry. It separates costs and income between components of local and international trade. Besides that, the framework analyzes the role of the industry in the national economy as well as its contribution to the gross domestic product. While the second direction focuses on strategic analysis and simultaneously evaluates the mutual influence of goals, constraints, and results of each actor participating in the industry; developing individual and collective strategies.

Commodity analysis examines the structure of economic processes in agricultural commodities production and distribution systems. The approach aims to improve the efficiency of the value chain by improving agricultural commodities’ functions, and public marketing organizations, as well as reducing transaction costs associated with the activities of farmers (Raikes, Jensen, & Ponte, 2000). The approach has the advantage of emphasizing the measurement of the relationship of inputs and outputs, prices, and value-added at different stages of the production process. So, this method is suitable for studying agricultural commodities and is controlled by the marketing system within the local and country (Kaplinsky & Morris, 2001).

3.1.2. Porter’s approach

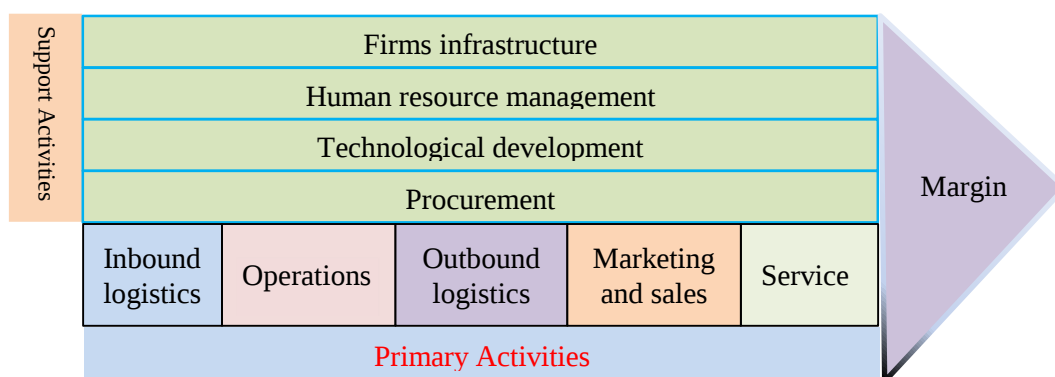


Figure 1. The value chain model Porter (1985)

The value chain consists of a series of activities conducted to produce a particular output in a firm (Porter, 1985). This approach is necessary to find a company's competitive advantage by isolating its activities into many activities, and competitive advantages are found in these activities. Enterprise competition can be illustrated in Figure 1, which includes various detailed activities.

Figure 1 analyzes VC according to Porter's conceptual framework, mainly towards activities, management decision support, management strategies, and values companies. With this conceptual framework, the VC analysis is only within the company's scope activity, whose ultimate aim is to enhance the company's competitive advantage.

3.1.3. *Global value chain approach*

The global value chain analytical framework developed by Gereffi (1999), and Kaplinsky (1999a, 1999b) has attracted considerable attention and is further developed by Kaplinsky and Morris (2001), Gereffi and Memodovic (2003). The global value chain analysis provides a comprehensive view of how companies or countries are globally integrated and assesses the factors of global income distribution. This framework allows us to understand the organization of the global industry by looking at the structure and activities of the different actors involved in a given industry.

As such, the global approach is a newer approach to how companies and countries integrate globally. Besides, it assesses the determinants of the division of labor, and the global distribution of demand, splits CGT's total income into rewards for chain actors, and finds out how companies, regions, and countries are linked to the global economy. Therefore, some value chain analysis has been implemented following this approach (Doan, Vo, Huynh, & Nguyen, 2015; N. Q. Nguyen, 2015; Phan & Nguyen, 2017; L. T. T. Vo & Nguyen, 2011; L. T. T. Vo et al., 2015; T. B. T. Vo & Nguyen, 2020).

3.1.4. *Valuelinks value chain approach of GTZ*

According to GTZ (2007), the value chain is also understood as a series of businesses or operators performing functions or stages: production, processing, trading, and distributing a particular product. Thus, in the value chain, there are "stages" in the chain. The stages can be described in detail by "activities" to show each stage's work clearly. Actors in the value chain perform functions in the chain, such as suppliers of inputs production, production farmers, and freight traders, as illustrated in Figure 2. In addition to actors, the value chain also has the organization's support for the value chain. The mission of the organization's support is to help grow the chain by facilitating upgrades value chain.

