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The Sustainable Shrimp Supply Chain in the Mekong Delta, Vietnam

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Abstract

In recent years, studies related to sustainable supply chain management have been done increasingly and expanded across different disciplines; among them, sustainable agricultural product supply chain is a topic of concern. In comparison with other supply chains, the shrimp supply chain plays an important role because of its high export value and possibility to provide many jobs for labourers, especially in developing countries. This paper aims to provide an insight into the current trends in sustainable supply chain management and the challenges in the implementation process towards an empirical study in this field in developing countries. The methods employed in this paper include a systematic literature review and a statistical method to describe the current state of production and of the shrimp supply chain. Although the sustainable supply chain management has been a concern of many discussions in the past few years, little contribution has been made to the shrimp industry, especially in developing countries. For sustainable development, environmental and social responsibility as well as economic efficiency must be assessed in a serious and objective manner. Hopefully, our work could make contribution to the development of a sustainable shrimp supply chain and a better insight into this field.

Key words: *sustainable supply chain management, sustainable shrimp supply chain, shrimp supply chain in the Mekong Delta, developing countries*

1. Introduction

Supply chain sustainability is examined in three aspects: economical, social and environmental performance. In recent years, many studies related to sustainable supply chain management have been extended to various industrial, agricultural and service sectors. The Mekong Delta, Vietnam, whose main export product is shrimp - an important part in the agricultural supply chain, has created opportunities for business development in the supply chain. In addition to the success in the development, the chain also reveals weaknesses such as environmental damage, food safety, and social responsibility issues. Although sustainable supply chain management has been a concern of many discussions in the past few years, little contribution has been made in the shrimp industry, especially in developing countries. This paper aims to provide a theoretical overview of supply chain management and the sustainability of the agricultural sector, and aims to indicate some suggestions for future research on sustainable shrimp supply chains - an area demanding more theoretical as well as empirical studies.

2. Theoretical overview

2.1 Sustainability

The World Business Council for Sustainable Development indicates that sustainable development involves pursuing economic prosperity, environmental quality, and social justice and if companies aim to maintain sustainability, they should not pay attention to finance only, but pay attention to all three factors in stead. The definition of sustainability relates to the three pillars of sustainable development, the so-called Triple Bottom Line (TBL). TBL is a concept of economical intergration with an emphasis on environmental, social and economic performance to improve the quality of human life. Elkington (1998, 2004) considers the concept of sustainability as the interface of the three economic, social and environmental components (Figure 1)

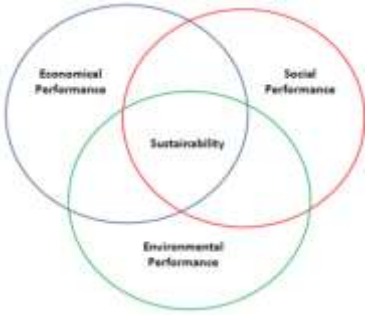

Figure 1: Sustainability as the interface of three components

2.2 Supply chain management

Sustainability has been the main issue in many discussions in recent years. One of the most frequently cited views on sustainability is from Brundtland's definition (WECD - World Commission on Environment and Development, 1987): "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Starik and Rands (1995), define sustainability as [...] "the ability of one or more entities, either individually or collectively, to exist and flourish (either unchanged or in evolved forms) for lengthy timeframes, in such a manner that the existence and flourishing of other collectivities of entities is permitted at related levels and in related systems" (p. 909).

As an ideology and method of production management, supply chain management (SCM) is an age-old concept, the term seems to first by used in 1982, by Mr. Keith. Oliver. In his book, "Competitive Advantage," a highly influential work, published in 1985, Harvard University professor Michael Porter shows that a company can make more profit by analyzing the five basic stages of the supply chain management process (Blanchard, D., 2013). Mentzer et al. (2001) argue that supply chain management is "the systematic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole".

2.3 Sustainable supply chain management (SSCM)

The concept of supply chain management can be extended by adding a sustainable aspect. Shrivastava (1995) describes sustainability as a potential for long-term risks related to resource depletion, fluctuations in energy costs, product liabilities, and pollution and waste management. Harland (1996) defines supply chain management as "the management of a network of interconnected businesses involved in the provision of product and service packages required by the end customers".

According to Carter and Rogers (2008), the SSCM can be identified as a strategic, transparent integration, and it aims at achieving the organization's social, environmental and economic goals in the coordination of the inter-organizational business processes to improve the long-term economic performance of the individual company and its supply chain.

Another definition provided by Seuring and Müller (2008) refers to SSCM as the management of information, finance and capital flows as well as co-operation among companies in the supply chain while taking goals from all three aspects of sustainable development: economic, social and environmental performance.

Carter and Rogers (2008) believe that companies that implement the SSCM strategy will achieve higher economic efficiency than companies that pursue only one or two of the three components. According to Büyükozkan and Berkol (2011), in order to achieve a sustainable supply chain, the involved companies need to meet a number of basic requirements targeted by the sustainability pillar - (i) Economy: total cost, economic benefit, equity and inventory management; (ii) Society: health and security, laws and regulations; (iii) Environment: proper use of fuel, emissions and waste.

