LE VAN THU

A STUDY ON THE SUPPLY CHAIN OF FARMED SHIRMP IN QUANG NAM PROVINCE

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Reviewer 1: .................................
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Doctoral Assessment Committee:
On: … h, …… …… 2015

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INTRODUCTION

1. The rationale of the thesis

Vietnam is one of the leading shrimp exporters in the world. In 2011, the total shrimp export turnover reached US$ 2.4 billion, up 17.64% from 2010, in which black tiger shrimp and white-leg shrimp accounted for 59.7% and 29.3% respectively. Vietnam’s shrimp products have been used in more than 91 countries and territories, among those USA, Japan and EU are the biggest markets making up over 65% of the shrimp export value in Vietnam.

For over the last two decades, the shrimp industry has gradually developed and considerably contributed to the total value added of the fishery sector and the country’s GDP. Vietnam’s shrimp industry, which is dominated by a vast majority of small-scale farmers, has been proving its strength in the context of integration and steadily exploiting its competitive advantage on the international market.

The supply chain of farmed shrimp is “the path” in which shrimp is created and goes through to the final customer. The chain connects the market supply and demand and is to convey information on shrimp demand from customers to farmers. It takes an important role in organizing and managing the shrimp industry in today’s competitive environment.

In recent years, Quang Nam Province has diversified crops and livestock structure in Agriculture-Forestry-Fishery production to improve the local residents’ living standards. However, farmers in general, shrimp farmers in particular have faced host of constraints in growing out and consuming products. The income is high, yet unstable and suffers heavily from disease outbreaks and unfavourable volatility of the shrimp input and output market. One of the most influential reasons is due to the ineffective operation of the shrimp supply chain, limited collaboration of the involved actors and ability to take control of environmental pollution, food hygiene and safety, and the improper benefit allocation between actors, especially to farmers.

Stemming from the above-mentioned reasons, the author chose “A study on the supply chain of farmed shrimp in Quang Nam Province” to be the research topic for his doctoral thesis.

2. Research objectives

2.1. Overall objectives

The thesis aims to provide scientific backgrounds and propose solutions to improving the
supply chain of farmed shrimp for the sake of elevated economic efficiency and sustainable development of the shrimp industry in Quang Nam Province.

2.2. Specific objectives

(1) Systematizing and clarifying the theoretical and practical issues related to the supply chain of farmed shrimp (CCSPTN);

(2) Analysing and evaluating the current situation of CCSPTN in Quang Nam Province;

(3) Proposing key solutions to improve CCSPTN to increase economic efficiency, competitiveness and the sustainable development of the shrimp industry in Quang Nam Province.

3. The object and scope of the study

3.1. The object of study

The study object is issues related to the supply chain/value chain in the intimate relationship with economic efficiency and competitiveness of the shrimp industry.

2.3. The scope of study

+ Content: To achieve the objectives set out, the thesis focused on the study of CCSPTN in Quang Nam Province, which included the in-depth analysis of the chain structure, the involved actors, the value creating process, the flows of products, information, finance and the relationship between actors in the chain; factors affecting the operation of the supply chain, the productivity and economic efficiency of shrimp farmers – the central actors of the chain; and the evaluation of comparative advantage and competitiveness of farmed shrimp within the limited economic resources. One the basis of those analyses, the thesis proposed key solutions to improving CCSPTN to increase economic efficiency, competitiveness and sustainable development of the shrimp industry in Quang Nam Province.

+ Space: To obtain in-depth analyses and draw logical conclusions, the thesis is limited to the scope of the shrimp industry in Quang Nam, including the involved actors inside the province to meet the demand of domestic and export market. In addition, the thesis also refers to primary and direct input suppliers, consumers, processors and exporters of the shrimp originally produced in Quang Nam. The expansion to the actors outside the province allows the well-rounded generalization of the supply chain/value chain of farmed shrimp.

+ Time: Secondary data used in the thesis covering the period 2005-2012, primary data
mainly collected from the survey in 2012, predicted data on related issues up to 2020.

4. Contributions of the thesis

The research results contributed to systematizing and clarifying theoretical and practical issues related to the supply chain/ value chain of farmed shrimp in the intimate relationship with economic efficiency and competitiveness of farmed shrimp. First of all, the model of supply chain analysis resulted from the perspective of integrating conventional supply chain analysis and Michael Porter’s value chain was employed to analyse the current situation of CCSPTN in Quang Nam province. This model identified the actors involved in each chain through the movement of the flows of material products consisting of the structure of CCSPTN, of the flows of value creating process, finance, information and the collaboration between the involved actors in CCSPTN in Quang Nam Province.

The value creating process is the most important process in the chain and also the key target of the supply chain management. Analysing CCSPTN also incorporates evaluating the groups of factors affecting the operation of supply chain, which eventually serves as the foundation for identifying the system of evaluation criteria and research methods of CCSPTN in Quang Nam Province. Based on the analysis of value creating process, the thesis came up with an evaluation of the performance and economic efficiency of each actor and the whole supply chain of farmed shrimp. The thesis also pointed out limitations and shortcomings in the flows of information, the collaboration, the value creating process and irrationality in the value added distribution between the actors and clarified the causes of the loss of shrimp farmers in the process of benefit distribution. In addition, the research analysed the key factors affecting productivity, investment efficiency of shrimp farmers – the central actors of the chain, and at the same time determined the competitive advantage of farmed shrimp products, and confirmed the viability and the potentials of this industry in the context of global integration. The thesis carried out an in-depth evaluation on the negative and positive impacts of each factor having on the operation of CCSPTN in Quang Nam province, including: i) natural conditions, ii) market, iii) shrimp farmers, iv) Government and state governance agencies, v) the management of CCSPTN, iv) infrastructure in the cultured areas and support services. Based on the analysis of the current situation of CCSPTN in Quang Nam, the thesis proposed key solutions to increase economic efficiency, competitiveness and develop the farmed shrimp industry in a sustainable manner.
LITERATURE REVIEW OF THE RELATED RESEARCH

1. Recent research into the supply chain of agricultural products and farmed shrimp

In recent years, there have been many studies on the supply chain of agricultural products, farmed shrimp. These researches addressed different aspects of the supply chain of agricultural products, of which some must be mentioned as follows:

Aramyan (2007) a study on “Measuring the performance of the supply chain in the field of agriculture – food sector”

Normansyah Syahruddin (2012), a doctoral thesis on “Sustainable management of the supply chain, a case study of the cocoa sector in Indonesia”

Vo Thi Thanh Loc (2006), a doctoral thesis on “Quality management of the seafood supply chain: improving the quality of the shrimp supply chain– prospect of seafood companies in Mekong Delta”.