According to this approach, the value chain analysis will focus on two main contents: financial, economic analysis, and strategic analysis of the chain. The financial and economic analysis focuses on benefits analysis and the distribution of benefits among actors in the chain. Meanwhile, strategy analysis concentrates on the relationships between actors and the strategies specific to each actor in the chain. The analysis results will be the basis for influencing the chain to upgrade the value of that product chain. Therefore, this approach will be suitable for small-value agricultural products. The chain links are formed on a small scale, such as at the local or regional scale, to target development and poverty reduction. Therefore, many authors have analyzed the value chain of agricultural products according to the approach of GTZ (2007) (Doan et al., 2015; H. T. T. Nguyen & Mai, 2017; N. Q. Nguyen, 2015; S. P. Nguyen & Le, 2013a, 2013b; Tran et al., 2012; L. T. T. Vo & Nguyen, 2011; L. T. T. Vo et al., 2015).

Based on GTZ's approach, the Asian Development Bank has introduced a practical handbook for value chain analysis titled "Making Markets Work Better for the Poor-M4P" (M4P,

2008). This approach is consistent with the value chain that has a high proportion of the poor at all stages of the chain, and the goal of pro-poor growth is achieved when the chain creates more jobs and higher incomes for the poor. This approach is appreciated by researchers for its suitability for agricultural products, especially those related to the poor. Therefore, the approach of M4P (2007) is also applied by researchers in value chain analysis of agricultural products (H. T. T. Nguyen & Mai, 2017; S. P. Nguyen & Le, 2013a, 2013b; S. P. Nguyen & Nguyen, 2014; Perez & Viana, 2012; Tran et al., 2012; L. T. T. Vo & Nguyen, 2011; L. T. T. Vo et al., 2015).

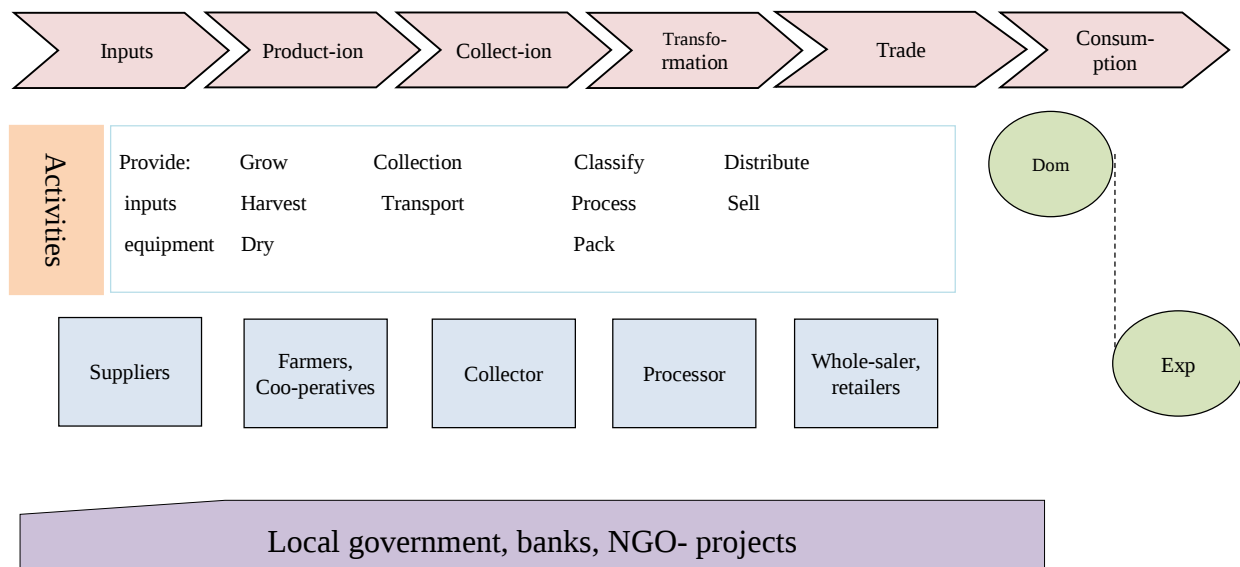


Figure 2. Map of GTZ's value chain (2007)

3.1.5. Another approach in value chain analysis

One of the other approaches to analyzing the value chain is the SCP model (Structure - Conduct - Performance) (D. T. Vo, 2016). Based on the SCP theory of market structure, market conduct, and market performance developed from the theory of industrial organization and used for industry research (Waldman & Jensen, 1998). The SCP model is one of the standard frameworks applied in market analysis. In particular, the first factor (market structure) means the number and size of actors participating in the supply chain, product differences, and barriers to entry and exit. These factors will affect the nature of competition and pricing behavior in the market. The second factor (market conduct) concerns the coordination of the market and the pricing policy applied by actors in the value chain. These factors can affect market performance, which measures the relationship between price and output and measures the effectiveness of innovation and investment.