2.4 Sustainable Supply Chain Management in the Agricultural Sector

Agriculture plays an important role in the development of any country or region because of its contribution to the economic and environmental development. Agricultural products have become a staple in daily lives and source of life for millions of people globally and are the main asset for the elimination of poverty in some low-income countries. (The United Nations, Millennium Development Goals, 2000).

Horrigan et al. (2002), mention the importance of sustainable agriculture to the environment, economic returns and social justice. Auroi (2003) mentions the important role of farmers and consumer associations in terms of fair trade to improve sustainable supply chain management in the globalized market. According to Nisbet et al. (2005), sustainable agricultural practices in the agricultural supply chain also help to reduce the impacts on the environment. Linton et al. (2007) argue that when considering the supply chain, one should consider from the raw materials used in the product to the delivery of the product to the customers. Pretty et al. (2008) believe that there is an increased acceptance and adoption of sustainability indicators in the agricultural supply chain including social and environmental performance. However, the achievement of agricultural sustainability means meeting the requirement for three challenges: (a) profitability - enhancing the viability and competitiveness of the agricultural sector; (b) planet - ecological challenge in promoting good environmental practices; and (c)

people - social challenge to improve living conditions and economic opportunities in rural areas. To address these three challenges, the role of policies and regulations such as the Common Agricultural Policy (CAP) is important for improving the sustainable agriculture, for the benefits of the whole market and the government, as well as maximizing the function of sustainable supply chains in agriculture, and the improvement in policies and regulations can result in more reasonable cost and benefit distribution (Peeters, 2010).

According to Galal et al. (2016), in developing countries, where supply chains often demand many manual laborers and when environmental regulations are still in place, both social and environmental aspects need attention. To achieve sustainability goals, the coordination among supply chain stateholders is essential. In order to ensure their position and role in the supply chain, each member must comply with social and environmental objectives while the competitiveness will be achieved through the fulfillment of customer requirements and eEconomic aspects (Seuring and Muller, 2008).

The failure of a stage or a factor in the supply chain will affect the overall performance and competitiveness of the supply chain system. Developing countries are challenged because their economic benefits are reliant on natural resources. Many social implications of production activities are neglected (Hutchins and Sutherland, 2008). Therefore, it is necessary to assess the performance of the whole supply chain in three aspects of sustainability. Economic, environmental and social constraints are three key points in the sustainable development of the agricultural supply chains and are becoming increasingly prominent in developing countries.

3. The shrimp supply chain in the Mekong Delta, Vietnam

Vietnam has a coastline of 3,260 kilometers. Aquaculture is now a strength that facilitates the expansion and promotion of economic development. According to the statistics of the General Department of Vietnam Customs, the export turnover of 10 major expcommodity groups of Vietnam in 2016 reached nearly 126.85 billion USD, accounting for 71.8% of total export turnover of the country. Of these, export turnover of seafood products was $US 7,053.14 million (Aries, 2017). Aquaculture is one of the key economic sectors of Vietnam and seafood products have been exported to approximately 160 markets around the world.

According to the Vietnam Association of Seafood Exporters and Producers (VASEP), Vietnam has overtaken Thailand and become the world leader in shrimp export (Tuyet Nhung, 2016). Vietnam's shrimp exports in recent years have generated higher turnovers than rice exports (US$2.2 billion in 2016), making shrimp the second most valuable agricultural commodity after coffee (US$3.36 billion in 2016) (Tran Viet, 2017). In 2016, the value of shrimp exports reached USD 3.15 billion, accounting for 45% of total seafood export turnover (Table 1).

In 2016, Vietnam exported shrimp to 90 markets, reaching a turnover of more than 3,1 billion USD, up 7% compared to 2015. Among them, five main markets - the US, EU, Japan, Korea and China - have been growing steadily.

Table 1: Vietnam seafood exports from 2014 to 2016

Unit: million USD

	2014		2015		2016	
Seafood exports	**Value**	**%**	**Value**	**%**	**Value**	**%**
- Shrimp	3,952.91	50.4	2,952.37	44.9	3,150.72	44.7
- Pangasius	1,768.16	22.6	1,565.17	23.8	1,714.89	24.3
- Tuna	484.24	6.2	454.97	6.9	509.79	7.2
- Mollusk	566.35	7.2			523.50	7.4
- Crab, other crustaceans	131.21	1.7	429.19	6.5	124.53	1.8
- Other seafish	933.17	11.9	1,170.89	17.8	1,029.70	14.6
Total	**7,836.04**	**100**	**6,572.60**	**100**	**7,053.13**	**100**

(*Source: from Reports on Vietnam seafood exports, VASEP 2014, 2015, 2016)*

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Table 2: Vietnam shrimp export markets from 2014 to 2016

