

Improving the efficiency of shrimp value chain in Ca Mau, Vietnam

Case study: focus on small shrimp producers

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Abstract <p>In recent years, shrimp industry in Ca Mau has faced many challenges and difficulties. The cost of shrimp farming in Ca Mau is increasing. The operation of small shrimp producers is low and high risky, which makes shrimp value chain inefficiency. According to some experts, the main problem of the shrimp sector in Ca Mau exist in supply chain management activity.</p> <p>The objectives of the thesis are (a) to find out existing problems of shrimp value chain in Ca Mau (b) to suggest some solution for improving the efficiency of shrimp value chain.</p> <p>The study of the shrimp value chain was carried out by using qualitative research method. Information was collected from small shrimp producers, be evaluated and further explored. Research findings was associated with the theoretical part to suggest solutions for the topic.</p> <p>In summary, supply chain management is the key of solutions for improvement of shrimp value chain in Ca Mau.</p>		
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1 Introduction

In any industrial fields, building up an efficient and effective value chain is the most important key for getting customer satisfaction and improving field's competitive advantage. In order to do that, it requires enterprises in the field take care of supply chain activities. In today's business environment, the survival of any business is not only dependent on its own ability to complete, but also the ability to cooperate in the supply chain. Thus, a business have to improve the efficiency of product value chain by paying more attention to material movement, a relationship between suppliers, and logistics activities.

Ca Mau is a province in the Mekong Delta of Vietnam, which has a great potential for aquaculture production, especially shrimp production. In recent years, Ca Mau shrimp cultivation has been developed significantly, becoming the biggest shrimp producer of the country. Although Ca Mau shrimp industry has achieved an impressive result in shrimp export, but it is still estimated to be unstable, not matching the potential, and existing many challenges.

The aim of the thesis is to discover activities relating to shrimp value chain in Ca Mau province, Vietnam. In theoretical part, readers are provided basic knowledge relating to supply chain activities and importance of integration along the supply chain. In the case study part, Ca Mau's shrimp value chain is analyzed, which helps readers understand how it is operated. Basing on the theoretical part, the analysis part and research finding, the author suggests solutions for increasing the efficiency of shrimp value chain.

The thesis focuses on answering the following questions: How is the shrimp value chain operated in Ca Mau? What are existing problems in Ca Mau's shrimp value chain? How to increase the efficiency of the shrimp value chain? In order to answer these questions, it requires collecting information from different references and reviewing shrimp producers.

2 Theoretical part

In this section, a basic knowledge about supply chain operations is covered as a base-ment of the research topic. The author pays attention on the integration in the sup-ply chain.

2.1 Introduction of a supply chain

Every product has its own supply chain. Depending on the characteristics of a prod-uct, its supply chain is simple or complex. The supply chain is a series of activities of independent organizations connected together in order to add value to the steam of material flow run from the initial suppliers to end customers. (Waters 2003, 7)

From the above definitions, we conclude that: A supply chain of a product must have at least two participating companies; Participating companies within a supply chain must be considered as independent organizations; Participating companies have to add value to the steam of material flow as a common commitment.(Lu 2011, 9)

In terms of structure, a supply chain is divided into 2 main groups of activities: up-stream activities and down-stream activities.

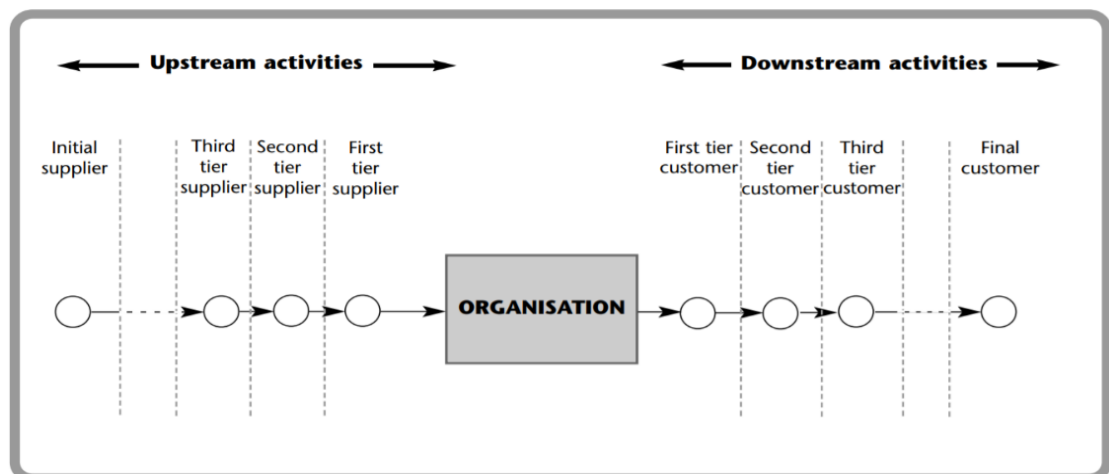


Figure 1: Structure in supply chain

Upstream activities refer the movement of materials among suppliers. Basing on a relationship with an organization, suppliers are divided into first-tier suppliers, second-tier suppliers and so on back to the original source. Downstream activities refer the movement of finished-product from the organization to final customers. It is also divided into levels: First-tier customer, second-tier customer, and so on to final customers. (Waters 2003, 8)