Figueirêdo, Meuwissen, and Lansink (2014) and Jordaan, Grové, and Backeberg (2014) extended the SCP framework for application value chain analysis. This framework will highlight the types of structure, process, and performance for the value chain and provide an integrated approach to explore the interactions between these factors and devise strategies for some value chains. According to this analytical framework, the unit of analysis is not a company but part of a value chain in one locality, competing with another value chain elsewhere. Because of the characteristics mentioned above of the SCP model, several studies have applied this approach to analyzing the value chain of agricultural products and commodities (Huynh & Luu, 2016a, 2016b; Kuguru, 2016; Luu, 2006, 2005; Mai, 2004; Ngaruko & Mbilinyi, 2014; T. V. Nguyen & Vo, 2014; Truong, 2014).

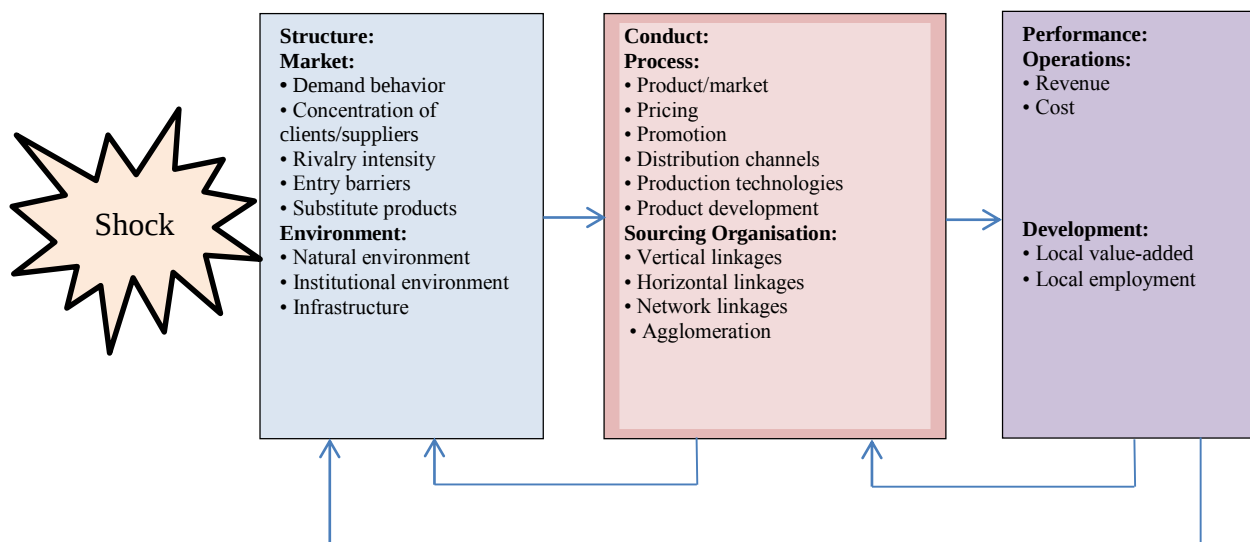


Figure 3. Expanded SCP value chain research framework (Figueirêdo et al., 2014)

In general, each of the above value chain approaches has its advantages and focuses on particular research objectives. Thus, it is impossible to have a general or correct method for product CGT analysis. Therefore, researchers will choose an appropriate approach or use multiple approaches simultaneously depending on each product and research objective. Some studies combine Kaplinsky and Morris (2001), and GTZ (2007) approaches simultaneously (Doan et al., 2015; N. Q. Nguyen, 2015; N. Q. Nguyen, Tran, Nguyen, & Nguyen, 2018). In contrast, H. T. T. Nguyen and Mai (2017), S. P. Nguyen and Nguyen (2014), S. P. Nguyen and Le (2013a, 2013b) combine two approaches GTZ (2007) and M4P (2007) in their studies. Besides, some studies have combined up to 03 approaches of Kaplinsky and Morris (2001), GTZ (2007), and M4P (2007) in research (T. T. Nguyen & Vo, 2019; L. T. T. Vo & Nguyen, 2011; L. T. T. Vo et al., 2015). They are even using more than three approaches, such as the value chain coffee of Vietnam and Cambodia (Perez & Viana, 2012), and coconut Ben Tre (Tran et al., 2012).