Truong Chi Hieu (2012), a doctoral thesis: “Shrimp supply chain, common property and pollution management: A case study of Tam Giang Cau Hai Lagoon”.

2. Overall assessment of the previous research into the supply chain of agricultural products, farmed shrimp

Overall, the mentioned research into the supply chain of agricultural products, farmed shrimp contributed to systematizing and shedding light on the theoretical backgrounds of the supply chain of agricultural products. However, they merely focused on the governance aspect of the agriculture sector in the connection with the supply chain. As a result, they didn’t look deeply into the supply chain model, but only investigating supply chain as an organisational model connecting involved actors in a commodity chain of a certain product or some research specifically studied a specific aspect of the supply chain. Up to date, there hasn’t been any research adopting the perspective of integrating conventional supply chain analysis and Michael Porter’s value chain in the model of supply chain analysis. On that basis, the thesis studied the supply chain in the intimate relationship with economic efficiency and competitiveness of the farmed shrimp industry with the purpose of proposing solutions to improve the supply chain of farmed shrimp to increase economic efficiency, competitiveness and develop it sustainably in Quang Nam province.
CHAPTER 1
THEORETICAL AND PRACTICAL BACKGROUNDS OF
FARMED SHRIMP SUPPLY CHAIN

1.1. Theoretical backgrounds of farmed shrimp supply chain

On the basis of studying the concepts, structure and the involved actors in the supply chain, economic nature, factors affecting the supply chain, distinguishing supply chain and value chain, the author suggested the definition of CCSPTN as: A system of organisations, persons, technology, activities, information and the resources related to launching the farmed shrimp products from farmers to consumers. The operation of the supply chain is also the process of creating value to transform the resources of water, land, seed, feed, veterinary drugs... and unprocessed products, to complete products and bring the products to the final consumers. The ultimate goal of supply chain management is to optimize the value created for the whole chain.

Pursuant to different approached, economists have suggested many distinct characteristics of supply chain. According to the supply chain management in agriculture, CCSPTN is divided into 2 groups of characteristics: i) The characteristics of farmed shrimp products when launched to the market, ii) The distinct characteristics of farmed shrimp as well as its production and consumption process leading to unique features in the formation of CCSPTN.

From the nature of supply chain analysis, the matters involved in this process are: Identifying actors of CCSPTN, the transformation process of the flows of material products, value creating process in CCSPTN. To achieve this goal, each intermediary in CCSPTN has to meet the demand of the customer above it. Manufacturing businesses play an important role in creating value for the supply chain.

The flows of finance, information and relationships in CCSPTN: According to experts from World Bank (2008), the supply chain in agriculture is a network embracing three cross-cutting flows along the length of chain: the flows of material products (physical flows), information and finance. CCSPTN, therefore, includes these 3 flows in it.

On the basis of theoretical backgrounds of factors affecting the supply chain, and the synthesis of experts’ viewpoints, domestic and international research related to the research topic, and the author’s field study, the thesis identified a number of groups of factors
affecting the operation of CCSPTN like: natural conditions, shrimp farmers, market, Government and State governance agencies, supply chain management and infrastructure.

It can be seen from the analysis model of CCSPTN that the analysis of value creating process is the core content. To optimize the created value, the actors have to make effort in minimizing the costs of value creating activities through the leading of the flows of products, information and finance. This also means increasing economic efficiency of CCSPTN. Competitive advantage decides if a national product can compete successfully in the world market.

The survival and development of CCSPTN requires that farmed shrimp products must obtain competitive advantage. Once the farmed shrimp industry obtains competitive advantage, it inherently attracts other socio-economic resources and successfully exploits the natural resources. Hence, the supply chain analysis, economic efficiency and competitiveness are the three core contents interrelated with each other to achieve the research objectives of the thesis.

1.2. CCSPTN management lessons in other countries and in Vietnam

Based on the experience of CCSPTN organisation and management in leading shrimp exporters in the world and the current situation of supply chain/value chain of farmed shrimp in Vietnam, some lessons can be drawn for the management of CCSPTN in Quang Nam: Innovating shrimp farming technology, shrimp farmers in Thailand continuously learn and apply latest technology to reduce environmental pollution, disease and improve productivity and economic efficiency of shrimp farming; founding organisations of fishery marketing (Thailand) or aquaculture associations (Bangladesh) or establishing cooperatives for small-scale farmers to provide consultancy services on technology, input and output support services for shrimp farmers. These incentives assist farmers cover the input costs without losing their status in negotiation, allow them to participate in the direct relationship with shrimp exporters, enhance the traceability of the products and monitor the requirements of food hygiene and safety, through the local inspection system to meet the demand of consumers in EU, Japan and USA market, foster vertical chain relationship, encourage processing exporting mills to collaborate with shrimp farmers through formal contracts. Building companies vertically integrated in aquaculture investment, food processing and seed provision to manage the product quality and the traceability of products; properly distributing the benefits between actors in CCSPTN, removing unnecessary intermediaries to minimize the costs and maximize the consumers’ interest.
CHAPTER 2
INTRODUCTION TO THE STUDY SITE AND RESEARCH METHODOLOGY

2.1. Natural and Socio-economic conditions of the cultured areas in Quang Nam province

Surface water resources in Quang Nam province are suitable for aquaculture, especially for brackish water shrimp farming. The total natural land area of the province is 1,043,837 ha, accounting for 3.09% of the total land area of the country. There are two kinds of soil suitable for riverside and coastal shrimp farming (alluvial soil, sand dune soil, and coastal sandy soil). Quang Nam’s climate is diversifying, influenced by northeast and southwest monsoon. Therefore, to ensure the shrimp productivity, crop yield and quality it is necessary to design accurate seasonal calendar for stocking the ponds in accordance with the weather patterns. Shrimp production make up a high proportion of the aquaculture value, 60.46% in 2010 compared to 17.05% by fish farming and 22.49% by others. Due to this value contribution, shrimp is considered as key sector in aquaculture in Quang Nam province. According to statistical data, the period 2005 – 2012 witnessed the annual growth rate of shrimp production value is 33.36%, lower than fish and others, which affected the average growth rate of production value in aquaculture. It is, therefore, of crucial importance that there must be effective solutions to develop the shrimp farming in a sustainable manner.