An existence of supply chain is necessary and indispensable in today's business environment because of some following benefits:

Firstly, supply chain allows for mismatches between supply and demand, helps connecting material sources between organizations. In reality, organizations could not operate in isolation; they need to make relationships with another one in a product value chain.

Secondly, a supply chain could solve the gaps created by far distance between suppliers and customers. A product might be manufactured at anywhere in the world and distributed to everywhere with a supply chain.

Thirdly, a supply chain helps manufacturers reduce costs such as warehousing cost, transportation cost. Enterprises could move their products into further chains nearer to customers such as wholesalers, retailers in a supply chain.

Fourthly, an existence of supply chain helps organizations being able to specialize in their operations. Instead of doing at all, each participating company in the supply chain only takes responsible for one or two phases of product life cycle.

2.2 Integration in the supply chain

Collaboration between participants in the supply chain is a mandatory requirement for the effectiveness of a product value chain. Therefore, integration in the supply chain must be considered as an important strategy of an organization.

2.2.1 Introduction of supply chain integration

A supply chain consists of distinct organizations. In which, each organization has different roles in the value adding process. But they have a common objective at the end of the supply chain is to satisfy the final customers. Thus, to reach the objective, activities in the supply chain have to be integrated.

Supply chain integration is a strategy that aims to link members working closer together in a supply chain to improve response time, production time, reduce costs and waste. In a supply chain, participating members are interconnected under three main flows: material flow, information flow and finance flow. An integration between participating organizations in a supply chain may be done tightly through three above flows. (Lu 2011, 104)

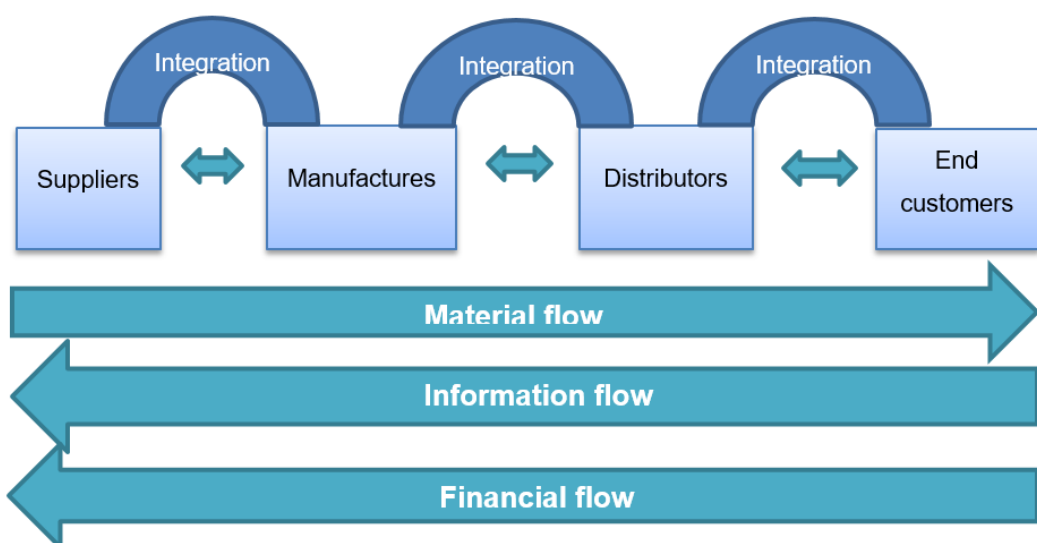


Figure 2: Main flows run through supply chain

Information flow: Today, the information system has played a key role in the success of an organization. Sharing information between organizations is beneficial to all because sharing information is used to make manufacturing plans, to forecast market demands and others. Thus, creating a reliable information channel is necessary for a supply chain, which could help to reduce costs and minimize risks in the operations of members.

Financial flow: a movement of money run from the final customers to the suppliers in a supply chain. Without it, a supply chain could not be existed. In addition, financial flow distribution is an important issue in integration along the supply chain. Therefore, it must be distributed fairly throughout the supply chain, allowing for better integration in the future.