3.2. The number of actors in the value chain

The product value chain diagram depicts the connection, dependence, and mutual understanding between actors in the chain and each actor's role. At each stage of the product circulation process, each actor in the product value chain has particular functions in operating the value chain: inputting, production, purchasing, processing, commercial, and consumption function. The number of actors depends on the operation of the chain and the size of the chain.

T. V. Nguyen (2012), analyzing the cassava value chain in Thua Thien Hue Province, shows four main actors involved: cassava farmers, small collectors, traders, and processing factories in the whole domestic consumption and export channels. The chili value chain in Dong Thap (L. T. T. Vo et al., 2015), cocoa in Ben Tre (T. H. Nguyen & Luu, 2014) also have similar results. Moreover, the number of actors is more than five, compared to the chains above that include retail actors in the domestic consumption channel. This result is illustrated in Ninh Thuan grape (S. P. Nguyen & Le, 2013a), tea in Moc Chau, Son La (K. V. Nguyen, Chu, & To, 2015), and coffee in Oromia, Ethiopia (Assefa, Habteyesus, & Nedjo, 2018).

The value chain with the most actors is seven, including the tea value chain in India (Langford, 2021); the coffee value chain in the Central Highlands (H. T. T. Nguyen & Mai, 2017); the lotus value chain in Dong Thap (T. B. T. Vo & Nguyen, 2020); the rice value chain in the Mekong Delta (L. T. T. Vo & Nguyen, 2011); pineapple value chain in Tien Giang (N. Q. Nguyen,

2015); apple value chain in Ninh Thuan (Nguyen & Le, 2013b) and the Ninh Thuan garlic value chain (S. P. Nguyen & Nguyen, 2014). In these value chains, the number of actors increases due to exporting companies or wholesalers and retailers outside the province.

3.3. Profit distribution among actors in the value chain

Value chain research has great significance for the sustainable development of products or industries, especially in agriculture. Important role's value chain analysis determines the distribution of benefits between actors participating in the chain. Thus, it can provide appropriate and timely solutions or strategies to improve the distribution of profits among the chain actors.

Value chain analysis of tea in India indicated that the profits of small tea growers are higher than green leaf collectors were Rs. 2.63 and Rs. 1.86/kg of green tea leaves, respectively. Processors had the highest net income, followed by retailers and wholesalers, and these were Rs. 20.00, Rs. 4.00, and Rs. 2.50/kg of made tea, respectively (Das & Mishra, 2019). In contrast, K. V. Nguyen et al. (2015) analyzed the distribution of profits/products among actors in the tea value chain in Moc Chau. The result presents that: Wholesalers have the highest profit percentage (30%) then traders (27%), tea farmers (16%), retailers (13%), and processing factories (12%). The rice value chain in the Mekong Delta (L. T. T. Vo & Nguyen, 2011) has the same results: wholesalers have the highest proportion of profit distribution, followed by retailers, farmers, households, and traders. Meanwhile, the apple value chain in Ninh Thuan (Nguyen & Le, 2013b) indicates that the actor with the highest profit distribution rate is the retailer (45 - 58%) then apple growers and traders.

Other studies show that farmers are the actor with the highest profit distribution rate in the value chain, specifically: Cassava value chain in Thua Thien Hue. Cassava farmers account for 70%, then the processor's factory and collectors (T. V. Nguyen, 2012). In the profit distribution of the chili value chain in Dong Thap, L. T. T. Vo et al. (2015) also show that farmers have the highest percentage in all channels, over 80%, followed by the traders, wholesalers, and exporters only about 3.7%. In addition, households are the actors with the highest income distribution at 60% and 74%, in the value chain of Ninh Thuan garlic (S. P. Nguyen & Nguyen, 2014) and Ben Tre cocoa (T. H. Nguyen & Luu, 2014), respectively in the non-processing channel. In contrast, the analysis results of profit distribution on processing channels of the green apple value chain in Ninh Thuan (Nguyen & Le, 2013b), cocoa in Ben Tre (T. H. Nguyen & Luu, 2014), and Dong Thap lotus value chain (T. B. T. Vo & Nguyen, 2020) show that the processing company has the highest profit distribution (67 - 85%), as fellow farmers.

