

# **Proposal of new logistics processes and SCM in Vinh Hoan Corp.**

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Master thesis  
2018

 **Tomas Bata University in Zlín**  
Faculty of Management and Economics

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Tomas Bata University in Zlín  
Faculty of Management and Economics  
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Academic Year: 2017/2018

## MASTER'S THESIS ASSIGNMENT

(PROJECT, ARTWORK, ARTISTIC PERFORMANCE)

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Thesis Topic: **Proposal of New Logistics Processes and SCM in Vinh Hoan Corp.**

### Thesis Guidelines:

#### Introduction

##### I. Theoretical part

- Compile the theoretical information, definition and previous studies about logistics implementation and supply chain management focusing on improving.

##### II. Practical part

- State the goals, sub-goals, research questions and methodology of the master thesis.
- Collect data of the corporate situation: financial data, competitor's data, market.
- Analyse the business model of competitor, logistics processes and SCM, market situation.
- Base on the results, suggest the proposal for improving the current processes and the organizational structure.
- Make the appropriate recommendations for optimizing the logistics activities, reduce costs, providing the best customer services.

#### Conclusion

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GRANT, David B., et al. Sustainable logistics and supply chain management: Principles and practices for sustainable operations and management. Kogan Page Limited, 2017. ISBN 978-0-74-946866-8  
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## ABSTRAKT

Czech abstract

Cílem této diplomové práce je popsat řízení logistiky a dodavatelského řetězce ve společnosti Vinh Hoan, která má vedoucí postavení ve výrobním odvětví Pangasius ve Vietnamu, a identifikovat hlavní oblasti, které by se mohly zlepšit. Práce je rozdělena do dvou částí, teoretické a praktické. Teoretická část poskytuje informace o pojmech týkajících se logistiky a řízení dodavatelského řetězce, několik nástrojů hodnocení procesů a nástrojů pro zlepšování procesů. Praktická část se zabývá analýzou současného stavu společnosti a obsahuje také návrhy na zlepšení jejího logistického procesu, které se zaměřují na stabilitu a udržitelnost surovin, proces přijímacích materiálů a systém sledovatelnosti.

Klíčová slova: logistika, řízení dodavatelského řetězce, Pangasius, odstraňování odpadů, zlepšování procesů.

## ABSTRACT

English abstract

The goal of this master thesis is to describe the logistics processes and supply chain management in Vinh Hoan, a market leader in Pangasius industry in Vietnam and as a result, identify the main areas that could be improved. The thesis is divided into two parts, theoretical and practical. The theoretical part provides information about terms relating to logistics and supply chain management, several tools of evaluating processes and the process improvement tools. The practical part is general picture of current stages of the company and the proposals for an improvement of its logistics process, which aim to the stability and sustainability of the raw materials, the receiving materials process and the traceability system.

Keywords: logistics, supply chain management, Pangasius, waste eliminating, process improvement.

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## INTRODUCTION

Viet Nam is considered as the developing country with the growth speed on the top of Asia. It is the result of the export turnover increasing significantly in the recent years. One of the leading business contribute to the export turnover is pangasius industry. There are many Pangasius farms, factories and company which are working in this great industry. For satisfying the variety of markets all over the world, Vietnam has collect a remarkable number of sales by the exporting contracts of Pangasius every year. Besides, the Mekong Delta region is also one of the best reasons that Pangasius industry received a huge amount of investment in the previous decade. From the foundation of those advantages, Vinh Hoan Corporation has been establish for approximately 30 years have taken its own opportunity to become the market leader in this industry. The company is still develop and complete its own processes and invest more into its business. The goals of Vinh Hoan are that keeping the leading position in the industry while expand in the potential markets. There is no room for doubt that Logistics and Supply Chain Management is playing an essential role on the business in Vinh Hoan. Since the company chooses the strategy of being the connection between the demanded clients and the raw, fresh pangasius supply in Vietnam. The most crucial point of its business is optimizing the Logistics management while establish the tight, closed Supply Chain so that the company could reduce the costs but still could deliver the best service to the customers. In this thesis master, I would like to present the concept of logistics and Supply Chain Management in Vinh Hoan while conduct some analysis in terms of the current stage of the company and finally deliver the proposal to optimize the productivity and efficiency in logistics and supply chain management in the corporation.

## **OBJECTIVES AND METHODS OF MASTER THESIS PROCESSING**

This Master's Thesis aims to contribute in the field of improvement in exporting company by identifying both the indigenous and exogenous problems.

The main research objective is:

- To improve efficiency logistics and Supply chain management Vinh Hoan by at least 15%-20%

Additional research objectives are:

- To analyze the current stage of the company and evaluate the current processes
- To identify wastes that contributes to work inefficiency

The research questions are:

1. What logistics strategy will brose company use in order to maintain the factory's competitiveness to deliver the best services to clients
2. What factors contribute to the instability and unsustainability in the Supply Chain?
3. Where is the wastes in the current processes and what should we have change?
4. What is the plan for implementation?
5. What measures should be taken to improve current logistics processes?

## **I. THEORY**

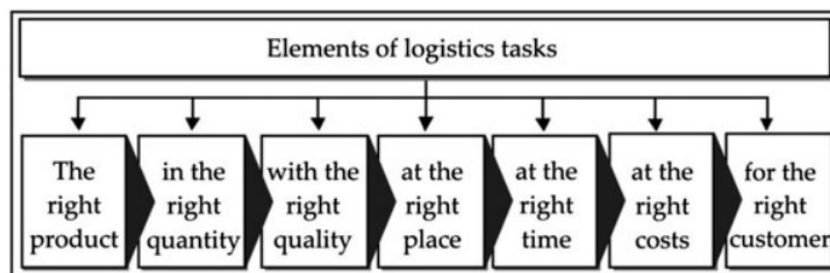
## 1 LOGISTICS INTRODUCTION

There are many version of logistics definition in a variety of perspective. Basically, logistics could be seen as the management of the flow of goods, information and other resources between inputs and outputs in order to meet the requirements of consumers. The theory of logistics management was classically defined by the Council of Supply Chain Management Professionals (CSCMP) in the United States as “that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverses flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers’ requirements”( Karatas-Cetin & Denktas-Sakar, 2013). In fact, logistics activities mainly include logistics network design, supply/demand planning, inbound and outbound transportation management, warehousing, materials handling, order fulfilment, inventory management, , and management of third-party logistics (3PL) service providers,... and other tasks which are very specific and typical. On the other hand, logistics could be varied by sourcing, purchasing and procurement; production planning and scheduling, operation management and customer service.

When it comes to the other way to have a deep understanding of logistics, Canadian Association of Logistics Management (1998) defines logistics as the process of planning, implementing, and controlling the efficient, cost effective flow and storage of raw materials, in-process inventory, finished goods and related information from point of origin to point of consumption for the purpose of meeting customer requirements.

Logistics has a variety of tasks such as flow management, warehouse management, order processing, Inventory management, transportation,... but they all follow the same evaluation indicators as the figure below:

Figure 1: Elements of logistics tasks



Source: Logistics Basics — Exercises — Case Studies (Gleissner, 2014)

## 1.1 Logistics classification

In general perspective, logistics could be classified by 3 main parts: purchasing Logistics, production Logistics and distribution Logistics. Purchasing logistics has the main tasks such as requirements planning, choosing suppliers, discussing orders, transport of materials and components, quality checking, components and materials storage. Production logistics is in the source of supplying production with materials, components and energies, production planning and scheduling, optimal stock level calculation, interoperation transport management, work in progress stocking while distribution logistics provide the services of order processing, final products storage, final products transport and distribution, customer services, customer service level evaluation.

In another perspective, logistics is divided into mega-, macro-, meso- and micro-logistics.

Mega logistics is getting established on the scale of the global economy in connection with the development of globalization processes, therefore it is also called global logistics. It provides management of logistical flows in associations of countries. At present, global logistics is recognized as operating in two international economic associations: the European Union (EU) and the USA - Canada - Mexico. At the same time, the fact that within the EU has achieved deeper integration with the creation of a single internal market is simplified and canceled customs formalities, the accelerated implementation of pan-European standards, the declared equality of the companies of the participating countries in obtaining state contracts in each country of union, etc.

Mesologistics is interpreted as the middle-level logistics of the economy, bearing in mind that the middle link is various economic associations, for example, vertically, horizontally integrated companies, companies with mixed integration, which generally correspond to the concept of a corporation.

Macro logistics manages the flow of goods in the economy of a particular country - the national economy. It is developing with respect to interindustry complexes, such as fuel and energy, agro-industrial, timber industry, and basic industrial complexes for the country's economy, for example, machine-building, metalworking, and can cover industrial enterprises, logistics infrastructure organizations (trade and procurement, transport and others) of one industry or different departments located in different regions.

Micro logistics acts on the scale of the main economic link - the enterprise, builds from the position of achieving strategic goals and optimization of the basic operational processes, provides solutions to tasks related to the functional areas of the enterprise. In essence, its micro logistics is a classic variant of entrepreneurial logistics, although according to the above commentary on the classification of logistics in terms of scope of operation, corporate logistics should also be included in corporate logistics.

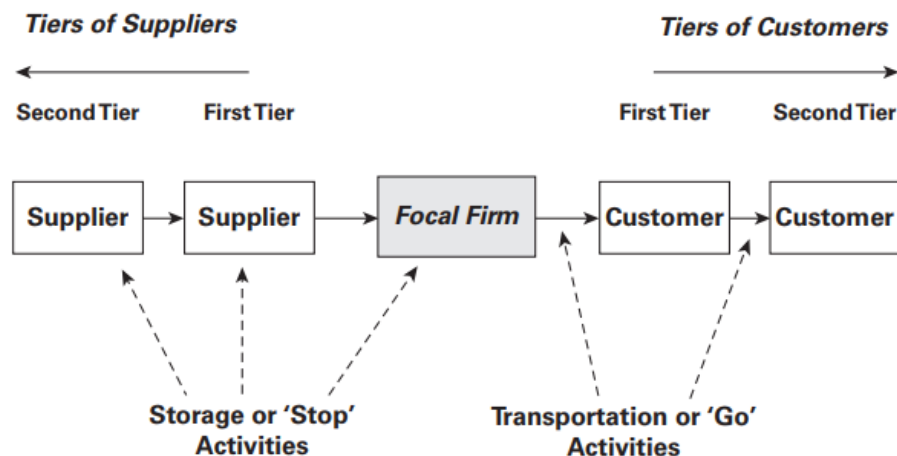
Micro logistics on the basis of the sphere of development of entrepreneurial activity is subject to further, more profound classification. At the same time, the existing forms of specialization in the economy in the context of two business sectors-the real sector and the financial sector-are important, bearing in mind that, on the whole, specialization develops on the basis of a general, private and individual division of labor.