2.2.2 Types of integration in a supply chain

Vertical integration is a strategy where a company expands its business operations in different parts of the supply chain. In this case, a company might control over several production or distribution steps involved in the creation of its product or service. For example, a car manufacturer might invest to own suppliers or distributor. Vertical integration can be carried out in two ways: backward integration and forward integration. Backward integration refers to control upstream activities. Forward integration refers to control downstream activities. (Investopedia)

Horizontal integration is a process of a company increasing its size at the same part of the supply chain. This can be achieved by internal expansion through a reinvestment of operating profits or by external expansion through a merger or acquisition (M&A). (Investopedia)

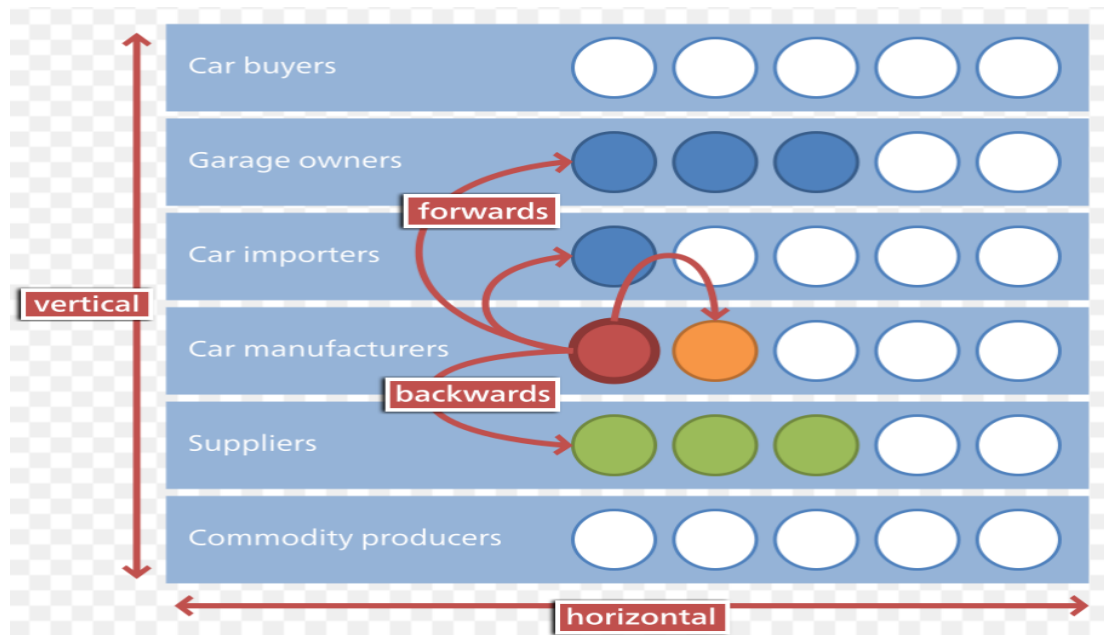


Figure 3: Vertical and horizontal integration in supply chain

2.2.3 Benefits of integration along a supply chain (Water 2003,42)

In any business relationships, cooperation always brings benefits to all. Viewing the main following benefits helps enterprises understand the importance of integration in a supply chain:

Firstly, a close alignment and coordination between organizations will help improve the efficiency of all members in the supply chain. It allows for solving common problems efficiently and effectively. Any uncertainty in the supply chain causes participating organizations react slowly to changing conditions.

Secondly, integration can improve the quality of the flow in the supply chain. Flow of material is moving faster and more reliable in a supply chain. Profits are shared for all participants. Information flow is shared and open to everyone.

Thirdly, cooperation allows organizations reduce costs. Good co-operation will create a balanced activity in each member. Organizations could lower stocks by just in time manufacturing and get benefits from economies of scale.

Finally, integration allows businesses to achieve customer satisfaction with shorter delivery times, faster delivery, and more customization.

Besides, to implement supply chain integration, it is important to explore the conflict views and co-operation views of a relationship.

Factor	Conflict view	Co-operation view
Profit	One organisation profits at the expense of the other	Both share profits
Relationship	One is dominant	Equal partners
Trust	Little	Considerable
Communication	Limited and formal	Widespread and open
Information	Secretive	Open and shared
Control	Intensive policing	Delegation and empowerment
Quality	Blame for faults	Solving shared problems
Contract	Rigid	Flexible
Focus on	Own operations	Customers

Figure 4: Co-operation view and conflict view present in a supply chain

2.3 Supply chain management

SCM refers to activities relating to a product's life cycle from acquiring raw materials, supplier, and production, through distribution to the final customer in the most

streamlined and cost-effective way possible. Good management in a supply chain brings many benefits for participating organizations. Some of them is to help improve material flow, minimizes delays and allows control quality of products through the supply chain, eliminate activities that do not add value into products. (Searcherp)



Figure 5: Supply chain management

2.4 Logistics and some main activities

Logistics is an important part of a supply chain management system. It refers activities that occur within the boundaries of a single organization. Logistics focuses its attention on activities such as transportation, packaging, distribution, and warehousing and delivery.