2.2. The current situation of shrimp farming in Quang Nam in the period 2007-2012

The main economic organisations in shrimp farming industry in Quang Nam province are shrimp farmers, input suppliers like hatcheries, feed suppliers, veterinary drugs production and actors distributing farmed shrimp including: collectors, seafood processors and exporters, wholesalers and retailers. Each actor in the province’s farmed shrimp industry has its own characteristics. Shrimp farmers - the primary shrimp farming agent are mainly small-scale, fragmented and lacking in production and processing facilities, information, especially information about market, and technology know-how. The supply of shrimp seed is from the hatcheries outside the province through 2 main forms of either directly to shrimp farmers or indirectly through the local seed nurseries.

The supply of industrial feed for shrimp farming is from the production agencies inside and outside the province. Shrimp products are for domestic consumption and exports. Shrimp production and processing establishments are characterized by small-scale, low investment capital, and unstable shrimp processing. Due to these features, shrimp production in Quang Nam is mainly to supply raw material for the processing and exporting
establishments in Da Nang city and some neighboring provinces (87.4%) 

2.3. Research approach and CCSPTN research framework

A system of solutions to improve CCSPTN to increase economic efficiency, competitiveness and to sustainably develop the shrimp farming industry in Quang Nam

Figure 2.1. Research framework for the supply chain of farmed shrimp in Quang Nam province

The systematic approach was adopted in the study of CCSPTN. The research framework for CCSPTN in Quang Nam province is the integration of conventional supply chain and the perspective of value added in Michael Porter’s value chain. This reflects the intimate connection between the analysis of the shrimp supply chain/value chain and economic efficiency and competitiveness of the farmed shrimp industry to propose solutions to improve the supply chain, increase economic efficiency, competitiveness and develop the shrimp farming industry in a sustainable manner.

2.4. Research methods
The survey involved 270 households in 9 communes representing 3 localities: Nui Thanh district, Thang Binh district and Hoi An city. Three communes were selected from each locality, 30 households/commune accounting for 25% - 30% of the shrimp farming households in each commune.

The input suppliers and shrimp consumers were selected through the use of random sampling: 10 hatcheries, 5 feed establishments inside the province, 5 feed establishments outside the province, 5 shrimp seed establishments inside the province, 10 feed and veterinary drugs dealers level 1, 10 feed and veterinary drugs dealers level 2, 10 big collectors, 10 small collectors, 10 wholesalers outside the province, 6 wholesalers inside the province, 10 retailers outside the province, 10 retailers inside the province, 10 seafood processing and exporting establishments outside the province, and 10 processing and exporting establishments inside the province.

The information sources and secondary date were collected from Quang Nam Department of aquaculture, Quang Nam Province’s Department of Agriculture and rural development, Quang Nam Department of Trade and Industry, office of agriculture and rural development in districts, and cities in the province, Centre of fishery extension, Statistical yearbook of Quang Nam province. The author also consulted the scientific reports related to shrimp farming activities.

The primary data were collected from the survey conducted at hatcheries and shrimp seed suppliers, feed production establishments, veterinary drugs to prevent and treat shrimp diseases dealers, shrimp farmers, collectors, seafood processing and exporting companies, wholesalers and retailers.

The data were processed using main methods including economic statistics, financial planning, supply chain analysis, identifying competitive advantage, production function, expert interview, and SWOT matrix analysis.
CHAPTER 3
CURRENT SITUATION OF THE FARMED SHRIMP SUPPLY CHAIN IN QUANG NAM PROVINCE

3.1. The analysis of the farmed shrimp supply chain in Quang Nam Province

3.1.1. The structure of CCSPTN in Quang Nam Province

Diagram 3.1. Overall diagram of CCSPTN in Quang Nam Province

Source: synthesized from the survey results in 2012

In CCSPTN in Quang Nam province, shrimp farmers are central actors producing shrimp for exports and consumption markets inside and outside the province. On the basis of the flows of material products through shrimp farmers, CCSPTN in Quang Nam province is divided into: upstream flows and downstream flows.
Diagram 3.2. The upstream flows of CCSPTN in Quang Nam province

The upstream flows of CCSPTN reflect the relationship between main input suppliers: shrimp seed, feed, veterinary drugs. According to the survey, the shrimp seeds are directly or indirectly supplied to the farmers by the hatcheries outside the province. The hatcheries with brandnames like: South Central Seafood investment Ltd Company, Viet-Uc Ltd Company,... sell shrimp seeds directly to shrimp farmers, accounting for 63.8% the volume of shrimp seeds provided to the whole province. The remaining supply of shrimp seed accounting for 36.2% is from the hatcheries outside the province, sold indirectly through shrimp seed nurseries in Quang Nam province. The shrimp feed and veterinary drugs are not sold directly from the production establishments to farmers, but through the medium of their systems of dealers.

Diagram 3.3. Flows of shrimp products for exports

Based on the ratio of the shrimp consumed in various types of markets, it can be seen that the downstream flows of CCSPTN in Quang Nam province consist of 2 main flows of distribution: the flows of products for exports accounting from 87.4% and the flows of products consumed outside the province accounting from 8.5% of the total volume of farmed shrimp provided by big collectors. The flows of products consumed within the province make a low consumption proportion of 4.1%. Therefore, this flow does not represent the target market of the shrimp farmers. The thesis only focused on 2 main flows of product consumption: the flows of products for exports and the flows of products consumed outside the province.

Diagram 3.4. The flows of shrimp products consumed outside the province

The flows of shrimp consumption outside the province reflect the shrimp consumption in Da Nang, Quy Nhon, Quang Ngai. Big collectors sell shrimp to wholesalers in wholesale markets outside the province at the ratio of 8.5% of the total volume purchased.
at shrimp farmers. At the wholesale markets, wholesalers sell shrimp to retailers/hawkers in local markets. For the small collectors, they are local residents and purchase under 1 ton of shrimp to supply for retailers outside the province, usually acquaintances, at the ratio of 4.4% of the shrimp volume provided by shrimp farmers. They tend to use motorbikes for transportation, products purchased can be frozen shrimp or fresh raw shrimp. Due to its small consumption volume, the thesis only focused on analyzing the flows of products in (2.1), for it is the main flows of product consumption, representing the consumption markets outside the province.