Within the real sector, there is an industry specialization, which exists in two versions: subject and technological. Specialization focuses the business on the production of goods for various purposes, technological specialization - for the performance of work, including the provision of services. In this regard, we can conclude that business logistics of the real sector of the national economy is developing in accordance with the current classification of industries and its composition is identical to the sectorial composition of the economy.( Logistics Classification, 2008)

## 2 SUPPLY CHAIN MANAGEMENT

The supply chain itself is a system of organizations, people, activities, information, and resources involved in the planning, moving, or storage of a product or service from supplier to customer (actually more like a “web” than a “chain”). Supply chain activities transform natural resources, raw materials, and components into a finished product that is delivered to the end customer. For example, I once heard a major paper goods manufacturer describe their supply chain for toilet paper as ranging from “stump to rump.” In contrast, supply chain management, as defined by the Council of Supply Chain Management Professionals (CSCMP), “encompasses the planning and management of all activities involved in sourcing, procurement, conversion, and logistics management. It also includes the crucial components of coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers.” In essence, supply chain management integrates supply and demand management within and across companies and typically “includes all of the logistics management activities noted above, as well as manufacturing operations, and it drives coordination of processes and activities with and across marketing, sales, product design, finance and information technology” (MYERSON, 2015)

Figure 2. The simplified supply chain



Source: Logistics and supply chain management (Gleissner,2014)

A firm’s simplified supply chain and its relevant features are shown in Figure as above. The immediate customer and supplier of the firm under consideration, or the focal firm, are known as ‘first tier’ customers and suppliers. The first tier customer’s first tier customer and the first tier supplier’s first tier supplier are the focal firm’s second tier customer and supplier

respectively, and so on. Between each supply chain node, where a node is the focal firm, a supplier or a customer, goods are moved by transportation or 'Go' activities. Further, goods are stored and/or processed at each node in storage or 'Stop' activities. Essentially, logistics and SCM are about 'Go' or 'Stop' activities, although details of each of them can be quite complex. However, it will be useful to consider this simple 'Go' or 'Stop' concept when discussing sustainability issues as they really occur during transportation or storage activities (Grant, 2015)

Supply chain management has been becoming increasingly important and vital in competitive business at present. Firms must adopt an appropriate supply chain management strategy in order to compete at the supply chain level. The strategy needs to integrate and coordinate throughout the supply chain to generate the performance of supply chain members (Green, 2008 & Cohen & Roussel, 2005 & Wisner, 2003)

## 2.1 The Value Chain

The Value Chain model, originated by Michael Porter, shows the value-creating activities of an organization, which as we can see in Figure No. relies heavily on supply chain functions. In a value chain, each of a firm's internal activities listed after the figure adds incremental value to the final product or service by transforming inputs to outputs. (Myerson, 2015)

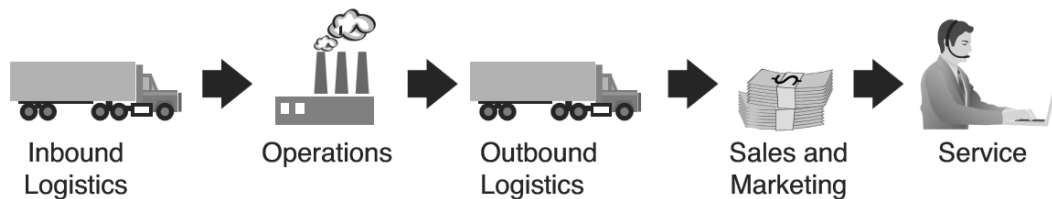
Primary activities relate directly to the physical creation, sale, maintenance and support of a product or service. They consist of the following:

- Inbound logistics – These are all the processes related to receiving, storing, and distributing inputs internally. Your supplier relationships are a key factor in creating value here.
- Operations – These are the transformation activities that change inputs into outputs that are sold to customers. Here, your operational systems create value.
- Outbound logistics – These activities deliver your product or service to your customer. These are things like collection, storage, and distribution systems, and they may be internal or external to your organization.
- Marketing and sales – These are the processes you use to persuade clients to purchase from you instead of your competitors. The benefits you offer, and how well you communicate them, are sources of value here.



- Service – These are the activities related to maintaining the value of your product or service to your customers, once it's been purchased. .( Myerson, 2015)

Figure 3. The Value chain



Source: Supply chain and logistics management made easy: methods and applications for planning, operations, integration, control and improvement, and network design.( Myerson, 2015)

After identifying the primary and support activities, businesses should identify the cost drivers for each activity. For a more labor-intensive activity, cost drivers could include how fast work is completed, work hours, wage rates, etc. Businesses should then identify links between activities, knowing that if costs are reduced in one area, they can be reduced in another. Businesses can then identify opportunities to reduce costs. Identifying the activities that create the most value to customers is the priority. These can include using relative marketing strategies, knowing about products and systems, answering phones faster, and meeting customer expectations. The next step is evaluating these strategies in order to improve the value. Focusing on customer service, increasing options to customize products or services, offering incentives, and adding product features are some of the ways to improve activity value. Lastly, businesses should identify differentiation that can be maintained and adds the most value. Ideally, value chain analysis will help identify areas that can be optimized for maximum efficiency and profitability. It is important, along with the mechanics of it all, to keep customers feeling confident and secure enough to remain loyal to the business. By analyzing and evaluating product quality and effectiveness of services, along with cost, a business can find and implement strategies to improve. (Harrison, Kayla, 2017)

### 3 LOGISTICS ANALYSIS AND IMPROVEMENT

In business, logistics refers to the network of the control system of the way resources flow through a business and from one company to the other businesses in the supply chain process or production process. The logistics business is his own course of study and expertise to managers, who understand the benefits of controlling logistics. Logistics professionals interested in the goals of continuous improvement, can have a significant impact on the profitability of the company. One of the most visible and valuable benefits of continuous improvement in a logistics business is the ability for a company to control its costs. Many costs tend to increase over time, such as labor, materials and energy. Increase the cost of cutting into profits unless businesses can increase prices without hurting consumer demand. By continuously improving logistics, a business can control its costs. For example, the pursuit of energy-efficient production methods will help a business defend against rising energy prices. Logistics provides a business with the materials and resources needed to produce goods for sale. Improvements in the logistics sector allow a company to utilize its maximum production capacity. Any shortages or delays of raw materials or labor mean factory idle and production that can not meet demand or meet sales targets. Logistic management can ensure there is a steady stream of available resources, regardless of market conditions. This would be the case when a business identifies and invests in new suppliers of essential goods or pursues a vertical integration strategy to gain further control of the supply chain upstream.

#### 3.1 Process Analysis

Sometimes it is difficult and complex to visualize an entire system in a manufacturing environment because of the proximity of the individual processes. Understanding what a business does and how it does it, requires documenting the inputs, processes, outputs and resources (Process Understanding & Improvement,2016). Process mapping is an analysis of a process flow by distinguishing how work is actually done from how it should be done, and what functions a system should perform from how the system is built to perform those functions. Using this method, the relationship, interconnections and process flows are grouped as a collection of elements to enable visualizing the entire operations and processes together and can conveniently make required adjustments to optimize the flows, an approach commonly employed in systems thinking. Process mapping enables manufacturers to easily identify the sequence of activities through processes that cut across the functional boundaries (Rybicka, Tiwari, Campo & Howarth, 2015). Three primary stages in mapping processes are

usually followed, i.e. identifying sequences of activities, diagnosing the activities for bottlenecks and redundancies as well as considering a course of action to enhance the production processes and flows (Okrent & Vokurka, 2004). Process mapping techniques also need to support users to decide whether one or several service components can substitute a product component and how this can be achieved (Biege, Lay & Buschak, 2012). There are several case studies that reveal the success of process mapping such as Kraft Maid Cabinetry, America's second largest cabinet manufacturer. Prior to reconfiguring production, drawer parts would travel a total of 208 miles, crisscrossing throughout the company's 1.2 million square foot plant. Components were cut in one area, holes drilled in another, joints machined in another area and finishing occurring far from where the drawer components would be assembled (Harps, 2008). Process flow mapping has also been widely used for manufacturing optimization where it allows the user to observe the 'as is' scenario and use the information to benchmark for improvements in the manufacturing environment (Smith & Ball, 2012). Process mapping allows for capturing materials and subsequently waste from manufacturing processes e.g., as a value stream mapping tool that enables organizations to work towards eliminating waste, maintaining inventory control, product quality improvement and financial and operation control (Abdulmalek & Rajgopal, 2007).

### **3.2 8 types of wastes**

In lean production or lean supply chain management, the firm should eliminate all wastes that not only add no value to the system but also cause some loss and increasing costs. After mapping the processes, we will conduct a deeper analysis in order to find out which wastes are currently available and point out the solutions for those. By the previous research and academic documents, there are 8 popular wastes in the production system that could reduce the performance of the whole firm:

- Excess Production - producing more than the customer needs right now, often done to avoid future setups, batch processes;
- Defects - work that contains errors, rework, mistakes or lacks something necessary - quality problems, paperwork, rework, returns;
- Unnecessary inventory - more materials, parts, or products on hand than the customer needs right now - WIP, raw materials, components, finished goods;

- Inappropriate processing - effort that adds no value from the customer's viewpoint - using the wrong tools, procedures or systems, multiple cleaning of parts, paperwork;
- Excessive transportation - Movement of people, information or product that does not add value – i.e., moving material between workstations;
- Waiting - Idle time created when material, information, people, or equipment is not ready – waiting for parts, inspection, prints, drawings, machine repairs, late starting meetings;
- Unnecessary motion - movement of people that does not add value: searching for parts, reaching for tools, lifting boxes of parts, excessive bending or stretching;
- Underutilized people - not using the mental, physical and creative skills of all of your employees, lack of shared vision, poor communication, lack of training programs, intimidating organizational culture (Hines & Rich, 1997)

“Ringena et al. (2014) demonstrated the Value Stream Mapping (VSM) technique and discussed the application of lean systems initiative on a product as VSM is involved in all the process steps. This visual tool helps identification of the hidden waste and sources of waste. Natasya et al. (2013) state that the conceptual model for leanness measurement had been developed and designed at two levels namely, the dimensions and the factors. The model also indicates the relationship between lean dimensions in the manufacturing systems and eight types of waste. Krishnan and Parveen (2013) studied and compared the various lean tools used and adopted in the manufacturing and the service sectors”( Arunagiri & Gnanavelbabu, 2016)

### **3.3 Lean production**

The term “lean production system” was introduced in 1988 based on a review of the TPS. The terms “lean manufacturing” and “lean production” were introduced in the book *The Machine That Changed the World* (Womack & Jones & Roos, 1990). Lean manufacturing is closely related to just-intime (JIT) production (Sohal & Egglestone,1994)and TPS. The relationship between lean, JIT, and TPS can be depicted as follows. Lean is a management philosophy that focuses on adding value, eliminating waste in processes, and meeting customer needs. JIT aims to improve (logistical) activities and eliminate problems in production. TPS is a business philosophy that emphasizes continuous improvement, employee learning and empowerment, and standardized work methods(Heizer & Render, 2014). Lean

development should be considered as a longterm philosophy rather than a short-term project. Lean philosophy aims to improve the value stream in a holistic way and to minimize non-value adding activities. Based on the current state analysis, several forms of waste were identified. The main challenges were identified to be a large amount of work-in-process (WIP) production, a large product portfolio, and the production layout. The first issue, the large number of WIP items, resulted in extra intermediate inventory, which caused disorder in the facilities. In addition, quality issues were not identified due to these inventories.(Jukka,2017) There are 5 steps to getting Lean:

**Define Customer Value:** precisely define value in terms of specific products with specific capabilities offered at specific prices through a dialogue with specific customers.

**Value Stream Analysis:** the process of identifying and removing the waste that is involved in providing the products that are value to your customers

**Flow:** This step identifies and eliminates any muda-causing structures or activities in the product flow that increase the manufacturing lead-time. It encourages companies to look at the physical distance that separates all pairs of functional departments that are utilized during the order realization process to fulfill customer demand. The most dramatic reductions in total lead time will be achieved by a product-focused organization (focused factory).

**Pull:** After the wastes in the system are reduced, a lean enterprise would use a strategy of pulling inventory through the system based on actual customer product demand, in contrast to the traditional approach of pushing inventory through the system. In a pull environment, the tendency of overproduction, which leads to increased inventory levels, can be controlled. In addition, letting the customers pull products as needed will eliminate the need for (unreliable) sales forecasts.

**Perfection:** This concept reminds the lean enterprise to continuously improve the production system, and move its performance towards perfection. The entire process of lean implementation must be a never-ending process since, in practice, the process of reducing effort, time, space, mistakes, and costs can never be perfect.

## 4 INNOVATION IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT

There is no room for doubt that logistics and Supply Chain Management play an essential role on the whole business picture. With new enabling technologies causing disruptions across the supply chain, the supply chain space is ripe for innovation. Most innovations in supply chain management build on existing achievements and reconfigure known methods and technologies rather than invent new ones. However, incremental change using emerging enabling technologies represents a huge portion of innovation used to stay ahead of competition. In the fast and increasing development of technology in the forth industry revolution, Logistics is working very hard to apply the new implications directly to the daily tasks and the big picture of supply chains management. Thanks to the efforts of innovation in the method and application the logistists apply year to year. Apparently, there are many implications in terms of innovation in logistics and supply chain management such as warehouse management system – smart warehousing, Transportation Management System(TMS), integrated digitization systems, information security,...However, in this thesis, I would like to point out the new technology for the traceability which is RFID.