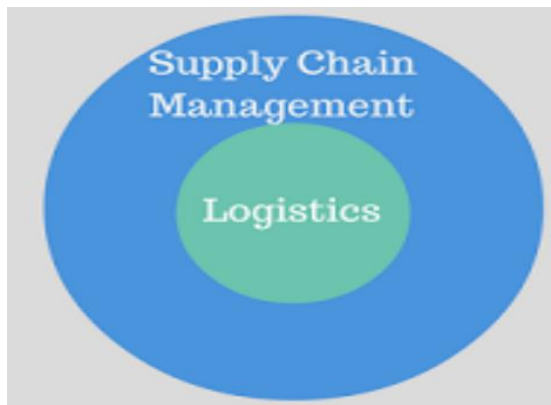


Figure 6: Logistics location in supply chain management

Transportation: a function that takes responsibility for moving materials from suppliers to the receiving area of the organization. This function includes choosing transportation modes, finding the carrier, designing the route, ensuring that the material is delivered on time and not broken.

Distribution center: a function that take responsibility in distributing finished products to retailers, to wholesalers or directly to consumers.

3 General overview of the shrimp industry in Ca Mau, VietNam

General information on the shrimp industry in Ca Mau helps readers understand the role of participants in the shrimp value chain and its process. Accordingly, readers can imagine its activity.

3.1 Overview of Ca Mau Province and shrimp industry



Figure 7: Map of Ca Mau province

Ca Mau is a province in the Mekong Delta region, characterized by the interlacing rivers and canals, low and flat terrain, and frequently flooded. The land of Ca Mau is mostly young region, accumulated over many years by rivers. The climate is featured by typically tropical with two distinct seasons: rainy and dry seasons. Moreover, Ca Mau has three sides facing the sea and the coast is over 254km long with more than 80 seaports. In general, Ca Mau has great potentials and advantages in aquaculture development, especially shrimp farming.

Ca Mau is the largest shrimp producer in Vietnam, accounting for 23 percent of total shrimp production in the country. In recent years, Ca Mau farmers are attractive to

change from rice cultivation to shrimp cultivation. Therefore, shrimp farming area continues to increase rapidly. In 2017, the area of the shrimp farming in Ca Mau is about 280,000 hectares. Output reached 156,000 tons and export value reached 1.1 billion USD. In 2018, Ca Mau plans to earn \$ 1.2 billion from exports and is expected to reach \$ 2 billion by 2020.

In addition, the province has 34 seafood processing plants with total capacity of 150,000 tons per year. The output of processing factories is mainly exported to foreign markets. Today, Ca Mau's shrimp export is present in more than 90 countries and territories. There are four distinct classifications of shrimp farming: intensive, improved extensive, mixed shrimp-forestry and rice-shrimp. Among these systems, the improved extensive is the most dominant because it is suitable for low and middle income producers.

3.2 Shrimp value chain in Ca Mau Province

The shrimp value chain of Ca Mau consists of 8 main sectors: input suppliers, shrimp producers, intermediaries, processors, traders, export agents, domestic market and export markets. Its process is showed below diagram.