Unit: million USD

	2014		2015		2016	
Shrimp export markets	**Value**	**%**	**Value**	**%**	**Value**	**%**
- US	1,064.05	26.9	657.04	22.3	708.76	22.5
- EU	682.75	17.3	548.58	18.6	600.37	19.1
- Japan	743.44	18.8	584.27	19.8	599.84	19.0
- South Korea	317.80	8.0	250.94	8.5	285.13	9.0
- China	414.07	10.5	350.37	11.9	435.62	13.8
- ASEAN	62.14	1.6	55.18	1.9	55.58	1.8
- Others	668.67	16.9	506.00	17.1	465.44	14.8
Total	**3,952.91**	**100**	**2,952.37**	**100**	**3,150.72**	**100**

(*Source: from Reports on Vietnam seafood exports, VASEP 2014, 2015, 2016)*

The Mekong Delta is one of the southernmost regions of Vietnam, also known as the Southwest Region. It has one central city, Can Tho City, and 12 provinces: Long An, Tien Giang, Ben Tre, Vinh Long, Tra Vinh, Hau Giang, Soc Trang, Dong Thap, An Giang, Kien Giang, Bac Lieu and Ca Mau. Shrimp farming is the most advantageous because this area has an aquaculture area of about one million hectares (including 700,000 hectares for shrimp farming). Over the past 10 years, shrimp production has maintained a high growth rate of 8.8% a year and has become an important livelihood for about one million people, of which over 80% people are small farmers, and this sector has created more than three million jobs in seafood processing factories and related services (Thai Nguyen, 2017). This rapid development is due to the rapidly increasing demand of the world shrimp market and Vietnam's shrimp production has gone up dramatically, especially since 2000 when the government allowed agricultural production based on natural and market conditions. The area and output of shrimp farming in the Mekong Delta has changed rapidly (Nguyen Duc Loc, 2017). The Mekong Delta has aquaculture areas accounting for 70% of the total aquaculture area of the country, producing 58% of the country's aquaculture output, 80% of shrimp output, and 60% of seafood export turnover in the whole country. Brackish water shrimp is a key species of aquaculture (Phuoc Minh Hiep, 2013). Thanks to the advantages of the shrimp sector, with the continuous expansion of the shrimp export market, it is potential to develop the Mekong Delta as the capital of high quality shrimp farming in the world, and to build a global brand for Vietnam shrimp. Vietnam will strive to become the world's shrimp factory. The objective by 2025 is to reach the shrimp export turnover of 10 billion USD, and shrimp sector must develop sustainably and strive to reach 10% of the national GDP (Huynh Hai, 2017).

Although Vietnam shrimp sector has achieved great achievements and results, it has not fully utilized its potential and advantages yet. Shrimp industry development still has many shortcomings and inconsistencies that directly affect the efficiency and sustainability in the production and marketing of this product. First, the infrastructure system has not met the requirements of reality; production organizations are small, scattered, and difficult to control; high-tech models are still limited; production and environment still have many shortcomings; the linkage in production and management among departments is loose,... (Xuan Thao, 2017). Besides, the price of raw shrimp is not reasonable compared with the export price due to the production cost in Vietnam is too high. Feed, breeding shrimps, veterinary drugs,... account for more than 70% of the total cost per shrimp culture cycle. At the same time, most of the input costs are totally dependent on foreign corporations, which makes production cost of Vietnamese shrimp always higher than that of other countries (H.Chung, 2017). According to Asian Development Bank (ADB), Vietnam needs to address some of the key policy challenges, including facilitating stronger competition in agricultural supply chains, post-harvest processing; build rural infrastructure, support agricultural commodities to help bring higher added value; sustainably implement natural resource

management; and effectively integrate climate change considerations into decision making (Daibieunhandan.vn, 2017). At present, the agricultural supply chain has too many middlemen, particularly traders. Traders are a barrier between farmers and businesses because they suggest low prices but they are much profitable, while the farmers are in the opposite side. Major disadvantages in the agricultural supply chain include over 70% of farming households cultivating on an area of less than 0.5 ha and not adopting modern farming practices, legislature constraints in terms of production development on a large scale and lack of working capital (Nistpass, 2016).

In order to achieve the objective of sustainable development, besides economic efficiency, environmental and social responsibility must be assessed in a serious and objective manner. Therefore, it is important to have empirical research on the effects of SSCM theories on the shrimp supply chain in the Mekong Delta to help supply chain stakeholders as well as admisnistrators have a holistic view of sustainability and appropriate approaches in the context of globalization today.

4. Conclusions

Globalization plays an important role in promoting sustainable development. Raw material prices are constantly rising due to unreasonable exploitation and utilization of natural resources. Sustainable supply chain development is an inevitable choice for the social development. Sustainable agricultural supply chains have a significant impact on economic, social and environmental activities and contribute positively to the world's poverty alleviation. In addition to other agricultural supply chains, shrimp supply chains play an important role in the economic and social development. This paper aims to overview a specific issue for discussion on the field of sustainable shrimp supply chain management. We hope that our work could contribute to the development of a sustainable shrimp supply chain and a better understanding of the field.

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