### 4.1 Traceability

In supply chain management, traceability is one of the most important terms indicating the strength of the supply chain “A generic definition for traceability is given by(Jansen-vullers & Dorp & Beulens, 2003) traceability is the ability to trace the history, application or location of an entity, by means of recorded identifications. The EU commission(2002) narrows down the definition to food industry defining traceability as the ability to trace and follow a food, feed, food-producing animal or substance intended to be, or expected to be incorporated into a food or feed, through all stages of production, processing and distribution. van Dorp (2002) provides an extended list of definitions on traceability, pointing out that the differences between them derive from the different type of activities that are included and the organizational context in which they are performed”. Traceability is considered as both ethical or environmental issue. It helps clients track down the components or materials when any problems happen so that they can troubleshoot the main issues. It becomes crucial, for example, in recalls and locates the source of the problem. When it comes to materials, traceability indicates the unique lot number of the material so that clients could trace back the origin of the material and address the problem based on that information. In the foundation

of those perspectives, traceability is considered as the very important factors in the fresh products business like pangasius. In fact, there is a new technology which is a little expensive but really potential in reducing risks and increase the quality of services provided to the main clients.

RFID technology has risen to become a revolutionary element in supply chain management. It is not just a replacement for barcodes. RFID ensures that the right goods are available in the right place with no discrepancies and zero errors. It makes the supply chain considerably more precise and improves the efficiency and reliability of the entire chain. As real-time information is made available also administration and planning processes can be significantly improved.

The RFID technology has the potential in not only tracing approach but also in other stages of the business. For example, in production manufacturers can also benefit from increased information gathered with the help of RFID technology. RFID tags can store far more information than conventional barcode labels. This information can be used to optimize production processes. Accurate knowledge of the real-time movements of raw materials and the time needed for specific production steps can be integrated into efficient production planning. With the help of RFID, manufacturers can also benefit from increased information in regards to repair and maintenance of their machines and equipment. This allows manufacturers to have visibility into valuable data such as: which machine has been repaired or undergone maintenance and when has this been done? This information helps to plan maintenance schedules. Hence, maintenance can become part of production planning and help to prevent costly production breaks. Keeping track of the large number of cartons is a very complex as well as time and labor consuming process. However, RFID can be implemented to ease the situation as it can improve information management concerning cargo flow. Usually, read-write equipment is installed at the entry to a warehouse. Every cargo unit is equipped with RFID tags and all the information relating to the tags is stored in the central computer of the warehouse. When the cargo is moved in or out of the warehouse, the read-write equipment registers it and forwards the data to the backend system. This allows the management center to manage the vast amounts of products going into and leaving the storage, recognize cargo and help with placement of the cargo in the warehouse. RFID in warehouse processes offers visibility of accurate real-time information, fast locating of products, possibility to record losses, ability to plan product locations strategically .

## **II. ANALYSIS**



## 5 THE MARKET RECAP: PANGASIUUS INDUSTRY IN VIETNAM

Regarding the structure of types of pangasius exports, it is forecast that the structure of export pangasius products will change in the direction that the proportion of traditional pangasius fillet decreases because the exports of pangasius are expected to continue to decline in two major markets, the U.S. and Europe - the two main export markets for pangasius fillets; the proportion of butterfly-cut pangasius has increased sharply because it is the most-favored product of Chinese market in 2017 and this market is expected to continue to be the biggest pangasius consumption market in 2018 when the pangasius trade promotion activities penetrated in the inland provinces of China (Hubei, Sichuan); other pangasius products such as: rolled, sliced, diced, fried, etc. increased because the demand from new markets such as Japan (pangasius to fake eel), Australia, Europe and the Middle East (breaded and seasoned products by market); on the other hand, the domestic market tends to favor these products more than traditional fillet products. Vietnam's seafood industry has a high growth rate with the average annual growth rate of 8.7% from 2000 to reach 7,228.5 thousand tons by 2017. Of which, 53% with increasing trend. Indeed, the rate of aquaculture is only 27.3% in 2000, up to 48.5% in 2006 and represents 53% of the current level.

The fishery plays an important role in boosting Vietnam's economy and contributes 3.4% of GDP in 2017 with total revenue of VND177,471 billion (+ 12.3%). The development of seafood export has contributed to creating jobs for millions of workers and a great source of foreign currency for the country. Vietnam is the net exporter of seafood with a total export turnover of USD 8,326.6 million in 2017 (+ 18.0% m / n). In general, Vietnam seafood exporters achieved a 10-year CAGR of 8.3% in the period 2007-2017.

Figure 4. The report of aquaculture export industry in Vietnam



Source: Custom Department Vietnam

Pangasius is the largest export seafood in Vietnam in terms of volume and ranking second in value. In 2017, Vietnam exported USD 1.777 million (+ 3.6%) of catfish to more than 160 countries, accounting for 21.4% of seafood export turnover nationwide. Whole fish and frozen fillets accounted for 99% of total Pangasius export, and the rest were by-products such as fish skin, fish meal and fish oil. Vietnam pangasius industry is aiming for higher value by-products such as collagen and gelatin extracted from fish skin. These products are more profitable with the average selling price 30 times higher than traditional counterparts.

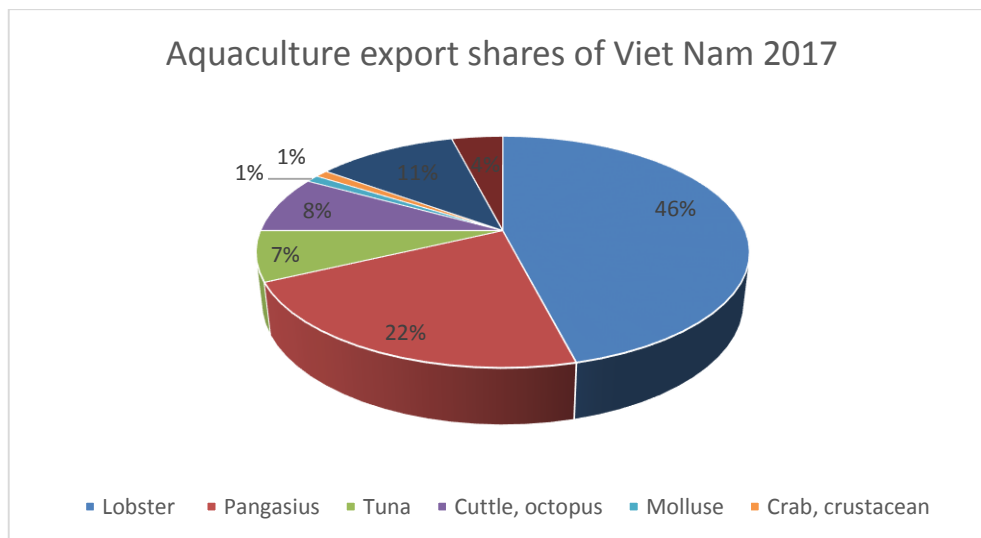
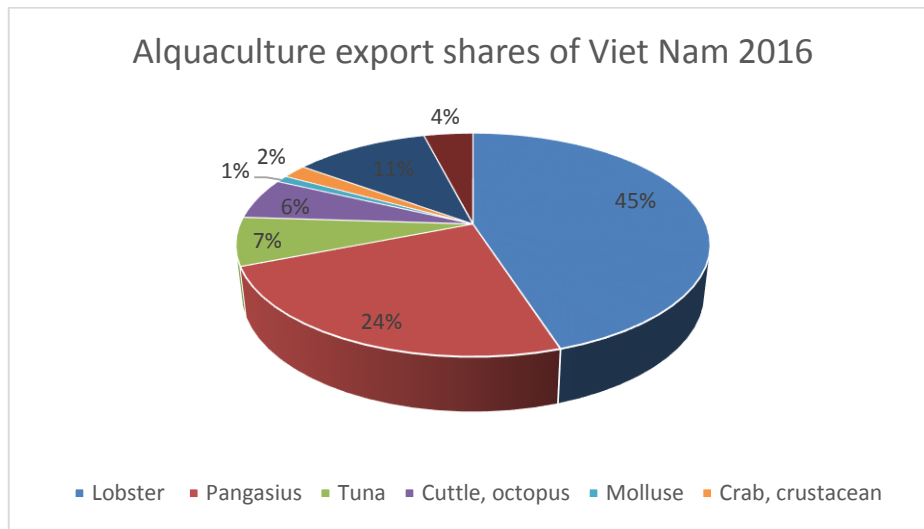


Figure 5. The share in terms of product type in aquaculture industry

According to VASEP - Vietnam Association of Seafood Exporters and Producers data, Pangasius export growth of 10 years CAGR is 6.1% from 980.0 million USD in 2007. However, the chart below also shows that the catfish industry VN does not grow according to straight

line. Specifically, Vietnam catfish export industry recorded high growth in 2008 and 2011 with the growth rate of 48.2% and 30.1% respectively. In the past two years, the export turnover has not grown, especially in the last 6 years.

This situation is mainly due to import barriers from the US and the EU - two major seafood import markets of Vietnam. These barriers include antidumping duties, increased food safety controls, quarantines and, more recently, Farm Bill regulations issued by the United States.

Figure 6: Pangasius export-import turnover (million USD)



### 5.1 Dominance of top pangasius exporting enterprises

The export volume share of top 10 pangasius exporting enterprises in 2017 reached 47.96%, up by 1.72% compared to 2016.

Table 1: Volume share of top 10 pangasius exporting enterprises

	Year 2016	Year 2017
Top 10 exporting enterprises	398,918	405,131
Total exports	831,734	876,108
Share	47.96	46.24

Source: General Department of Vietnam Customs

## 5.2 Leading pangasius exporting enterprises

### 5.2.1 Change in positions of the top 20 pangasius exporters in 2017

In 2017, Vinh Hoan Corp. continued to be the biggest exporting enterprise, followed by I.D.I Investment and Multinational Development JSC (up by three places), followed by Nam Viet JSC, Hung Vuong Corp. and Bien Dong Seafood Co., Ltd. Similarly, Godaco Seafood Joint Stock Company, Dai Thanh Co., Ltd and Truong Giang Fishery Holdings Corporation also increased by 6, 3 and 3 places to surpass Hung Ca Joint Stock Company and An Giang Fisheries Import and Export JSC (the positions of the two companies decreased 3 places). Especially, Hoang Long Seafood Processing Co., Ltd and Cadovimex II Seafood Import - Export and Processing JSC (also belonging to Hoang Long) increased by 14 and 5 places respectively, becoming the enterprise with the sharpest increase among top 20 enterprises.