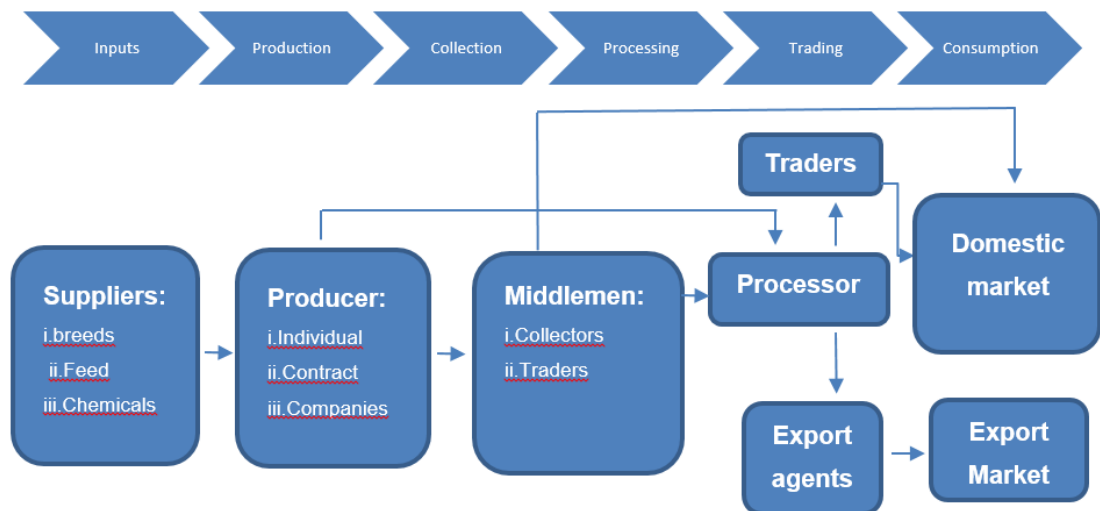


Figure 8: Shrimp value chain cluster

Input suppliers

Input materials for shrimp farming include: breeds, feed and chemicals. In terms of breeders, there are nearly 900 shrimp hatchery operators in Ca Mau, producing about 9-10 billion fries a year, meeting only 50 percent of the seed demand. In addition, 70 percent of shrimp-fry nurseries are small in scale and scattered, with limited technology and experience. As a result, seed quality from these operators is poor and unstable. In addition to the lack of a proper local government control, low quality seed have been spread throughout the market.

Shrimp producers

Shrimp producers in Ca Mau are mainly individuals or households. Based on scale, shrimp farmers are divided into two groups.

Farmers	Large-scale	Small-scale
Amount	20%	80%
Area of farmers	>1,5 hectare	<1,5 hectare
capital	Sufficient	Insufficient
Technical know-how	High	Low
Skills	High	Low
Relationship	Processors	Middlemen

Table 1: Characteristics of shrimp farmers

In Ca Mau, small-scale farmers are dominated, taking account for about 80% of the shrimp households. They are characterized by small pond areas, limited capital, limited technical farming, and limited farming skills. In addition, they have a close relationship with intermediaries and lack a cooperation with processors.

Middlemen

Intermediaries play a crucial role in the shrimp value chain because of its role in connection between markets and small farmers. Most of the shrimp output of small farmers are bought by middlemen. Typically, middlemen usually survive at least two levels: first-level and second-level.

- First-level middlemen are small collectors. To maximize profits, they try to bargain with the farmers to get a good deal. Due to the lack of connection with market, small farmers often lose value in negotiating prices with collectors.
- Second-level middlemen are traders. They buy shrimps from small collectors and sell them to the processors.

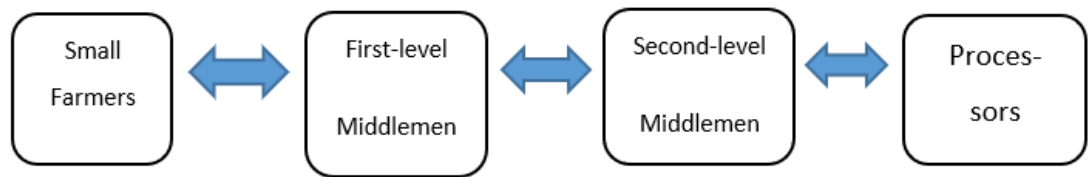


Figure 9: Intermediate stages between small farmers and processors

Processors

Most of the processors in Ca Mau lack own raw shrimp areas. They only make a relationship with big scale farms. Although small farmers take account of 80 percent of shrimp farmers, the cooperation between small farmers and processors is limited. In addition, as many small farmers only harvest small quantities of shrimp at the same time, the plants rely on intermediaries who can collect shrimp from different farms. Therefore, most of the small farmers' shrimp production are bought by middlemen. In order to have enough raw material for processing, the processors have to engage in relationships with middlemen as the first-tier suppliers.

Trader

In the domestic market, a small amount of shrimp is transported from Ca Mau to Ho Chi Minh City for consumption. At first it is distributed at wholesale markets by traders. Retailer rebuy shrimp from traders in wholesale markets and resell to end customers in smaller markets. Therefore, before shrimp is sold to end customers, shrimp is usually transferred into 2 levels of traders: traders in wholesale markets and traders in smaller markets, which cause the price of shrimp to rise and shrimp value chain is longer.

End customers

Overall, in terms of shrimp product, customer satisfaction is under safety, high quality, reasonable price and hygiene. In the domestic market, most final customers prefer to buy fresh shrimp and they are unsatisfied with shrimp product. As one of top

concerns of domestic customers is the safety of shrimp. In fact, high-quality shrimp are often preferred for export. The remaining shrimp are not eligible for export to be consumed in the domestic market.