3.1.2. The value creating process in CCSPTN in Quang Nam

3.1.2.1. Shrimp farmers

To produce 1 ton of shrimp, shrimp farmers in Thang Binh district paid an investment cost of 76.88 million dongs, shrimp farmers in Nui Thanh paid 71.15 million dongs, and those in Hoi An paid the highest cost of 80.84 million dongs/ton. In terms of investment cost per ha of shrimp farming, farmers in Nui Thanh district paid highest cost of 454.25 million dongs/ha, those in Hoi An paid the least of 197.01 million dongs/ha. The reason is that the shrimp productivity in Hoi An was low leading to highest average investment cost. The benefit –cost ratio per ton in Nui Thanh district was highest (0.37), 0.05 higher than the average level. This reality proves that shrimp farming in Nui Thanh district obtained higher economic efficiency than in the other two districts.

The total cost of value creating process/household/ton of shrimp is the sum of total production cost deducting the expenses of shrimp seeds and feed provided by the shrimp seed and feed establishment, which is 24.6 million dongs (including the cost of shrimp farming activities is 24.48 million dongs and marketing cost of 0.12 million) creating value profit of 24.16 million dongs/ton. Thanks to the collaboration between input and output actors, the shrimp farmers can reduce the transportation and marketing cost, which in turn helps to increase the profit.

3.1.2.2. The value creating process of actors involved in the upstream flows of CCSPTN

(1) Hatcheries outside the province

The value creating process of hatcheries outside the province includes: (i) breeding activities, (ii) marketing activities. According to the survey data analysis, for every ton of shrimp, hatcheries sell 12.54 million dong shrimp seed on average, in which the production cost is 9.58 million dongs and the profit obtained is 2.96 million dongs. The economic
efficiency of the direct sale of 1 ton of shrimp from hatcheries outside the province to farmers is higher than that of shrimp seed nurseries. The reason is that the average price of ten thousand shrimp seeds sold directly to farmers is 529,034 thousand dong, in which the total cost/ten thousand PL12 shrimp is 401,046 thousand dong accounting for 75.84% of the selling price and the cost of buying stock is 168,028 thousand dong accounting for 33.1% of the selling price. In comparison, the average price offered by the shrimp nurseries is 310,000 thousand dong/ten thousand shrimp seeds (0.6 lower than direct selling price by hatcheries), in which the total cost is 257,074 thousand dong accounting from 83.13% of the selling price.

(2) Feed production establishments for shrimp farming industry

According to the survey results, for every ton of farmed shrimp, feed production establishment recorded a turnover of 34.9 million dongs, in which the total production cost is 21.98 million dongs accounting for 62.98%, the average profit is 12.92 million dong accounting from 37% of the turnover, the benefit-cost ration is 0.59, in which material costs make up a large proportion of 23.65% of the turnover. The total cost of value creating process is 13.73 million dongs, including costs of production activities, transportation, advertisement and marketing. The feed production establishments inside the province achieve higher economic efficiency over 1 dong spent than the feed production establishment outside the province. However, in this competitive market, it is necessary to continuously improve product quality to ensure the sustainable and high economic efficiency.

(4) The system of feed dealers for shrimp farming industry

According to the survey results, the average turnover/dealer/ton of shrimp is 2.91 million dong, in which the cost of value creating process coinciding with the cost of business operation of the dealer is 2.45 on average. The average profit obtained in 0.45 million dong. The profit/ton of shrimp obtained by dealers level 1 is higher that by dealers level 2. In reality the income discount of dealers at level 2 is 7% lower than dealers level 1, combined with lower consumption volume leading to higher costs distributed/ton of feed. The average benefit-cost rate of the dealers is 0.18. This is the reward of the feed production establishments offering to dealers to promote consumption and reduce inventory products.

3.1.2.3. The value creating process of actors involved in downstream flows of CCSPTN

(1) Big collector
The value creating process of big collectors is through the activities of collecting and selling shrimp to seafood processing and exporting establishments or to wholesalers. The average selling price of 1 ton of shrimp to seafood processing and exporting establishments is 116.34 million dong/ton, in which the average total investment cost is 103.69 million dongs/ton and the average profit is 12.65 million/ton. Shrimp supplied for the markets outside the province for the average price of 117.41 million dong/ton, in which the average total investment cost is 103.19 million/ton. The difference in shrimp’s selling price and collecting cost between actors is due to different requirements on shrimp quality, shrimp products (frozen shrimp or fresh raw shrimp), size, location, selling time. However the actual difference in reality is not big between different flows of products in the markets.

(2) Seafood processing and exporting establishments

A ton of processed shrimp requires 1.5 ton of raw shrimp. The investment cost is 120.01 million dong/ton, the average selling price is 197.87 million dong/ton of processed shrimp, in which the price of raw shrimp is 132.57 million dong/ton, the average profit is 12.5 million dong/ton of raw shrimp. Among the production costs, the cost of raw shrimp is 116.34 million dong/ton accounting for 87.76% of the selling price, the processing cost is 3.67 million dong/ton accounting for 2.8% of the selling price. The return rate on 1 dong investment cost is 0.1, lower economic efficiency compared to other actors in the chain like collectors or shrimp farmers. The cost of value creating process of the processing and exporting establishments is 3.73 million dong/ton of raw shrimp. The price of raw shrimp is the value created by the previous actors in CCSPTN for the processing and exporting establishments.

(3) Wholesalers outside the province

Through the buying and selling activities, the actors of wholesales add the storage and transportation cost for retailers. The total cost paid by wholesalers is 122.88 million dong/ton, in which the cost of raw shrimp is 117.41 million dong/ton, accounting for 84.55%, the cost of trading activities is 5.47 million dong/ton including the costs of electricity to run freezer, additional ice, delivery transportation to retailers/hawkers in local markets. Among the cost of value creating process, the average transportation cost/ton of shrimp paid by wholesalers is 60,000 thousand dong higher than that of big collectors. Especially, in case of prolonged storage, the difference reaches 740,000 thousand dong/ton. The main reason is due to the dependence on the daily consumption of retailers, which leads to the wholesalers obtaining lower economic efficiency than big collectors. There should be measures to enhance the value added to the wholesalers.
(4) Retailers outside the province

The average turnover is 155.65 million dong/ton, in which the average total investment cost is 143.75 million/ton accounting for 92.35% and the average profit is 11.9 million dong/ton accounting from 7.65% of the turnover; the average cost of purchasing raw shrimp is 138.87 million dong/ton, accounting for 89.22% of the turnover. The average total cost of retailing activities is 4.88 million dong/ton accounting from 3.14% of the turnover. The return rate on the investment cost is 0.08 lower than wholesalers lying in the same flows of products consumed outside the province. The cost of value creating process is the cost of retailing activities at 4.88 million dong/ton.