Table 2 :Changes in positions of top 20 biggest pangasius exporting enterprises in 2017 by export volume vs. 2016

Exporting enterprise	Year 2017	Year 2016
Vinh Hoan Corp	1	1
I.D.I Investment and Multinational Development JSC	2	5
Nam Viet JSC	3	3
Hung Vuong Corp	4	2
Bien Dong Seafood Co., Ltd	5	4
Godaco Seafood Joint Stock Company	6	12
Dai Thanh Co., Ltd	7	10
Truong Giang Fishery Holdings Corporation	8	11
Hung Ca Co., Ltd	9	6
An Giang Fisheries Import & Export JSC	10	7
Phat Tien Seafood Co., Ltd	11	13

Cadovimex II Seafood Import - Export and Processing JSC	12	17
Cuu Long Fish Import-Export Corp	13	18
Hoang Long Seafood Processing Co., Ltd	14	28
Cuu Long An Giang Seafood Import Export JSC 15 15	15	15
An Phu Seafood Corp. 16 16	16	16
NTSF Seafoods JSC 17 22	17	22
Van Y JSC 18 14	18	14
Hai Duong Seafood JSC 19 19	19	19
Hiep Thanh Seafood Corp 20 21	20	21

Source: General Department of Vietnam Customs

### 5.3 Exports of top 20 pangasius exporting enterprises in 2017 vs. 2016

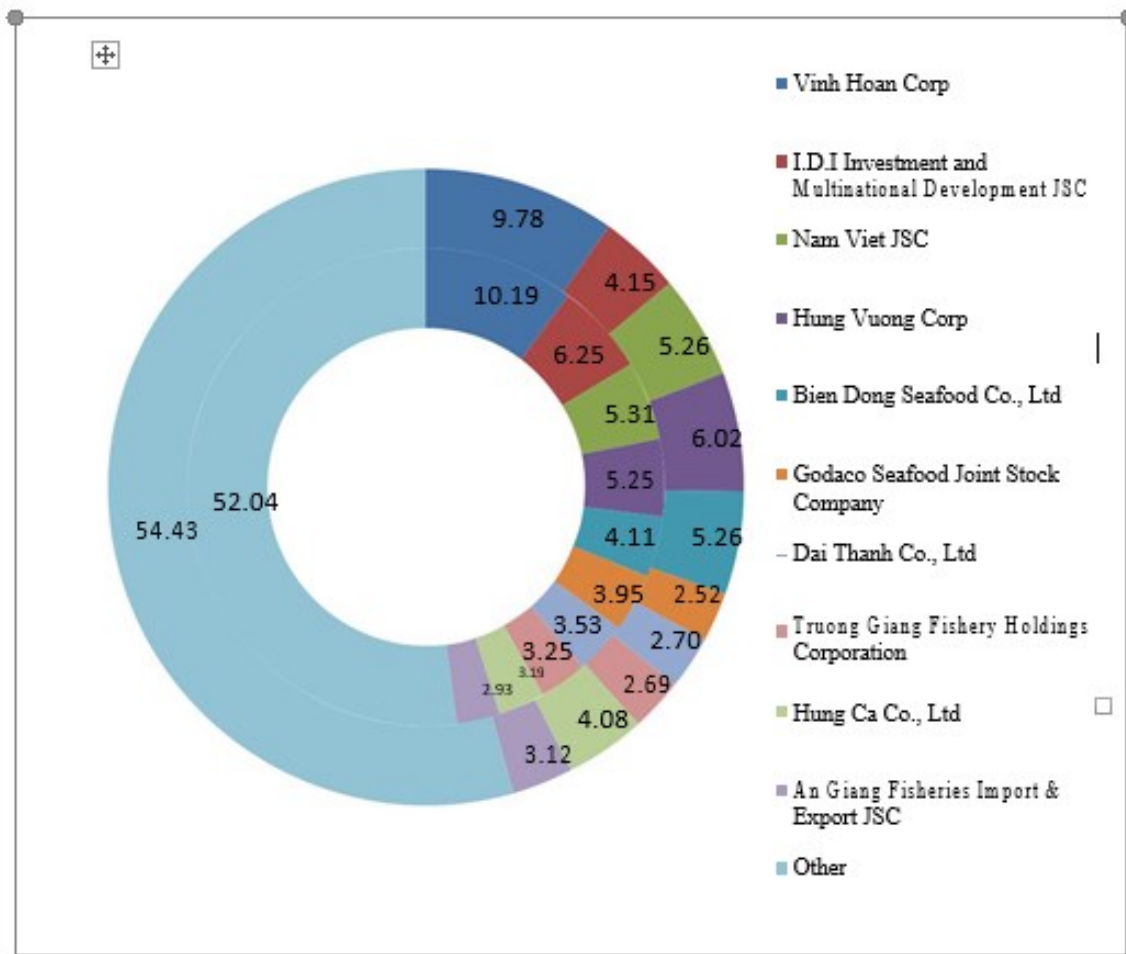
#### 5.3.1 Exports of top 20 pangasius exporting enterprises in 2017 vs. 2016

In 2017, there were more than 250 big and small enterprises involved in exporting pangasius of Vietnam, but the volume and export value concentrated in 20 biggest enterprises, accounting for 67.68% of the total export volume and 72.02% of the total export value. Of them, Vinh Hoan Corporation was the biggest exporter of pangasius with 84.74 thousand tons and the export value of US\$ 264.13 million, down by 1.08% in volume but up by 8.82% in value compared to 2016. (APPENDIX PI)

#### 5.3.2 Changes in export volume shares of pangasius exporting enterprises

In 2017, the market shares of enterprises with the strong exports to China-Hong Kong such as Vinh Hoan Corporation, I.D.I Investment and Multinational Development JSC, Godaco Seafood Joint Stock Company, Dai Thanh Co., Ltd and Truong Giang Fishery Holdings Corporation tended to increase. In contrast, the market shares of enterprises with the strong exports to the United States and EU such as Bien Dong Seafood Co., Ltd, Hung Vuong Corp. and An Giang Fisheries Import & Export JSC tended to fall.

Figure 7. Market share by export volume of biggest pangasius exporting enterprises in 2017



Note: Internal round is shares for 2017; External round is share for 2016

Source: General Department of Vietnam Customs

### 5.3.3 Pangasius exporting enterprises to North America

The pangasius exports of Vietnam to North America in 2017 were 175.26 thousand tons, worth US\$ 486.69 million. Vinh Hoan Corporation was the biggest pangasius exporting enterprise of Vietnam to North America with 54.13 thousand tons, worth US\$ 172.72 million, down by 5.71% in volume and but up by 5.27% in value year on year. The second position belonged to Bien Dong Sea Products Co., Ltd with the export volume and value of 32.92 thousand tons, worth US\$ 108.66 million, respectively, a sharp decrease of 25.06% in volume and 14.06% in value compared to 2016. In contrast, Hung Vuong Corporation is the third biggest exporting company with the export volume and value of 21.14 thousand tons,

worth US\$ 73.02 million, up by 154.78% in volume and up by 272.97% in value.(APPENDIX PII)

#### **5.3.4 Pangasius exporting enterprises to EU**

Pangasius exports of Vietnam to EU in 2017 were 84.5 thousand tons, worth US\$ 203.46 million, down by 28.15% in volume and 22% in value compared to 2016. Of which, the exports of most enterprises tended to fall. Four out of five enterprises with the highest export volume included: Vinh Hoan Corp., Nha Trang JSC, Hung Vuong Corp. and Nam Viet JSC dropped by 9.59%, 13.83%, 65.15% and 47.5% in volume compared to the previous year. Only the export volume of Godaco Seafood JSC rose slightly by 1.85%( APPENDIX PIII)

#### **5.3.5 Pangasius exporting enterprises to United States**

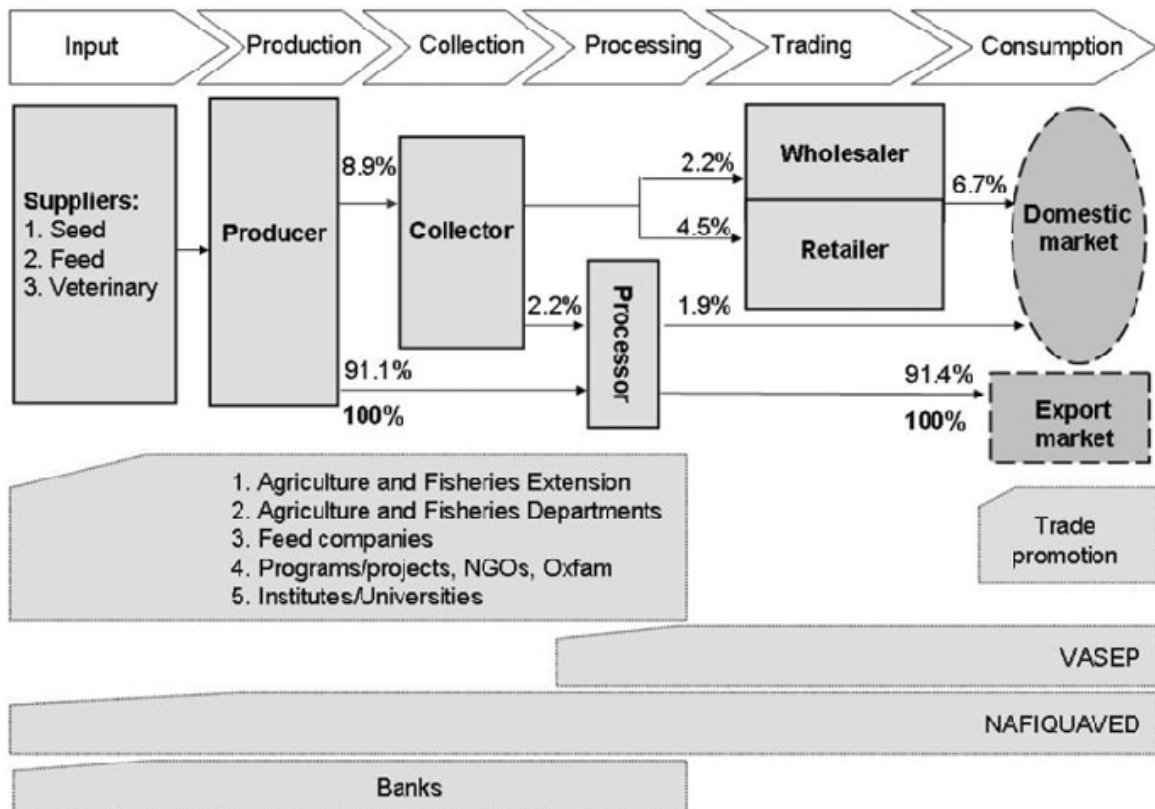
In 2017, exports to the U.S. concentrated on three biggest enterprises, including: Vinh Hoan Corporation, Bien Dong Seafood Co., Ltd and Hung Vuong Corporation with total share of 93% in volume and 94% in value. Of them, Vinh Hoan Corporation was the biggest exporter of pangasius to the U.S with 45.16 thousand tons and the export value of US\$ 150.05 million, down by 8.11% in volume but 3.4% in value compared to 2016. The next position belonged to Bien Dong Seafood Co., Ltd with the export volume of 32.83 thousand tons and the export value of US\$ 108.31 million, a sharp decrease of 24.71% and 13.59% respectively compared to 2016. Meanwhile, the exports of Hung Vuong Corporation increased to 628.69 % in volume and 663.63% in value to 16.28 thousand tons and US\$ 63.42 million.

### **5.4 Vietnam Pangasius Supply Chain**

Pangasius export value chain in the Mekong Delta provinces involve a variety of stakeholders such as: Stakeholders involving in aquaculture (suppliers of fingerlings, feeds, medicines, farming households); stakeholders involving in processing pangasius (traders, processing plants); stakeholders involving in consumption (export plants, retail channels and international markets).

Basically, the export value chain of pangasius can be described in the following diagram:

Figure 8. Vietnam pangasius supply chain



Source: High and low value fish chains in the Mekong Delta: Challenges for livelihoods and governance (Loc, Brush, Sinh & Khiem, 2010)

- Farming households:

The characteristics of farming households are small and have limited capital, small and scattered farming area, unfavorable production conditions (deep inland or not convenient for transportation). Therefore, the productivity and quality of pangasius of this group is quite low and uneven. In the context of increasingly stringent export standards and traceability requirement, prices of pangasius products of farming households are often forced down; therefore, farming households tend to cooperate and outsource for enterprises.

- Big enterprises:

Regarding big enterprises, the demand for raw materials is increasing due to the instability in the market of raw pangasius. Enterprises have two orientations for being active in the sources of materials, including (i) self construct farming areas and (ii) coordinate with co-operatives and big farming households.



The reactivity in material sources of big enterprises will help reduce the risk during the production process and promote enterprises to expand their operations. In addition, the reactivity of enterprises in material sources through coordination will help farming households stabilize the production.

- Small enterprises:

Along with the trend of forming a closed pangasius production line of big enterprises, small enterprises suffer loss and gradually to turn to outsource or have to transfer the ownership.