3.3 Overview of logistics activities in shrimp value chain

Procurement

Due to limited available funds, small farmers often receive inputs from traders as a high interest rate loan. With capital barriers, small farmers often have less voice in negotiating with other sectors in the supply chain. As a result, the quality of inputs is not guaranteed to small farmers, compared to large farmers. In other words, the purchasing function is not implemented for small farmers.

In addition, when middlemen buy shrimp from small farmers, most transactions are made by verbal agreement without any formal contract.



Figure 10: The collectors buy shrimp at a farm

For processors, a large amount of shrimp material is purchased from intermediaries. In reality, most processors face a status of shortage of raw material. In addition, unstable product prices are the barrier of processors. In some cases, traders can work together to control the price of raw shrimp, which caused processors spend more money on their purchases. Moreover, buying through intermediaries, processors cannot control the quality of raw shrimp.

Transportation

Due to an intensive network of canals and rivers, the main mode of transport used is small boats. In fact, small boats lack the cooling systems, which adversely affects the freshness of the shrimp.



Figure 11: Main transportation mode in Ca Mau



Figure 12: Traders collect shrimp from individual farms by small boats

The collectors use small boats to approach each farm. Then, the shrimp is transferred to a gathering place where a small truck may be available. The shrimp is preserved with ice, packed in Styrofoam boxes and further transported by refrigerated vehicle.



Figure 13: Collectors pack shrimp in Styrofoam box at a collection site for transportation.

Distribution center in the domestic market

In the domestic market, fishery products are mainly distributed through wholesale markets. Normally, shrimp is transported by refrigerated trucks from Ca Mau to Ho Chi Minh City for consumption. Binh Dien wholesale market is the main distribution center in Ho Chi Minh City. The main problem of the wholesale market is a poor facility in storing perishable food, lacking a cooling system that can keep shrimp in a good condition.



Figure 14: Seafood area in Binh Dien market

4 Qualitative research and results

Qualitative research is to explore and comprehend attitude of people, their perceptions, motivations as well as their behaviors through constructing and analyzing data. Target groups of qualitative research may be common clients or/ and academic audiences as experts, senior employees, etc. Qualitative research method can help marketers consider validity and reliability of interviewees. The method includes words, phrases, text or even images. During the interview, researcher may systematically record by individuals and gather data then with approval of participants. The research should be solution-oriented, not neutral, pragmatic, confidential, time and cost constrained and report-based. In addition, a depth interview must be more like a conversation with a clarified purpose. (Kent 2007, 86-103.)

4.1 Problems in shrimp production in Ca Mau

A discussion with some shrimp producers in Ca Mau was made to indicate the difficulties in shrimp production. Firstly, shrimp farmers worry about rising food prices recently. It means that shrimp producers have to spend more on feed costs, which make shrimp farming business is less profitable. According to some explanations of feed suppliers about rising food prices, the reason for this is the lack of raw materials in the domestic market.

Secondly, shrimp producers complained about inadequate seed quality. According to experienced farmers, seed quality accounts for 70 percent of the success of shrimp crops. Shrimp producers in Ca Mau have been facing a shortage of disease-free fries supplies. At present, there are many seed suppliers in the area. However, the seed market is not properly inspected by local authorities, which made the poor quality seed to spread to the market. While the awareness of shrimp farmers about the quality of shrimp fries is limited. As a result, finding a reliable seed supplier is difficult for most shrimp producers.

Thirdly, shrimp producers lack capital to produce shrimp, while banks refuse loans for small farmers. The only way to continue shrimp farming, farmers receive input raw materials from some suppliers with a high interest rate loan, which make shrimp farming less profitable.



Figure 15: Picture of shrimp farmer's livelihoods

Fourthly, shrimp is infected disease. Due to a bad weather and polluted water sources in Ca Mau in recent years, the growth of shrimp is severely affected. In addition, a big amount of the seed is disease-free. This makes shrimp susceptible to infection. According to farmers in Ngoc Hien, Ca Mau, disease can cause damage from 30-70 percent of crop efficiency. To prevent shrimp from diseases, farmers prefer to use antibiotics in shrimp farming, which is prohibited in aquaculture.



Figure 16: Waste in a shrimp farm in Ca Mau

Fifth, since 2015, climate change and sea level rise have brought threats for farmers to develop shrimp farming. Due to hot weather, drought and salinity intrusion, shrimp farmers are having difficulty in improving ponds and shrimp farming.



Figure 17: Drought in Ca Mau in 2016

Lastly, small farmers are limited to technical farming. Because technical training programs for small farmers are limited in Ca Mau. Most farmers learn from each other or follow the advice of agents and companies that provide food and medicine. Restrictions in shrimp technical farming make small producers less efficient.