The analysis of the value creating process of each actor in CCSPTN in Quang Nam province indicates that: each actor undertakes a number of value creating activities when the flows of material products go through it, transforms the raw materials and natural resources to shrimp product, processed shrimp products meet the various need of consumers; in the whole CCSPTN only farmers produce shrimp, other actors are suppliers, distributors bridging the input and output factors to the markets; the results and economic efficiency of each actor depend on the organisation of its value creating process.

3.1.3. The flows of finance in the farmed shrimp supply chain in Quang Nam

3.1.3.1. The payment process and economic efficiency of the chain

<table>
<thead>
<tr>
<th>Table 3.1. The performance of finance activities of the actors in CCSPTN in Quang Nam province (per 1 ton of shrimp)</th>
<th>unit: million dong</th>
<th>Value chain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Justification</td>
<td>Hatcheries</td>
<td>Feed production establishments</td>
</tr>
<tr>
<td>I. Flow 1.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Turnover (selling price)</td>
<td>12.54</td>
<td>34.90</td>
</tr>
<tr>
<td>2. Difference in shrimp price(%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3. Production cost</td>
<td>9.58</td>
<td>21.98</td>
</tr>
<tr>
<td>4. Benefit</td>
<td>2.96</td>
<td>12.92</td>
</tr>
<tr>
<td>5. Benefit/cost</td>
<td>0.31</td>
<td>0.59</td>
</tr>
<tr>
<td>II. Flow 2.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Turnover (selling price)</td>
<td>12.54</td>
<td>34.90</td>
</tr>
<tr>
<td>2. Difference in shrimp price(%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3. Production cost</td>
<td>9.58</td>
<td>21.98</td>
</tr>
<tr>
<td>5. Benefit/cost</td>
<td>0.31</td>
<td>0.59</td>
</tr>
</tbody>
</table>

Source: the author’s calculation
In Flow 1.1, the difference between the end actors and farmers is 33.77%. Similarly, in Flow 2.1 the price difference between farmers and the end actor is 58.63%. The shrimp selling price to the final consumer is 155.65 million dong/ton higher than the export price (132.57 million dong/ton), which leads to the low shrimp consumption in the domestic market. In the flow 2.1, 1 dong of investment gain 1.10 dong of profit, higher economic efficiency than in flow 1.1, yet limited consumption of 8.5% compared to the yield provided for the market by shrimp farmers. The analysis of the payment process between the actors shows that shrimp farmers are the central actors earning the highest return rate on the investment (from 23.18 million dong to 24 million dong/ton of harvested shrimp). This rate is higher than that of other actors in the chain and shrimp farmers also obtain higher economic efficiency than actors in the downstream flow in CCSPTN in Quang Nam. Based on the survey data analysis, shrimp farmers earn the lowest total mixed income (on average 188.7 million dong/household) and so the mixed income per capita is also lowest reaching 80 million dong/person/year.

3.1.3.2. The financial position and profit distribution among actors in CCSPTN

It can be seen from Table 3.2 that in CCSPTN for markets outside the province, the cost of value creating process in each chain varies. In this chain, shrimp farmers have highest cost of value creating process (39.9%) including wages, expenses of veterinary drugs and chemical substances, marketing cost. However, the profit earned is not comparable with the financial position of shrimp farmers (28.4%). Similarly in CCSPTN for export markets (Table 3.3), shrimp farmers pay the cost of value creating process at 24.6 million dong/ton accounting for 45.2%, yet the earned profit is only 24.3 million dong/ton accounting for 36.9% of the total chain value while the other actors in downstream flow obtain a profit proportion higher than their financial position.

**Table 3.2. The proportion of the value creating cost, profit earned by actors in CCSPTN for markets outside the province**

<table>
<thead>
<tr>
<th>Actors</th>
<th>Total production cost</th>
<th>Value creating cost</th>
<th>Proportion of value creating cost</th>
<th>Profit</th>
<th>Profit proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hatcheries</td>
<td>9,58</td>
<td>5,81</td>
<td>9,43</td>
<td>2,96</td>
<td>3,63</td>
</tr>
<tr>
<td>2. Feed production</td>
<td>21,98</td>
<td>13,32</td>
<td>21,62</td>
<td>12,92</td>
<td>15,83</td>
</tr>
<tr>
<td>Feed establishments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Feed dealers</td>
<td>2,45</td>
<td>2,45</td>
<td>3,98</td>
<td>0,45</td>
<td>0,55</td>
</tr>
<tr>
<td>4. Shrimp farmers</td>
<td>74,94</td>
<td>24,60</td>
<td>39,94</td>
<td>23,18</td>
<td>28,40</td>
</tr>
</tbody>
</table>
5. Big collectors & 103,19 & 5,07 & 8,23 & 117,4 & 14,22 & 17,42 \\
6. Wholesalers outside the province & 122,88 & 5,47 & 8,88 & 138,8 & 15,99 & 19,59 \\
7. Retailers outside the province & 143,75 & 4,88 & 7,92 & 155,6 & 11,9 & 14,58 \\
Total & 61,60 & 100,00 & 81,62 & 100,00  \\

Source: survey data in 2012

The data analysis indicates that to improve CSPTN to increase economic efficiency, competitiveness, and sustainable development of the shrimp farming industry, it is critical to adopt effective solutions to elevate the value added for shrimp farmers. These solutions include micro-economic and macro-economic management to create best conditions to simultaneously resolve the benefits of shrimp farming and achieve the optimization of customers’ benefits or maximise the value added of the whole supply chain of farmed shrimp in Quang Nam province.

Table 3.3. The proportion of value creating cost, profit earned by actors in CCSPTN for export markets

<table>
<thead>
<tr>
<th>Actors</th>
<th>Total production cost</th>
<th>Value creating cost</th>
<th>Proportion of value creating cost</th>
<th>Price</th>
<th>Profit</th>
<th>Profit proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hatcheries</td>
<td>9,58</td>
<td>5,81</td>
<td>10,70</td>
<td>12,54</td>
<td>2,96</td>
<td>4,50</td>
</tr>
<tr>
<td>2. Feed establishments</td>
<td>21,98</td>
<td>13,32</td>
<td>24,50</td>
<td>34,90</td>
<td>12,92</td>
<td>19,63</td>
</tr>
<tr>
<td>3. Feed dealers</td>
<td>2,45</td>
<td>2,45</td>
<td>4,50</td>
<td>2,90</td>
<td>0,45</td>
<td>0,68</td>
</tr>
<tr>
<td>4. Shrimp farmers</td>
<td>74,94</td>
<td>24,60</td>
<td>45,30</td>
<td>99,24</td>
<td>24,30</td>
<td>36,91</td>
</tr>
<tr>
<td>5. Big collectors</td>
<td>103,70</td>
<td>4,46</td>
<td>8,20</td>
<td>116,30</td>
<td>12,64</td>
<td>19,20</td>
</tr>
<tr>
<td>6. Wholesalers outside the province</td>
<td>120,01</td>
<td>3,67</td>
<td>6,80</td>
<td>132,60</td>
<td>12,56</td>
<td>19,08</td>
</tr>
<tr>
<td>Total</td>
<td>54,31</td>
<td>100,00</td>
<td>65,83</td>
<td>100,00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: survey data in 2012

3.1.4. The flows of information in the chain

- The level of vertical information exchange: The level of information shared among actors reflects the quality of the information flow which is smooth or blocked in the shrimp supply chain. In CCSPTN in Quang Nam province, the level of information exchange between actors in the relationship of partners is varied.