Thus, through the analysis of the profit distribution of actors in the value chain, it shows no general rule for the distribution of profit ratio/product unit. The actors on different distribution channels also have different rates. This rate entirely depends on the number of actors on the channel and the operation of each channel.

The highest profit distribution ratio/product unit does not mean that the actor's average income/year or season is also the highest. When analyzing the distribution of profits on the export channel in the rice value chain in the Mekong Delta, L. T. T. Vo and Nguyen (2011) illustrated that farmers are the actors with the highest profit rate (36.5%). However, if calculating the profit index of each actor/year, rice farmers account for less than 0.01%, while exporting companies account for 88%. Similarly, the chili value chain in Dong Thap of L. T. T. Vo et al. (2015) also presents that, although chili farmers have the highest percentage in all channels, 80 - 90%. While the wholesalers only account for 5% - 16%, but the average profit/year is the highest proportion (64.7%), and the farmer has only 2.3%. Research on the value chain of An Giang mango (T. T. Nguyen & Vo, 2019) and Dong Thap lotus (T. B. T. Vo & Nguyen, 2020) also give the same results.

L. T. T. Vo et al. (2015) illustrates profit distribution in the chili value chain because farmers' products/year is much lower than that of traders and wholesalers. L. T. T. Vo and Nguyen (2011) also illustrate that households grow rice on a small scale, and the production cycle lasts 03 - 04 months compared to other business actors in the chain. For example, traders can sell ten tons of rice/per day. This research explains why the income and profit of the farmer/year are many times lower than other actors in the chain.

It can be seen that the profit distribution of the actors/year is quite different. Farmers are the actors with the lowest income/year in the chain due to the small production scale. Meanwhile, large traders, wholesalers, or processing and exporting companies are the actors with the highest income/per year thanks to the advantages of scale and large consumption volume.

3.4. Some tools in value chain analysis

3.4.1. PEST analysis model

Analyze the PEST model (Political, Economical, Sociocultural, Technical) to see the advantages that will be considered as opportunities for actors participating in the value chain to have the opportunity to improve operational efficiency. The difficulties will be threats or challenges to the effectiveness of the actors in the value chain. These opportunities and challenges will be the input factors of SWOT analysis to find solutions to improve performance's value chain (Le, 2019).

3.4.2. Porter's five forces analysis model

Porter (1985) gave a theoretical framework to analyze the model of five forces of competitive pressures of the industry and an enterprise. This model is considered a valuable and effective tool to devise a competitive strategy for an industry or firm. There are five analysis contents in this model, including 1) the bargaining power of suppliers; 2) buyers' bargaining power; 3) threats of new entrants; 4) substitutes' threat; 5) competition of existing competitors in the industry. Thus Porter's five forces analysis model will indicate the advantages and disadvantages of the actors' production and business and the basis for strengths and weaknesses in SWOT analysis. Some value chain studies have used this model as a basis for proposing solutions to upgrade the chain (Le, 2019; S. P. Nguyen & Nguyen, 2014; T. T. Nguyen & Vo, 2019).

3.4.3. SWOT matrix analysis

SWOT analysis is the analysis of strengths, weaknesses, opportunities, and threats. Therefore, researchers have applied this method in value chain analysis to discover recommendations and upgrade strategies, focusing on leveraging strengths and opportunities to overcome weaknesses and threats. The SWOT analysis model is increasingly used by numerous in value chain analysis (FAO, 2015; Fonseca, Coelho, Soares, Correia, & Soares, 2020; Le, 2019; T. H. Nguyen & Luu, 2014; S. P. Nguyen & Le, 2013a, 2013b; S. P. Nguyen & Nguyen, 2014; T. T. Nguyen & Vo, 2019; L. T. T. Vo & Le, 2011; L. T. T. Vo et al., 2015).