4.2 Relationships in value chain

In fact, most processing factories do not own raw material areas. They have only formal relationships with big farmers and support them in shrimp farming. Although small farmers account of 80 percent of the shrimp farmers, a relationship between processors and small farmers is limited. That is explained by small farmers who are not willing to sell shrimp to processors due to delays in payment by companies. In addition, small farmers are small in shrimp production and geographically isolated, processors cannot cooperate with all.

In addition, all activities related to collection, packaging, storage and transportation of raw shrimp from small farms are carried out by middlemen. In other words, the processors do not control any upstream operations of the supply chain.

Moreover, there are existing conflict views in shrimp supply chain in Ca Mau. Some of them are:

- Sectors in the supply chain only focus on own operations, not on the customers. Therefore, the connection between them is weak.
- On the profit side, a profitable organization is the expense of another organization. Profits are not shared either.
- Communication between organizations is limited, not open. In some case, fraud occurs among organizations.
- Information is secretive and not shared between members.

As a result, the unstable supply of raw materials by processors and the low productivity of shrimp producers are common in Ca Mau. Processors have been operating under their capacity and shrimp production is risky and less profitable.

4.3 Role of intermediate stages in the value chain

In the shrimp value chain, there are usually two or three intermediate stages between small farmers and processors. Their role is to collect shrimps at small farms and sell them to processors. In fact, because they only focus on making a profit, which causes damage to others. For small farmers, they try to buy shrimp at a low price. For processors, they try to sell shrimp at a high price. In addition, the quality of raw shrimp in intermediate stages is not properly controlled. In some cases, the intermediaries can pump impurities into the shrimp material to gain weight and maintain its freshness.



Figure 18: Pumping contaminants into raw shrimp is discovered

Therefore, the activities of intermediaries in the shrimp value chain has a negative impact on the efficiency of the value chain. In fact, they do not add any value to raw shrimp. As the role of members in a supply chain, middlemen should be eliminated.

4.4 Customer satisfaction

According to the survey about consumer concerns when choosing fishery products in three largest cities in Vietnam: Hanoi, Ho Chi Minh City and Can Tho, most of them worry about safety food and food hygiene. In particular, surveying 794 households in 3 cities, the interest rate in safe seafood was 86%, in Can Tho, followed by Hanoi with 84,2% and Ho Chi Minh City at 77,5. %. Therefore, the average interest rate about the safety of seafood in the three cities was 82.5. While food hygiene, consumer concerns accounted for 86.5% of the total surveyed households. From the numbers, it is clear that customers are not satisfied with the seafood and shrimp products are no exception.