- Among the upstream actors: The survey of 4 upstream actors (including shrimp farmers) in CCSPTN in Quang Nam shows that there are two actors having the average
level of information exchange with the other two, they are shrimp farmers (3.019) and feed production establishments/dealers

- *Among the downstream actors:* The survey of 5 downstream actors (including shrimp farmers) shows that there are 3 actors having average level of information exchange with actors in their direct relationship, they are big collectors, wholesalers outside the province and the seafood processing and exporting establishments.

- *Level of horizontal information exchange:* There is weak communication in each stage.

In general, the level of information exchange in CCSPTN in Quang Nam is limited, the information shared mainly through direct trading relationship between actors in the chain. This is one of the reasons leading to the lack of transparency, congestion of the information flow, affecting the collaboration between actors, economic efficiency reduction and constraints to maximise the chain value.

### 3.1.5. The collaboration between the actors in the supply chain

- *Among the upstream actors:* Through the survey of 3 upstream actors in CCSPTN in Quang Nam, the collaboration between actors were self-evaluated as weak (average level <2.6)

- *Among the downstream actors:* The survey results show that the collaboration between downstream actors is not yet high. Among the 5 actors surveyed, there are 3 actors namely big collectors, wholesalers outside the province, the processing and exporting establishments reaching the relatively average level (2.9, 2.7 and 3.1 respectively)

- *Horizontal collaboration not yet close and lacking in sustainable links*

In short, the analysis of the collaboration of both upstream and downstream actors in CCSPTN in Quang Nam shows that the level of cooperation between actors is low, mainly depending on the direct relationships born during the trading activities. This is the embryonic sign of incoherent and partial relationship, yet to reach the level of vertical integration, which consequently leads to reducing economic efficiency and competitiveness of shrimp farming in Quang Nam province.

### 3.2. The key input factors affecting productivity and economic efficiency of shrimp farming
The regression coefficients of the independent variables such as seed, industrial feed, labor wage, quarantine, separate water supply system and training were positive and had the significance level of over 90%

Table 3.4. The estimated results of Cobb-Douglas production function of shrimp farmers adopting intensive farming season 1 and intensive farming season 2 in Quang Nam

<table>
<thead>
<tr>
<th>Variables and coefficients</th>
<th>Intensive farming season 1</th>
<th>Intensive farming season 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficients</td>
<td>T-stat</td>
</tr>
<tr>
<td>Constant (C)</td>
<td>-2,946***</td>
<td>-2,523</td>
</tr>
<tr>
<td>LnX1- Ln(stocking density)</td>
<td>0,205***</td>
<td>4,176</td>
</tr>
<tr>
<td>LnX2- Ln(feed)</td>
<td>0,642***</td>
<td>17,360</td>
</tr>
<tr>
<td>LnX3- Ln(labor)</td>
<td>0,350**</td>
<td>1,998</td>
</tr>
<tr>
<td>D1- Quarantine</td>
<td>0,088*</td>
<td>1,704</td>
</tr>
<tr>
<td>D2- Farming pond environment</td>
<td>-0,071*</td>
<td>-1,665</td>
</tr>
<tr>
<td>D3- Irrigation system</td>
<td>0,098**</td>
<td>2,087</td>
</tr>
<tr>
<td>D4- Diseases</td>
<td>-0,090*</td>
<td>-1,883</td>
</tr>
<tr>
<td>D5- Training</td>
<td>0,086**</td>
<td>1,999</td>
</tr>
</tbody>
</table>

F-Statistic   | 125,072***  | 108,355*** |
R²            | 0,7931      | 0,7720     |
R²-Adjusted R Square | 0,7868  | 0,7649     |
Observations  | 270         | 265        |

Source: survey data in 2012

Notes: (*) statistically significant 90%  (**) statistically significant 95%  (***). statistically significant 99%,

The regression coefficients of farming pond environment, diseases decrease shrimp productivity with the statistical significance of 90% or above in both farming models. This means that shrimp productivity decrease or increase positively with individual regression coefficients. Diseases and farming pond environment are the two prominent factors affecting shrimp productivity. Provided that the other factors are constant, if diseases occur and are timely controlled, the productivity reduces (8.6% for intensive farming crop 1, 10.45% for intensive farming crop 2) in comparison with shrimp farms having no diseases or infection. Likewise, if the farming pond water is contaminated, the productivity reduces (6.8% for intensive farming crop 1, 17.14% for intensive farming crop 2) in comparison with uncontaminated shrimp ponds. Therefore frequent pond treatment and disease prevention is a must in white-leg shrimp’s intensive farming, crop 2.

Table 3.5. Marginal productivity of primary inputs to shrimp farming in Quang Nam

<table>
<thead>
<tr>
<th>Inputs</th>
<th>unit</th>
<th>X mean</th>
<th>Marginal productivity- MP&lt;sub&gt;x&lt;/sub&gt;&lt;sub&gt;i&lt;/sub&gt; (ton/ha)</th>
<th>Marginal product value- Mov&lt;sub&gt;i&lt;/sub&gt; (mill. dong)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X&lt;sub&gt;1&lt;/sub&gt;- Stocking density</td>
<td>Ten thousand /ha</td>
<td>125,56</td>
<td>0,009</td>
<td>0,007</td>
</tr>
</tbody>
</table>

21
Based on the production function established corresponding to each season of intensive farming in a year, the marginal productivity and marginal product value of each input factor were identified as in Table 3.5. From that, economic efficiency of each input factor was also calculated.