- Traders:

Traders collect fish from each small pond and sell it to enterprise to enjoy the price difference. In addition to the centralization of farming areas and the formation of linkages, the role of traders has also decreased significantly

## 6 SUPPLY CHAIN MANAGEMENT AND LOGISTICS PROCESS IN VINH HOAN LIMITED CORPORATION

### 6.1 Company introduction

#### 6.1.1 Establishment

Vinh Hoan Company was established in 1997 in Dong Thap - the largest catfish farming area in the Mekong Delta. With only 5 clients in 1998, the company has developed rapidly and now has more than 300 customers, exporting to more than 40 countries in the world. With 20 years of experience in pangasius production and export, Vinh Hoan is leading the pangasius industry in Vietnam and is the second largest seafood exporter in the country with total export turnover of 270.0 million USD in 2017, accounting for 15.2% market share of pangasius. Vinh Hoan's export turnover is double that of Vietnam's second pangasius export company Hung Vuong (HVG) with the export turnover of 121.0 million USD in 2017.

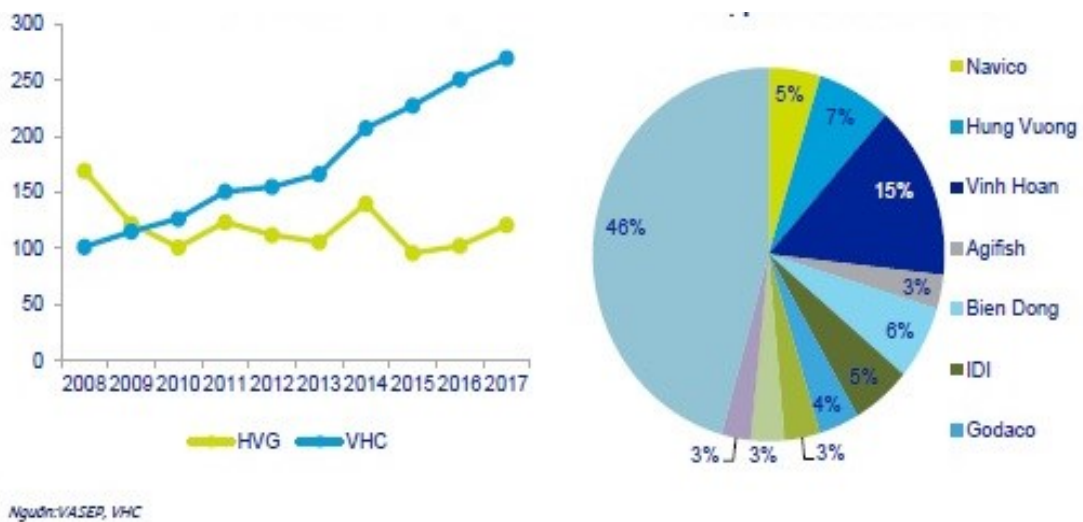


Figure 9. Market share and the export turnover of Vinh Hoan(VHC) in the pangasius industry in Viet Nam

#### 6.1.2 Supply Chain Management in Vinh Hoan

The production has closed from hatchery, farming to the state-of-the-art processing plant, supplying a wide range of products from frozen fillet, fish, fish, to collagen, gelatin, rice and shrimp. The company is currently operating with 32 ponds on a total area of 530 ha and 55 ha of Pangasius breeding area. Half of VHC's farming areas have Global GAP, ASC or BAP certification. Vinh Hoan is operating 6 processing plants with the total capacity of 850 tons

of raw materials per day, the value added factory and the rendering factory with the capacity of 2,000 tons / year and 18,000 tons / year respectively.

With 65% of raw material, VHC also works closely with third-party suppliers, mostly small farmers. In order to strictly manage the quality and traceability of breeding stock, to ensure hygiene and antibiotic residues, the company has a policy of providing high quality hatchery and providing loans at preferential interest rates. This will help establish a strong and sustainable linkage for the pangasius industry.

About half of VHC's aquaculture area has received the Aquacultural Stewardship Council (ASC), Best Aquaculture Practice (BAP) or Global GAP (Global Good Aquaculture Practice) or two or three certificates for the same pond. Specifically, the company currently has 142ha with ASC certification, 155ha with BAP certification and 180ha with Global GAP certification.

These certificates show that Vinh Hoan has met strict quality and safety requirements for the most difficult export markets such as the US or the EU. Vinh Hoan also demonstrates that its production supply chain is sustainable, ensuring the standards of labor safety and environmental protection through these certifications.

The standards given by each distribution / retail channel in each export market are different. Therefore, diversification of certificates will help VHC increase its competitiveness in export markets and open new markets. According to VHC management, the average selling price was also increased by 10-15% compared to the market thanks to these certificates. linkage for the pangasius industry.

In the pangasius sector of Vietnam, Vinh Hoan is one of the few enterprises that can build a tight and sustainable supply chain. With 220ha of cultured area expanded in 2016, raising the total area of breeding areas to 530ha and 55ha of nursery farms, Vinh Hoan raised its self-sufficiency rate to 65% in 2017, from 17% in 2007.

Figure 10. Material demand and percentage of self-supplied materials



High self-sufficiency helps Vinh Hoan control the quality of inputs with the ability to trace the origin of seed and fish material, avoid the majority of diseases and control the antibiotic residue in export products. The company is less dependent on external suppliers and less affected by price fluctuations in the market.

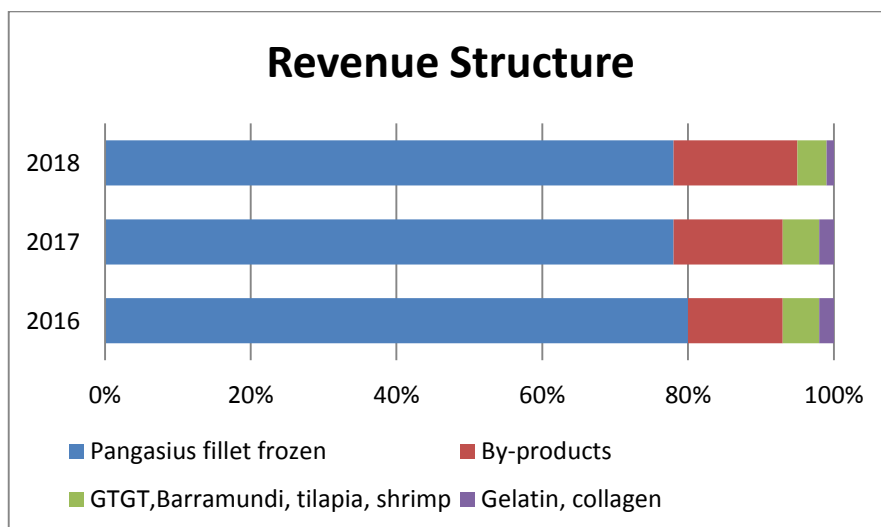
**6.1.3 Key products and markets:**

The dispute between the United States and Vietnam around the name "catfish" - catfish began in 2001 when the US asked Vietnam pangasius to be labeled as "tra" or "basa" to distinguish it from fish. slippery cat in the United States. Misinformation in the EU has created negative perceptions about Vietnamese pangasius. Finally, excess antibiotic residues are often found in shipments of pangasius from Vietnam due to lack of control and lack of information from small farmers. The events were mainly due to lack of brand names, trademarks and lack of promotion.

Large export companies such as Vinh Hoan have made great efforts in quality control and food safety, labeling and branding in hopes of changing consumer perceptions about the image of Vietnamese pangasius to stimulate demand. Building a strong brand also helps businesses increase export prices.

VHC's main products are frozen pangasius, accounting for more than 75% of total sales in 2016. The contribution of value added products remains low, accounting for less than 2% of total sales while by-products contributed ~ 15%. The goal of VHC is to increase the proportion of value added products to 10% of revenue, as this segment has high LNG rates of 22-25%.

Figure 11. The revenue structure of Vinh Hoan



Another notable segment is the collagen and gelatin products extracted from fish skin. Although this segment currently accounts for less than 1% of total VHC sales, this is a potentially very large product with high profitability. According to VHC, gelatin products are sold at a high price of ~ \$ 10 / kg and collagen is priced at \$ 20 / kg while traditional by-products such as fish skin are only sold at ~ \$ 15,000 / kg (~ USD 0.7 / kg). VHC said that this segment could achieve a 25-30% LNG margin.

The most noticeable segment is value added products with a high LNG margin of 22-25%. VHC has also expanded its products to tilapia, seabass and shrimp to further diversify value added products. By 2016, value added products, seabass, tilapia and shrimp contributed 4.4% to VHC's total sales. We expect this ratio to increase to 4.6% in 2018. The company's target is to raise this ratio to 10%.

A quick market survey shows that frozen barramundi fillet can be sold at \$ 11 / kg and frozen shrimp has an average selling price of \$ 9.5 / kg.

Table 3: Profit margin categories

Category	LNG
Pangasius fillet frozen	12-16%
By-products	8-10%
GTGT products	20-25%
Barramundi, tilapia, shrimp	14%
Gelatin, collagen	25-30%

The US, EU and China are the three largest export markets of VHC in 2017. Although the pangasius industry in Vietnam has moved from the US and EU markets to China, but China is still only market. the third largest school of Vinh Hoan. Due to the shortage of raw materials in the past two years, Vinh Hoan has chosen to focus its resources on traditional markets such as the US and EU instead of expanding its new market, China. We believe that Vinh Hoan's move is a step in the right direction as the average selling price in China tends to be lower than other markets, mainly because China imports whole fish instead of processed fillet. Meanwhile, VHC's business strategy is to develop more value added products. In addition, because the US and EU are the two most demanding markets, meeting the standards of these two markets will help VHC penetrate into other markets.

VHC currently accounts for 43.5% of total catfish imported into the United States from Vietnam. In this market, VHC's products are sold in well-known retail chains such as Walmart, Target, Trader Joe's & Kroger. Sysco and US Food Service are also longtime customers of Vinh Hoan in the US.

For the EU market, VHC holds 15.1% of Vietnam's pangasius market share by the end of 2017. Vinh Hoan products are sold at Tesco, Casino and Metro supermarkets.

VHC also holds a high market share in major markets such as Canada (38.2%), Japan (29.5%), Hong Kong (26.5%) and Australia (22.3%).

## 7 CURRENT STATE ANALYSIS

In this part, I would like to analyze the whole process that the firm is using in Vietnam since the raw materials is inputted until the final products are delivered to customers.

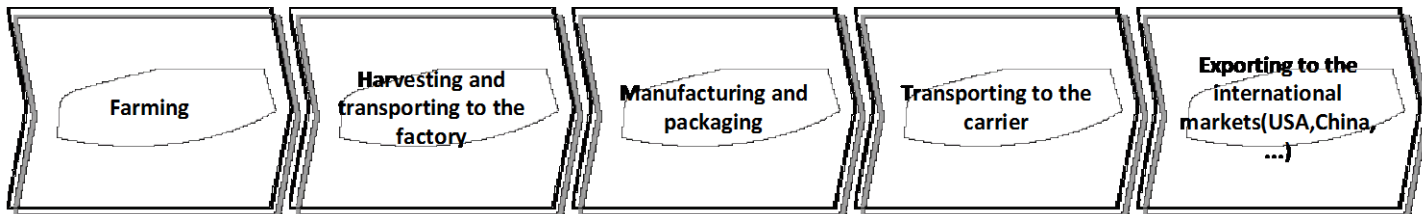


Figure 12. General process of manufacturing and selling the main product of Vinh Hoan “Frozen pangasius fish fillet”

### 7.1 Hatchery, nursing and aqua culturing the “Pagasius”

#### 7.1.1 Hatchery and nursery:

In the aquaculture industry, breeds are considered as the most important factor determining the success of farming and nursing because if the breed has the unqualified quality, it is not possible for the baby-fish growing well enough so that we could manufacture the high-quality products. At present, Vinh Hoan has 9 different farming area located in Dong Thap province Vietnam supplying 80% raw materials for 3 main factories in the same province. The breeds are supplied from the hatchery farms of Vietnam governments and the owned hatchery establishment of Vinh Hoan. In the past, the main breed supply is natural, thus, the quality was not reached the international standard and it caused many losses due to the heterogeneity in production progress. Regarding the report of Aquaculture Alliance (Nguyen), “From 1950’s seed is from the wild environment, from 1970’s the research started, from 1990’s it widely applied and produce all year round with the fecundity 400 fries/female( 5 kg)”

Figure 13. The hatchery processes



The standard of seed production is clarified as the maturation age is 3 years for domesticated and 4 year for the wild broodstock. Rematuration capacity is 3-4 times per year, time of broodstock exploitation is 3-4 years. Besides, it must have no collaboration between seed and grow out producers as the company policy. The breeding program designed and operated by RIA2(2001-2018) with the purposes of increasing growth and fillet yield, improving growth rate 13% per generation.