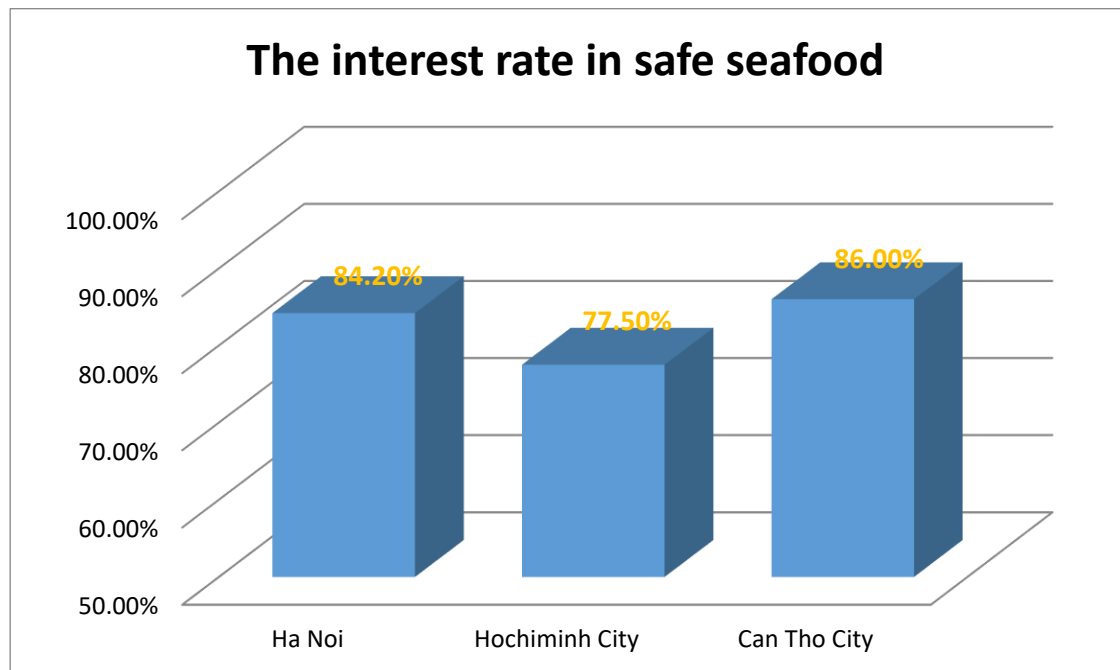


Figure 19: The interest rate in safe seafood in three big cities in Vietnam

5 Suggestions for improving the efficiency of shrimp value chain

Overall, a discrete link between participating members is the main problem in the shrimp supply chain. That leads to unreliable raw material flow and inefficient operation of main subsectors in the shrimp value chain. Therefore, the main solution for improving the efficiency of shrimp sector in Ca Mau is implement integration in all level of shrimp supply chain. Supply chain integration allows shrimp production of small farmers more productive. This is because if processors cooperate with small farmers, they support small farmers about farming techniques, skills, and some inputs. And more important thing is processors could control the raw shrimp, having a stable supply sources. In summary, a cooperation between subsectors in shrimp sectors bring benefits to all. As a result, the efficiency of shrimp value chain is improved.

In addition, processors might implement vertical integration by controlling some parts of the supply chain such as owning raw material areas, or distributor. That helps processors' supply chain operate more effectively.

Moreover, problems relating to poor quality of seed and high feed costs should be paid attention to. To solve the inadequate seed quality, the local authorities should control seed supplying market properly. On the other side, the province invest in setting up more reliable shrimp-fry nurseries and improve the awareness of shrimp producers about high quality seed. For the problem of high feed costs, the solution is developing the raw material areas of food manufacturing.

6 Conclusions

To answer the main research question, basic knowledge of supply chain and supply chain integration is covered in the theoretical part. In addition, existing problems in the shrimp value chain are explored. Accordingly, improvements have to be proposed correspondingly.

Part of the research has been done in order to understand the difficulties of small farmers and satisfaction of domestic customers. Based on the research findings, shrimp production in Ca Mau is developing unsustainably. There are many issues in shrimp value adding process, which makes shrimp production more risky and undeveloped. Moreover, the dissatisfaction of customers with shrimp product reflected the inefficiency of shrimp value chain.

Regarding the solutions of improving the efficiency of shrimp value chain in Ca Mau, the main one is implementing integration in all level of the supply chain. That allows improve the performance of participants in the shrimp supply chain and eliminate unnecessary intermediate stages in the supply chain. As a result, the efficiency of the shrimp value chain is improved.

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Appendices

Theme interview questions:

Question 1: How do you think about the quality of breed, Luu? Are you satisfied with it?

Question 2: What do you think about feed costs, Nguyen? Does it affect much to your profit?

Question 3: How does shrimp disease affect to shrimp productivity, Vu?

Question 4: Do you think that the quality of water source for shrimp farming is worse, Nhu?

The record of interview results:

Phong vẫn người nuôi tôm ở thị trấn Rạch Giá, Ngọc
Điền, Cà Mau.

1. Theo ông Nguyễn Triệu Phú, 42 tuổi, có kinh nghiệm
nuôi tôm 20 năm; Đầu năm 2018, giá thuê cần cho tôm liền
tục tăng, tính ra mỗi bao 10 kg tăng từ 10.000 - 20.000 đồng
/bao. Điều này làm nhiều hộ nuôi tôm rất lo lắng, vì số vốn
bỏ ra lớn, dẫn tới lợi nhuận giảm.

2. Theo ông Lưu Tuấn Vũ, 65 tuổi chủ trang trại tôm 2 ha.
Hiện nay, chất lượng tôm giống còn nhiều bất cập. Tôm giống
kém chất lượng tràn lan trên thị trường gây khó khăn cho
người nuôi tôm.

3. Theo ông Vũ Hạo Nam, 30 tuổi. Dịch bệnh ở tôm diễn
biến rất phức tạp. Nếu tôm bị bệnh thì mức độ thiệt hại
thường từ 30 - 70%.

4. Theo bà Hoàng Thị Thu, 40 tuổi. Do thiếu vốn sản xuất bà phải vay với lãi suất cao 10% / năm để mua nguyên liệu đầu vào: con giống, thức ăn.

5. Theo bà Thu Nga, 45 tuổi. Nuôi tôm công nghệ sinh học đòi hỏi kỹ thuật cao, nhưng cho năng suất cao. Bà phải bỏ rơi trong việc áp dụng kỹ thuật mới.

6. Theo bà Nhu Quỳnh, chủ ao tôm 1200 m² chất lượng nguồn nước ngầm càng xấu đi, ảnh hưởng tới sinh trưởng của tôm.