Economic efficiency of input factors was indicated in Table 3.6, with the average selling price of 99.1 million dong/ton of shrimp, if ten thousand shrimp seeds/ha is added, intensive farming crop 1 earns a profit of 0.352 million dong, and intensive farming crop 2 is 0.179 million dong. Increasing 1 ton of feed/ha will bring about a profit of 25.5 million dong and 5.6 million dong for intensive farming crop 1 and crop 2 respectively. Increasing one day of hired work will bring about a profit of 0.166 million dong and 0.110 million dong for intensive farming crop 1 and crop 2 respectively. Comparison between the two crops shows that the three factors of stocking density, labor and feed bring about higher investment efficiency for intensive farming crop 1 than for crop 2.

Table 3.6. Economic efficiency of primary input factors for white-leg shrimp farming in Quang Nam province

<table>
<thead>
<tr>
<th>Input factors</th>
<th>Movie (mill. dong)</th>
<th>$P_X$ (mill. dong)</th>
<th>Movie-$P_X$ (mill. dong)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Crop 1</td>
<td>Crop 2</td>
<td></td>
</tr>
<tr>
<td>X₁ - Stocking density</td>
<td>0.869</td>
<td>0.696</td>
<td>0.517</td>
</tr>
<tr>
<td>X₂ - Feed</td>
<td>51,138</td>
<td>31,358</td>
<td>25,682</td>
</tr>
<tr>
<td>X₃ - Labour</td>
<td>0.267</td>
<td>0.211</td>
<td>0.101</td>
</tr>
</tbody>
</table>

As can be seen from the above analysis, to achieve economic efficiency in white-leg shrimp farming in Quang Nam, the shrimp farmers should focus on intensive farming crop 1 in low land areas, increasing stocking density, worked hours to take care of shrimp at all stages from feeding, aeration monitoring, checking water color, preventing diseases and giving timely treatment to pond environment. It is advisable to select high quality feed to increase shrimp productivity, shrimp product value and economic efficiency.

3.3. Competitive advantage of farmed shrimp in Quang Nam Province

3.3.1. DRC coefficient of farmed shrimp products
The results below show that both farmed shrimp in both crop 1 and crop 2 has high competitive advantage because all DRC/SER are smaller than 1 (DRC of crop 1 is 0.4892, of crop 2 is 0.5853). However, farmed shrimp in crop 1 has higher competitive advantage than in crop 2. The reason is that farmed shrimp in crop 1 has high yield, low level of environmental pollution and diseases, no pressure of floods which results in high investment.

Table 3.7. DRC of intensively farmed shrimp in two crops for exports in Quang Nam province (per a ton of farmed shrimp)

<table>
<thead>
<tr>
<th>No.</th>
<th>Criteria</th>
<th>Unit</th>
<th>Crop 1</th>
<th>Crop 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Endogenous factors that can’t be purchased and domestically produced</td>
<td>1000VND</td>
<td>66689.51</td>
<td>80805.27</td>
</tr>
<tr>
<td>II</td>
<td>Imported factors</td>
<td>USD</td>
<td>241.62</td>
<td>265.81</td>
</tr>
<tr>
<td>III</td>
<td>Cost of collecting and processing</td>
<td>1000VND</td>
<td>8180.00</td>
<td>8180.00</td>
</tr>
<tr>
<td>IV</td>
<td>Output value</td>
<td>USD</td>
<td>9500.00</td>
<td>9500.00</td>
</tr>
<tr>
<td>V</td>
<td>DRC</td>
<td></td>
<td>12.23</td>
<td>14.63</td>
</tr>
<tr>
<td>VI</td>
<td>Official rate</td>
<td>USD</td>
<td>20.83</td>
<td>20.83</td>
</tr>
<tr>
<td>VII</td>
<td>Shadow exchange rate</td>
<td>USD</td>
<td>24.99</td>
<td>24.99</td>
</tr>
<tr>
<td>VIII</td>
<td>DRC/SER times</td>
<td></td>
<td>0.4892</td>
<td>0.5853</td>
</tr>
</tbody>
</table>

Source: survey data and the author’s calculation

This coefficient shows that in case of crop 1 if $ 0.4892 investment is spent, within the average duration of 80 days, the harvested and exported shrimp products will earn an added foreign currency of 1 USD while in case of crop 2 the investment spent is 0.5853 for the same value added. This finding has a significant impact on the local economic strategy development.

3.3.2. DRC sensitivity analysis

Table 3.8. DRC sensitivity analysis of intensively farmed shrimp for exports in two crops in Quang Nam province

<table>
<thead>
<tr>
<th>No.</th>
<th>Change in cost of price of exporting shrimp</th>
<th>Scenarios</th>
<th>Crop 1</th>
<th>Crop 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Change in cost of price of exporting shrimp</td>
<td>Scenarios</td>
<td>0.4892</td>
<td>0.5853</td>
</tr>
<tr>
<td>II</td>
<td>Domestic production cost</td>
<td>2.3</td>
<td>0.5612</td>
<td>0.6677</td>
</tr>
<tr>
<td></td>
<td>Increase 15%</td>
<td>0.6331</td>
<td>0.7529</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increase 30%</td>
<td>0.4921</td>
<td>0.5863</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>Exporting cost</td>
<td>3.3</td>
<td>0.4950</td>
<td>0.5901</td>
</tr>
<tr>
<td></td>
<td>Increase 15%</td>
<td>0.4950</td>
<td>0.5901</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increase 30%</td>
<td>0.4950</td>
<td>0.5901</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>Price of exporting shrimp</td>
<td>4.3</td>
<td>0.5796</td>
<td>0.6906</td>
</tr>
<tr>
<td></td>
<td>Decrease 15%</td>
<td>0.7109</td>
<td>0.8480</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Decrease 30%</td>
<td>0.7109</td>
<td>0.8480</td>
<td></td>
</tr>
</tbody>
</table>
### V Cost and price of exporting shrimp

| 5.3 | All the costs increase 15% and the price of exporting shrimp decreases 15% | 0.6695 | 0.7977 |
| 5.4 | All the costs increase 30% and the price of exporting shrimp decrease 30% | 0.9359 | 1.1168 |

*Source: Survey data and the author’s calculation*

From the table 3.8, the scenarios of change in input and output costs are unfavourable for shrimp farming in local areas in Quang Nam province, yet the ratio of DRA/SER is always under 1. However, when domestic production cost and exporting cost increase 30% and the price of exporting shrimp decrease 30%, shrimp farming in crop 2 loses its comparative and competitive advantage. On the other hand, since the collaboration between actors in the chain is not binding tightly, the increase of input cost and decrease of output price will unavoidably have adverse impacts on shrimp farmers in Quang Nam.