**7.1.2 Farming( aquaculturing)**

The most important evaluation key for Global GAP is the hygiene factors and the quality of products. There are 2 main standards which are usually applied are:

The input: Clean water, no infected by industrial factors or biological factors, qualified breeds from the registered breed farms, certificated by state or international certification.

Depend on the region of production farm, the indicators could be changed to be fitted to the environment, the most popular indicators to be reached the global GAP standards showing in the following table

Table 4: Basic standard for Pangasius fishery pond according to GlobalGap standards.

Temperature	26 - 30°C
pH	7-8
Oxygen	Minimum 3 mg per litter
NH3	Maximum 1 mg per litter
Coliform	Maximum 10000MNP/100ml
Lead(Pb)	0,002-0,007 mg per litter
Cadmi	0,8- 1,8 mg per litter

Source: VASEP

**Pangasius Feed:**

Pangasius feed has developed greatly over the years. One example is industrial feed that can reduce fish diseases and environmental pollution by feed residuals, but industrial feed is more expensive than other alternatives such as homemade feed. In addition, young fish cannot feed well on homemade feed so industrial feed is often used during the first two months



of the grow-out culture system. When the market price for fish drops, farmers tend to apply both industrial and homemade feed.

**Homemade feed** - this consists of two ingredients, rice bran and trash fish in different ratios to provide good protein content during periods of growth. Farmers have also begun using alternative protein sources such as soybean meal, corn, dried fish, meat bone meal and poultry. Farmers also mix rice bran, trash fish and other ingredients, cook the mixture and use an extruder to create a sticky and long string feed. Feed additives are also included as they enhance feed quality, fish health and fish growth. Examples of feed additives are vitamin C, lysine, anti-oxidants, probiotics, vitamins and a mineral premix. Homemade fresh feed is made from materials such as rice, fishmeal and soybean. These are finely ground, mixed together, cooked and cooled before being made into small handfuls or pressed into pellets.

**Commercial pelleted feed** - this feed is dried and pelleted by industrial processing lines. Since 2008 there has been an increasing trend towards the use of commercial pellets that contain rice bran, maize and fishmeal. Although they are more expensive, they result in better feed conversion ratios and water quality, and are designed to float to avoid any build up of food in cages or at the bottom of ponds. Some farms use commercial pellets throughout the on-growing process, and others only in the first and last month while the fish are given farm-made food. (Pangasius Farming: Feed and Nutrition, 2018)

#### **FCR (Food Conversion Ratio) and Feeding Practice:**

According to the FAO, the feed conversion ratio (FCR) of Pangasius that are fed commercial pellets is around 1.7-19:1. Pangasius feeding is divided into two stages. The first tends to use feed with high amounts of protein and minerals so the fish gain maximum length. In the second stage, the carbohydrate concentration of homemade feed is usually increased to fatten the fish, make them heavier and thus result in higher production. Improvements in feed can significantly contribute to increases in growth rate, fish survival and a shortening of the culture cycle. For the further development of the Pangasius feed industry, to improve sustainability and reduce feed costs, there is a need for more laboratory studies and the development of fishmeal-free diets as well as a global approach to the issue of guaranteeing sustainable feed.

## 7.2 Harvesting and transportation to the factories

In this part, I would like to describe in particular the processes of harvesting and transporting to the factories by boats in the following figure:

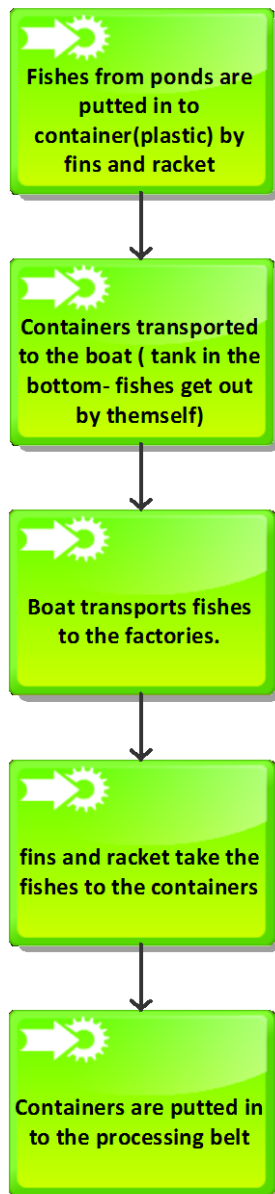


Figure 14. Process of harvesting and transporting to the factories

There are 4-5 workers who are responsible for catching the alive pangasius fishes by fins and rackets to the boats using the small plastic containers. The boat equipped a large tank in the bottom in which contain the fresh and alive fish during the transportation from the farms to the factories. In the receiving points, there are another 4 -5 workers in charge of delivering fishes from the tank of the boats to the processing belt which is settled up to transfer the raw

material directly to other stages of production. The main stage of production would be describe in detail in the next chapter.

### 7.3 Manufacturing and packaging

The production system is operated daily base on the following processes:

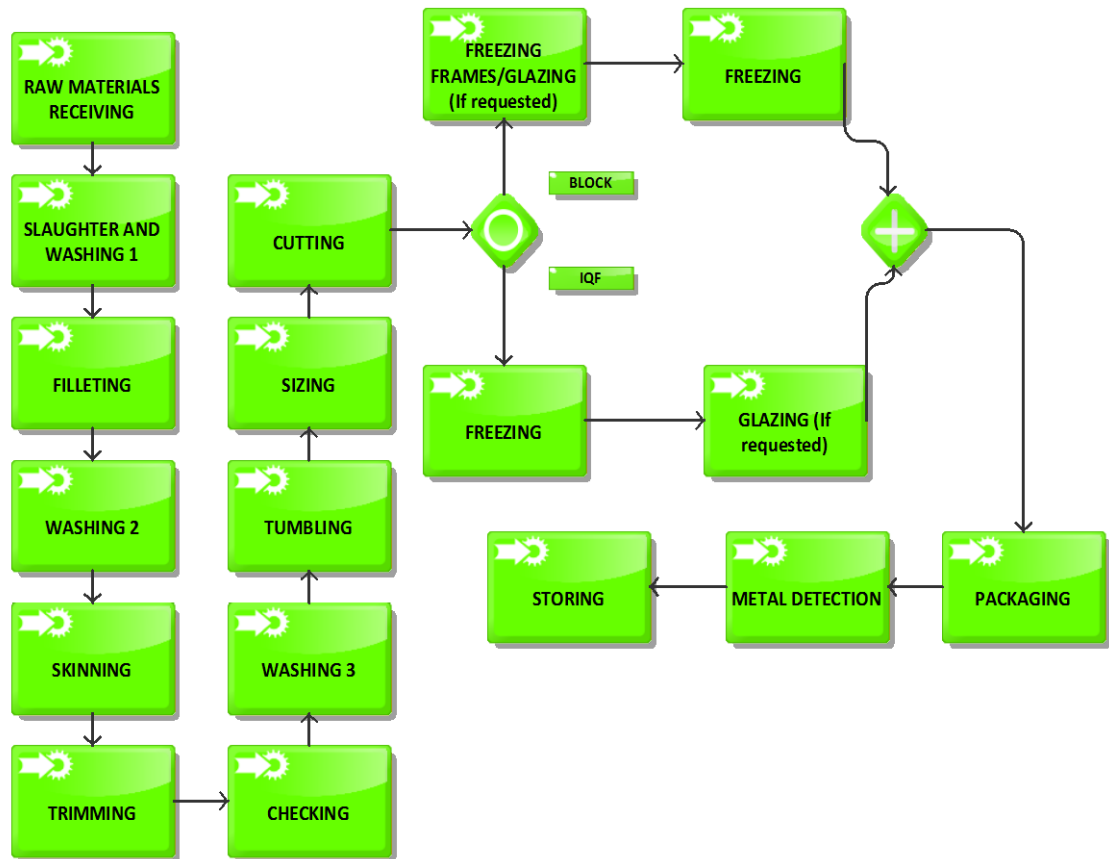


Figure 15. The main production processes

#### Description of the production processes:

Processing step	Parameters	Description
Receiving raw materials	Residue of antibiotics and banned chemical Pesticide: Trifluralin, Chlopyrifos no detected	Pangasius fish are transported from farm to factory by boat then delivered at the raw material receiving area Accept only raw material meeting factory's requirements: fish weight as per requirement for each batch, alive and fresh, no dis-

		<p>ease, no scratches. Test result of non detected banned antibiotics and chemicals are available</p> <p>Note: Additional test result of non detected Trifluralin, Clopyrifos is required for fish not from company's farms.</p>
Slaughter & Washing 1		Fish are slaughtered and bled and passed to washing tank. After washing, fish are transferred to filleting area.
Filleting		Fish are filleted on plastic cutting board by stainless steel knife; Fillets are moved to washing step 2 in baskets
Washing 2	Water temperature under or equal to 20 °C	Baskets of fillets are moved to washing 2 area to be washed in water at temperature lower than or equal to 20°C in order to wash off the blood and foreign matters. After that fillets are moved to skinning machine in baskets
Skinning		Skin is removed by machine. Then skinless fillets are moved to trimming area
Trimming		Use stainless steel knife to remove red meat (not applicable to untrimmed fillet products), bones, fat, and skin remained (if any). Baskets of trimmed fillets are collected at the end of <b>conveyor belt</b> for checking
Checking		Place every single fillet piece on candling table, using both hands and eyes to detect parasite, bones, read meat remained. Accept only whole fillets, no parasite, no bruises, no read dots, being firm and totally boneless. After checking, fish fillets are moved to preliminary sizing step

Preliminary sizing		Fillets are preliminarily sized by machine for conveniences of the following steps
Washing 3	Water temperature lower than or equal to 10°C	After checking and preliminary sizing steps, fillets are moved to washing step 3 with water temperature at lower than or equal to 10°C
Tumbling	Solution additive with the ratio 1 solution: 2 fish Tumbling time: 10 – 35 minutes (depending on quantity of fish in tank, firmness of fish meat and product specifications)	Fish fillets are tumbled in the Phosphate or non-Phosphate solution with the ratio of 1 solution: 2 fish. Tumbling time: 10-35 minutes depending on firmness of fish meat, size of raw material, quantity of fish for each batch and product specifications.
Sizing	Temperature of fish fillets lower than or equal to 10°C	Fish fillets are sized as per specifications: 60-120 120-170 170-220 220- up g./ piece; or 2-3, 3-4, 4-6, 6- 8. 8-10, 10 up oz./piece; or 2-3, 3-5, 5-7, 7-9, 9-11, 11 up oz./piece; or as per customers' requirements
Cutting		For cutting products: There are several cutting methods such as topsol portion, strip, and loin with sizes and weights based on customers' requirements.
Arranging in to freezing pan	Temperature of fish fillets lower than or equal to 10°C	Block frozen: fillets are placed in freezing frames; water is added for glazing if required IQF: fillets are placed on freezing belt Keep products at temperature of lower than or equal to 10°C

Freezing	<p>Temperature of contact freezer before freezing from minus 5 to 0°C. Freezing time: lower than or equal to 4 hours for block frozen and 10-25 minutes for IQF</p> <p>Core temperature of products: minus 18°C</p>	<p>Freeze products in contact or freezers. Temperature of contact freezers before freezing is from minus 5°C to 0 °C. Freezing time does not exceed 4 hours for block frozen and 10-25 minutes for IQF products depending on fillet sizes. Core temperature of products is lower than minus 18°C</p>
PA/Carton		<p>Packaging must be checked to display pangasius products commercial name and scientific name as an allergen</p> <p>PA packaging used for vacuumed products must have “Keep frozen”</p>
Metal detection and Packing		<p>After being removed fromg freezing frames, glazed and packed, products are passed through a metal detector. Then products are packed again in carton boxes per customers’ requirements.</p> <p>Cartons are clearly marked with product name, size, net weight, production date, name and address of producer, product of Vietnam identification of the lot, EU code( for shipments to EU)</p> <p>For products certified by BAP, cartons have to have BAP logo and CoC number</p>
Cold storage	<p>Temperature of cold store: lower</p>	<p>After being packed final products are arranged orderly in cold store</p>

	than or equal to - 18°C	Products are stored at temperature of lower than or equal to -18°C
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The processes of receiving materials and manufacturing is continuously improved. However, it is currently quite complicated and also it has a variety of steps. Therefore, the whole processes must be implemented in the high condition of carefulness. In several stages, we could see the wastes such as defects, excess productions or unnecessary inventory. In the next part, I would like to analyze those issues as well as propose the solutions for eliminating those wastes.