3.5. Solutions to upgrade the value chain

Value chain research has great significance for the sustainable development of products, especially in the agricultural sector. Kaplinsky and Morris (2001) emphasize: Value chain analysis has a central role in determining the distribution of benefits of the participants in the chain. This role means analyzing profit and margin/product to determine who benefits from participating in the chain and which participants could benefit from more organization and support. Besides that, policymakers have timely recommendations to distribute benefits among actors fairer, create

higher added value, and better support chain development. Some studies have used different qualitative and quantitative analysis tools to develop solutions to improve the value chain's profits.

The first is a group of solutions related to strengthening horizontal and vertical links between actors in the chain for different purposes. The solution to enhance horizontal linking helps producers improve production efficiency, increase price bargaining, and promote product consumption (FAO, 2015; Fonseca et al., 2020; N. Q. Nguyen, 2015; S. P. Nguyen & Nguyen, 2014; T. T. Nguyen & Vo, 2019; Phan & Nguyen, 2017). Besides, the horizontal linkage among farmers also reduces production costs (H. T. T. Nguyen & Mai, 2017; L. T. T. Vo & Le, 2011; L. T. T. Vo et al., 2015). Moreover, vertical links between actors, especially between coffee farmers, cooperatives, and processors do present opportunities for producer upgrading (Vicol, Neilson, Hartatri, & Cooper, 2018). These links will help distribution channels to reduce intermediary costs and increase income for the actors involved (H. T. T. Nguyen & Mai, 2017; Nguyen & Le, 2013b). Even the linkage between input suppliers and production households will reduce production costs for farmers (T. H. Nguyen & Luu, 2014).

The second is a group of solutions to improve product quality through strengthening agricultural extension. Agricultural extension activities include training on production, processing, and product preservation techniques to enhance the productivity and quality of agricultural products (Dinh & Pham, 2011a; K. V. Nguyen et al., 2015; S. P. Nguyen & Le, 2013a, 2013b; S. P. Nguyen & Nguyen, 2014; T. H. Nguyen & Luu, 2014; Tardzenyuy, Jianguo, Akyene, & Mbuwel, 2020). In addition, quality will also be improved by training and transferring production techniques according to VietGAP, GlobalGAP, UTZ, or 4C standards, ... The solution will respond to increasing demand for quality of the domestic market and technical barriers of export markets (Bui & Le, 2015; Dinh & Pham, 2011b; N. Q. Nguyen, 2015; Piao, Fonseca, Carvalho, Saes, & Lucianac, 2019; T. T. Nguyen & Vo, 2019; L. T. T. Vo & Le, 2011).

The third is the product development solution group, diversifying products to create products with high added value. If actors invest or upgrade processing and preservation technology, the seasonal problem of products will be solved. The product will be preserved longer, meet market requirements, and reach further markets (Boaventura, Abdalla, Araujo, & Arakelian, 2018; FAO, 2015; Gashaw, Habteyesus, & Nedjo, 2018; H. T. T. Nguyen & Mai, 2017; L. T. P. Nguyen, 2017; P. V. Nguyen & To, 2014; S. P. Nguyen & Nguyen, 2014; T. H. Nguyen & Luu, 2014; Perez & Viana, 2012; Tran et al., 2012).

The fourth is a group of solutions for building a system that provides market information for all actors participating in the chain. Access to market information can help farmers update new farming methods, improve product quality, get the latest price information, and enhance actors' bargaining power. K. V. Nguyen et al. (2015); N. Q. Nguyen (2015); S. P. Nguyen and Nguyen (2014); S. P. Nguyen and Le (2013a).

4. Conclusion

From the literature review above, gaps in value chain analysis in the agricultural sector include:

First, it can be seen that studies on the value chain of agricultural products use various approaches value chain such as Kaplinsky and Morris (2001), GTZ (2007), ValueLink (M4P, 2007), and the SCP analysis framework. Researchers can use one approach or a combination of approaches in the value chain analysis of agricultural commodities. However, papers using the approach between the extended SCP analysis framework and other approaches in value chain analysis are not widespread, especially in the value chain analysis of agricultural products.

Second, studies focus on analyzing price, value-added, and profit among actors in the chain but have not yet analyzed the causes of markup through actors or market power in value chain analysis.

Third, most of the studies use the SWOT matrix analysis tool or combine it with Porter's five forces analysis to provide solutions to upgrade the value chain. However, scarce studies combine all three models of Porter's five forces, PEST, and SWOT models, to have a complete basis for proposing solutions to upgrade the chain.

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