With the average export price of white-leg shrimp: in crop 1 the ratio DRC/SER is always under 1, in crop 2 in 2008 and 2009 the ratio is bigger than 1 due to the increased input costs and decreased exporting price compared to that in 2007, which led to a reduction on economic efficiency and competitiveness. This is the strong scientific evidence for the state governance agencies to take into consideration to encourage the shrimp farmers in low-lying areas to adopt one farming crop to ensure the economic efficiency and competitiveness.

### 3.4. Overall assessment of the current situation of the shrimp supply chain in Quang Nam

- The survey results indicated that the shrimp supply chain in Quang Nam province consists of a number of actors, each actor is a chain performing specialized activities in each stage. First and foremost, shrimp farmers are regarded as the central actors and the sole actors that produce shrimp products to serve the market consumption.

- Each actor in the chain holds an important role in creating the value of the chain. Through its own activities, the actors contribute to the value added to the shrimp product in the supply chain. In downstream flows of CCSPTN in Quang Nam, shrimp farmers have highest economic efficiency and financial position, yet the benefits are not yet properly distributed.

- The analysis of factors affecting shrimp productivity and economic efficiency shows that: the factors of stocking density, labor, amount of feed, quarantine, training and investment in irrigation system contribute to increasing shrimp productivity. Diseases and contaminated farming pond reduce shrimp productivity. The factors of stocking density, labor, amount of feed also contribute to increasing economic efficiency of shrimp farmers.

- The farmed shrimp products in Quang Nam province have competitive advantage with DRC/SER<1. However, if the input costs and output price increase and decrease respectively over 30%, farmed shrimp products’ competitiveness will be low. The reality shows that crop 1 yielded higher economic efficiency and competitive advantage than crop 2. When the average export price reaches US$ 4.27 thousand/ton, the farmed shrimp in crop 2 loses its competitive advantage.

- The factors of natural conditions, market, shrimp farmers, government and state
governance agencies in Quang Nam, the factors in CCSPTN management as well as factors of infrastructure in the cultured areas and support services have impacts on the operation of CCSPTN in Quang Nam. In particular, factors of cultured area planning, scale and farming area, weak irrigation system, unqualified logistics support, poor transportation systems are hindrances to the operation of CCSPTN in Quang Nam. These limitations need to be addressed to improve the supply chain to increase economic efficiency, competitiveness and to develop the shrimp farming in a sustainable manner.

CHAPTER 4
SOLUTIONS TO IMPROVE THE SHRIMP SUPPLY CHAIN IN QUANG NAM PROVINCE

Accurate assessment of the current situation of CCSPTN in Quang Nam and the domestic and international shrimp consumption trend serves as a strong foundation for effective solutions to improve CCSPTN in Quang Nam Province.

The proposed solutions to improve CCSPTN in Quang Nam province were also based on perspectives, orientation of improving CCSPTN to increase economic efficiency, competitiveness and to sustainably develop the shrimp farming industry as well as the analysis of SWOT matrix about the strengths, weaknesses, opportunities, threats of the shrimp farming in Quang Nam province.

The key groups of solutions to improve CCSPTN in Quang Nam province includes

4.1. Solutions to each actor in the chain

This includes (i) increasing shrimp productivity and economic efficiency for the shrimp farmers, (ii) enhancing the collaboration and information exchange for each actor in the chain, (iii) taking food hygiene and safety into consideration in each actor in the chain

4.2. Solutions to state governance agencies in Quang Nam province

This group of measures includes (i) planning the shrimp cultured areas towards sustainable development, ensuring the stability, quality and efficiency of the chain, (ii) upgrading the infrastructure of the cultured areas towards increasing economic efficiency, competitiveness and sustainable development; (iii) financial policy to improve CCSPTN; (iv) promoting the role of community groups, towards establishing cooperatives of shrimp farming services to resolve benefits for shrimp farmers; (v) improving human resources serving in the shrimp farming industry; (vi) expanding domestic shrimp consumption markets and export markets; (vii) strengthening state management of CCSPTN, creating favorable conditions for the sustainable development of shrimp farming industry.

CONCLUSIONS

The analysis model of CCSPTN focused on analysing actors involved in the supply chain, the transformation of flows of material products, value creating process, payment
process, information exchange and collaboration in the chain. In which, value creating process is the most important one and also the ultimate purpose of the chain. The analysis of CCSPTN did not only analyse its actors but also groups of factors affecting the operation of the chain. The thesis adopted appropriate research methods including supply chain analysis, production function analysis, competitive advantage to solve the core relationship of supply chain/value chain in intimate connection with economic efficiency and competitiveness of the shrimp farming industry.

The research results indicate that the shrimp products has to go through many intermediaries to the hand of consumers, which are collectors, wholesalers, retailers, seafood processors and exporters, foreign importers. The supply chain aims to satisfy the shrimp demand for export markets and domestic markets outside and inside the province. There are two main flows of high shrimp consumption, flows of shrimp exports and shrimp consumption outside the province provided by big collectors accounting from 87.4% and 8.5% respectively. Each actor able to promote its position and roles in the value creating process of the farmed shrimp supply chain, which is reflected through the performance and economic efficiency of each actor and the whole supply chain.

However, there are still limitations as follows:

When the input costs increase and the exporting price decreases by 30% compared to the current conditions, the farmed shrimp products in Quang Nam fall to disadvantaged situation for intensive shrimp farming in crop 2 and in some local areas. The flows of information exchange are not perfect, actors sharing information mainly through direct trading relationships, which affects the operation of the supply chain in each chain, especially between shrimp farmers and collectors. The collaboration of actors in the chain is weak, not yet establishing close links and strategic alliance through vertical integration.

The analysis of the flows of finance and value creating process in CCSPTN indicates that all the actors obtained high economic efficiency, especially shrimp farmers. However, despite the important financial position in the supply chain, shrimp farmers are not given comparable benefits while the intermediaries such as big collectors, wholesalers, retailers, seafood processors and exporters contribute low proportion of value creating costs, but gain many times higher mixed income per capita than shrimp farmers.

The survey results show that all the factors affecting the operation of CCSPTN in Quang Nam, in which factors of cultured area planning, infrastructure and support services, production scale (capital, farming area), food hygiene and safety are the bottleneck situation hindering the performance of the supply chain. On the basis of research results, the author proposed synchronous, systematic, highly feasible and complementary groups of solutions to improve the CCSPTN in Quang Nam province.
THE AUTHOR’S PUBLICATIONS RELATED TO THE RESEARCH TOPIC