#### **7.4 Transporting to the carriers for exporting**

Before exporting, Vinh Hoan conduct the final audit by National Argo- Forestry- Fishers Quality Assurance Department for evaluation of the condition, packaging, quality, quantity,... and take the sample for biology and chemistry test. In the next 3-7 days, Nafiqad will certify the shipment and deliver the export certification.

Together with the export certificate, Vinh Hoan conduct the loading shipment to the containers(freeze-containers), loading process would be done in the factories, then those containers would be transported to the Container Yard(CY) for the seaway transport based on the exporting terms agreed with clients (FOB or DDP).

## **8 DESCRIBING THE WEAKNESSES IN LOGISTICS PROCESSES AND SUPPLY CHAIN MANAGEMENT IN VHC**

### **8.1 The stability of the raw materials (alive or fresh pangasius fish)**

In the previous 10 years, there has been an incredible increasing of the sales volume in the Pangasius industry. This booming development leads to the crisis in supply – demand in this industry. While the farms are not able to supply the materials for the whole industry, factories keep growing in the surprising numbers. Investments keep increasing remarkably to this industry. From 2003 to 2008, the number of Pangasius fillet manufacture factories rise in double or triple units; the utility was 2.7 times increased, the factories of “Pangasius food” increase gradually due to the feed consumption rise.

“According to traders, processing plants in Can Tho, An Giang, Dong Thap, etc., the estimated inventory for early 2017 was 305 thousand tons of material pangasius (down by as much as 50% compared to early 2016). 2016 was a year with the sharp growth in pangasius exports (up by nearly 17% compared to 2015) mainly because China imported large-sized pangasius (from 1kg/head upward) while the imports of the U.S. Also soared sharply year on year. Meanwhile, the pangasius output in 2016 only edged up by over 4% compared to 2015, so the ending stocks in 2016 tumbled compared to the beginning of the year.

In 2017, it was expected that the pangasius exports would reach 1.25 million tons, up slightly by over 4% compared to 2016, but still lower than the export demand. Therefore, the average prices of pangasius sized 700-900 gr/head in the Mekong River Delta in 2017 rose by about 20% compared to 2016 to VND 25,000-25,500/kg. Especially, in the last week of February 2017, prices of material pangasius were VND 26,000/kg - a new record at that time. The low supply pressure continued to prolong until the end of 2017, or even in quarter 1 of 2018 when the demand for orders to the U.S., especially China and domestic markets kept rising, marking a new record prices of VND 28,500-29,000/kg in early October 2017. This new record was maintained until December 2017 and up compared to VND 27,000-28,000/kg established in 2011-2012” (Vietnam pangasius annual report 2017 and outlook 2018).

The unbalanced supply-demand market affected to all company which exporting pangasius products to the variety of markets. Vinh Hoan as the leader in the Pangasius export industry have been under the high pressure of low supply and high demand. In the highest demanded season, the whole system of manufacturing has suffered the pressure of production since the



customer's orders are reaching the peak, the supplying raw materials is not sufficient and under requirements. The value stream is slightly broken right in the first stage which is Raw material receiving because the supplied resource of raw and fresh Pangasius is not stable and extremely rare in the high season. While the self-supplied materials from the owned farms has filled only 60% of the factory capacity, the rest source should be well supplied from the purchasing department( searching and dealing with Pangasius fish farmers to purchase the raw and fresh fishes and transport to the main factories). Supply Chain Management team has worked on this issue for few years and I will place my recommendations in terms of logistics and Supply Chain Management in the next chapters so that the company could optimize its capability in the high demanded season of the Pangasius. Eventually, when the price goes high in the peaked period of exporting, the company have been through the situation of lacked materials, thereby being frustrated in sales and the orders being delayed for weeks. Consequently, the position of Vinh Hoan in the market get down sharply due to the lateness of processing orders. The business get stuck in the value chain as the company could not receive and process the purchase orders while the price go high and the demand in the main markets like US and EU peaked.

## **8.2 Overload production pressure in the peaked season**

Production system is over capacity because of the low cooperate between Vinh Hoan and importing company in their markets. For example, the orders have been called occasionally and randomly based on the temporary demand in the customers' market. In fact, Vinh Hoan is in the out of control position in this trade game. They have to follow the purchase orders strictly without any plans or management actions. As a result, the supply chain is under the high pressure in those periods. The production is overload, quality control system is manual thus easily make the mistake of defects in manufacture processes. On the other hand, the in cooperation has shown in terms of the shorterterm and temporary contract. It means that the importers only take orders when they have the need of distribution tra fish (Pangasius). The business run under the risky terms in the weak relationship between Vinh Hoan and their strategic partners. There is no such strong connect among those corporation to make sure the value stream have been operated smoothly and sustainably. The lack of stability in volume orders make the Value chain always in the unstable condition and the production managers could not manage the processes effectively by the traditional processes and methods. It is

extremely necessary to reengineer in production so that it could fit the seasonal characteristics of the industry. In addition, the packaging and labeling stage is basically depended on the specification request from clients. It leads to the passively stand on the other requirements. Therefore, the processes of production should be flexible and based on the high technology so that the manufacture belt could follow the variety of request from the client side. Furthermore, application of the updated warehouse management system should be another solution for this issues. In the next chapters, I would like to conduct a deeper analysis about this recommended solution.

### **8.3 Traceability**

In Vinh Hoan, the whole processes are not included any traceability tools or application. It is resulting to the fact that the clients are not satisfied with the services and products the company has provided. The proposal of the new project should be implementation to set up the new traceability system in terms of the different kind of products. Traceability offers a way to boost brand image amid consumers' growing concerns about the sourcing and path of what they eat and the products they buy. In addition, the data generated from a traceability program can help companies optimize business processes, such as informing planning and supply chain management strategy. It can help address performance issues related to lead times, transportation costs and inventory management.

### **8.4 Wastes in the processes – Analysis evaluation**

With regards to the logistics processes, Vinh Hoan has a quite completed process which include many international standards of production, quality, qualification and specification. However, if we go deeper into their stages of implementation, there are still some issues which cost a significant amount of resource ( employees, time cost, money,...). For example, the processes of receiving materials as the figures No. represent the number of employees, time cost and the number of steps to get the materials into the factories. In this businesses, we could find few wastes such as waiting, inappropriate processing, unnecessary motion, underutilized people. Furthermore, the risk of not sizing materials from the very first step of the production process could lead to the complicated and unnecessary inventory. Since the order from the clients usually has only from 1 to 3 sized and weighted specification, the raw and fresh fishes from ponds have no records of such information. Consequently, in

the stage of sizing in production system, the factory has to eliminate the unqualified materials, then we need a motion to make them freeze and storage them for the next wave of production which aim to the fitted orders.

Business Modeler:

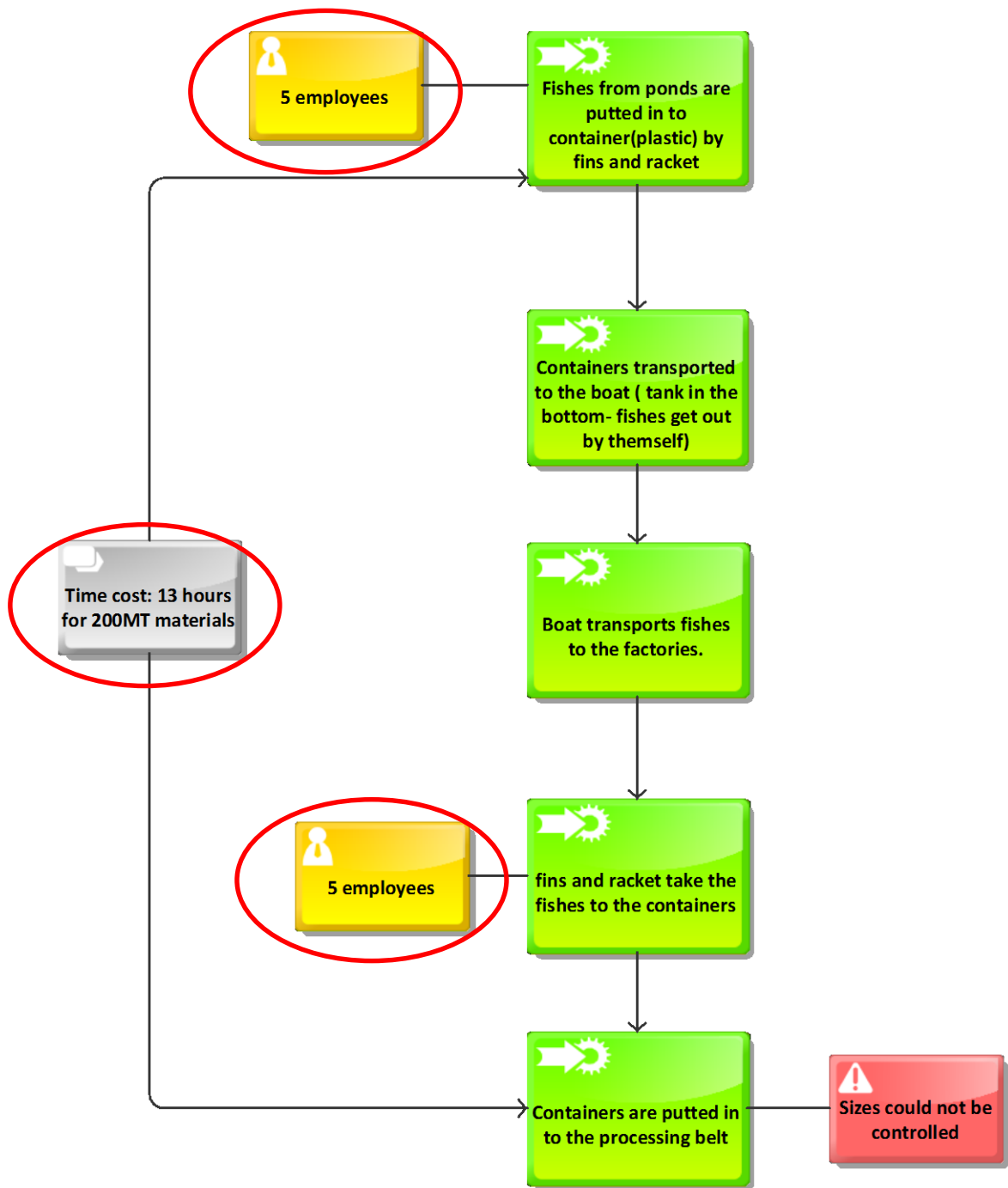


Figure 16. The process of receiving materials



Figure 17. Visualization of the receiving materials stage.

In this stage, there are at least 5 employees( basic workers) in charge of transporting the alive and fresh fishes from the ponds to the boat-tanks. They will start their jobs from 03:00 in the morning loading the fresh materials to the boat until 04:00 in the afternoon (13 hours/day) to make sure all the boat has full of raw fishes and be transported to the factories. In the factories receiving points, it costs 5 workers as well in each points of receiving to do the same jobs. That is a huge amount of labour cost since Vinh Hoan has to pay them 20 USD per hour which mean \$2600 USD per day for 1 line of transportation. In addition, due to the slowness of this method of loading fishes on the boat, each day(13 working hours) the factories could received only 200 MT of raw materials and it is not sufficient to the production targets in the peaked seasons.

As we could see from the visualized pictures, where the the stage of receiving materials and freezing fillet is implementing, the number of employees in receiving materials stage is more than others. For instance, the factory only need 1 employee for taking products after freezing while they need 4-5 employees for only receiving materials from the boats and 4-5 others for storing fishes into the boats

Figure 18. Fillet products taking and sourcing after freezing



## 8.5 Summary

In the Pangasius industry in Viet Nam, Vinh Hoan still stay at the first position of the sales volume and market share. The company has many certificates from the trusted international standards for the quality of the product. After few decades establishment and development, the production processes and the supply chain management in Vinh Hoan is quite professional and productive. However, there are a few problems in the receiving materials stages which cost a lot of labour cost and expenses. In addition, the traceability is also the main issue since US and EU markets are putting harder and harder on Vietnamese Pangasius firms on the quality, hygiene standard, etc ,.. The traceability system in Vinh Hoan is still manual system with the hard cover of documents. Lastly, the receiving materials stage of Vinh Hoan has been spent a huge amount of resource including human resource and time cost. It could be better if Vinh Hoan apply the new approach to this stage for decreasing the time and expense and also ensure the availability of raw materials to keep the production lines on stable.

## **9 PROPOSAL OF IMPROVEMENT IN VINH HOAN SUPPLY CHAIN MANAGEMENT AND LOGISTICS**

When it comes to improvement in Vinh Hoan, I would like to go through 4 main issues which I pointed out in the previous chapter and give the recommendations for each issue that could help the company overcome the loss of wastes in logistics processes, minimize the cost of production as well as optimize the efficiency in manufacture system.

### **9.1 Stability and sustainability in material supplies**

Improve the self-supply resources, owned farms should be more productive and deliver the higher targets resulting to the stability and sustainability of the raw and fresh pangasius(tra) fish supplies.

Create a unbreakable value chain among the farmers in the Mekong river Delta and the company. Establish the relationship with them so that the company can get the chance to purchase their products with the good price in the peak season.

When it comes to the issues of unstable and uncertain raw materials, there are several recommendations from me to address the problems. First of all, Vinh Hoan should improve the self-supply resources, the farms which run by their own should be more productive and deliver more proportion of materials for the production system. Therefore, the stability and sustainability of the raw and fresh tra fishes supplies would be much more guaranteed.

On the other hand, let's say the self supply resource could cover 60% the total raw materials needed, it is still 40% left which depend on the individual farms all around the Mekong Delta, Vietnam. Thus, the mission of the purchasing team in the next stages of improvement should be creating an unbreakable supply chain between the individual fishing families and Vinh Hoan. It is extremely necessary to establish the relationship with those individuals so that the company can reach enough amount of materials in a good prices in the peak seasons. The approach methods to build such relationship is based on a win – win deal for both side.

In the farmer side, they have the resources (ponds, lands, human capital,...) to produce the raw qualified Pangasius. Nevertheless, they could not afford the feeding consumption sometimes due to not enough capital and no potential to sale in the high price. In the company side, Vinh Hoan has their own farms, however, they do not supply enough material for them to make sure the production chain operate effectively although they have the super power of financial resource as well as the market information, the high standard technical employees

could help maintain the quality of the grown Pangasius. From all above reasons, the cooperation between these two forces would ensure and enable a sustainable value chain in pangasius production. The company can help farmers in case they are in the capital crisis while the contracts of long term supplying could be conduct so that not only Vinh Hoan can ensure the stable flow of raw materials but also the individual Pangasius farms can eliminate the risk of selling their products and put the priority on enhancing the quality of production, focus on the aquaculture techniques and provide the best grown fishes to the market.

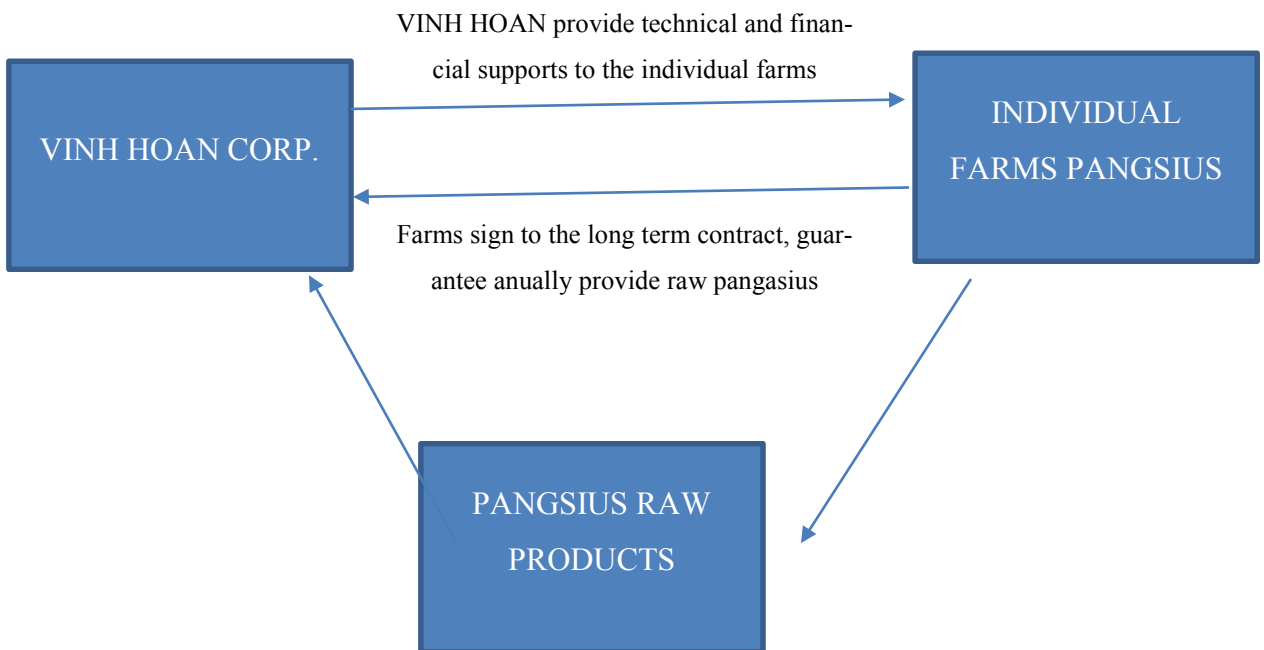


Figure 19. The continuous circle in value chain between Vinh Hoan and the individual farms  
 The proposal for establishing the continuous circle in value chain between Vinh Hoan and the individual farms by steps: Purchasing portfolio approach.

**Step 1: Classification**

The profit impact of a given supply item can be defined in terms of the volume purchased, percentage of total purchase cost, or impact on product quality or business growth. In Vinh Hoan case, the items are classified mainly by size of the Pangasius, volume purchased in each type of size, percentage of cost in those size, which size has the greatest impact on quality and productivity. Supply risk is assessed in terms of availability, number of suppliers,



competitive demand, make-or-buy opportunities, and storage risks and substitution possibilities. In Vinh Hoan case, purchasing manager could analyze the availability of the fish size, number of suppliers could provide those size of pangasius, which one is the best for storage and warehouse management. Based on those criteria, we could sort out all the items in to categories: strategic (high profit impact, high supply risk), bottleneck (low profit impact, high supply risk), leverage (high profit impact, low supply risk), and noncritical (low profit impact, low supply risk)

Table 5: Classifying Purchasing Materials Requirements

Procurement focus	Main tasks and impacts	Required information	Decision level
Strategic items	Export to US,EU and China Market	170-220; 220- up g./piece	Top level
Bottleneck items	Produce the additional products	Under 40, 40-60 g./piece	Higher level
Leverage items	Export to other markets	120-170, 170- 220, g./piece	Medium level
Noncritical items	Domestic market	60 – 120 g./piece	Lower level

**Step 2: Market analysis, finding all potential vendors and conducting evaluation.**

In Vietnam market, there are a variety of suppliers(individual farms) which has a wide range of product type, quality and the stability. Vinh Hoan needs to systematically reviews the supply market, assessing the availability of strategic materials in terms of both quality and quantity, and the relative strength of existing vendors. The company then analyzes its own needs and supply lines to gauge its ability to get the kind of supply terms it wants. In this case, Vinh Hoan should make the list of all potential suppliers which qualified the technical, hygiene requirements and conduct the evaluation on them base on the given criteria. Then the purchasing team should conduct the market research project assessment for evaluate the market strength and the vendors qualification

**Step 3: Action Plan**

No.	Tasks	People in charge	Time table											
			May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
1	<b>Classification</b>													
	Collect old data on size, sales volume, inventory figures													
	Analysis data													
	Deliver the final result													
2	<b>Market analysis</b>													
	Vendors searching													
	Vendors assessment													
	Market research													
	Strategic positioning													
3	<b>Implementation</b>													
	Approach													
	Offer													
	Make the deal													
4	<b>Follow up</b>													
	Relationship establishment													
	Technical supports													
	Other supports													

Table 6: Action plan for suppliers relationship establishment

**Step 4: Follow up**

It is the most important step to complete the sustainable circle between the company and the stakeholders. It must have the follow up actions after the first deal to keep the relationship longer and the stable volume of materials will be delivered on time every year with the balance and reasonable price. Vinh Hoan should propose more supports regarding to technical issues, capital, transportation so that they could make sure the individual farms are willing to make the long term relationship with the company and provide them the stability and sustainability in material supplies.

When it comes to the overload in the peak season, Vinh Hoan should tight up the supply chain, manage the relationship with the main clients, aim to the long terms contract, annual contracts so that Vinh Hoan could control the trade game and have the clue for resource planning and avoid the overload in production or under high pressure. The good relationship with their clients and partners could help the supply chain operate smoothly and

**9.2 Traceability system**

Because of the combination of the origin in terms of raw materials, the most difficult barrier of Vinh Hoan when it comes to the importing procedure to US or EU markets is the traceability. While there are no such technology to enable the tracing systems in their products, the company has suffered the tough procedure when the imported government ask the provident of product origin. At present, Vietnamese market mostly do the traceability based on the hard version of documents, therefore, losses in those documents could be able to cause the variety of wastes in the value stream such as waiting, unnecessary motions or unnecessary transportation. I would like to propose the solution by the new technology RFID( Radio Frequency Identification) which can help improve the efficiency on Supply Chain Management and traceability process.

In Vinh Hoan business, the most popular way to transport large amounts of cargo is to use shipping containers. Container transports are oftentimes chosen as they ensure safe and secured transportation, low costs, standard packaging and high transport density. Companies that use RFID in tracking and managing of shipping containers are able to track containers in each link of the supply chain. Active RFID Tags can be used to track containers in real-time in yards and docks. Ultra-high frequency RFID technology has long identification distance and speeds up identification. To sum up, the RFID has the great potential to invest

based on its benefits and values but the most important one is that once the problem happened in every products, Vinh Hoan could trace back the issue and address that problem instantly. Therefore, the cost of wastes would decrease significantly if the company invest to this technology. It could be a great investment decision to set up this tool for Supply Chain management of Vinh Hoan.

The cost for RFID is quite high, however, with the price of each carton box of Pangasius is approximately \$50 USD. It's only cost 1.2% of the total revenue while the profit margin is 16% approximately. In the following figures, we could see the cost analysis and the return expectation for equipping the RFID system. The main cost from this system is that the tags of RFID, which is equipped to each box, block, or each container of products. Then, the technology agency will provide the installment of the software, main server, which could help

**Figure 20. Estimated Costs for a Radio Frequency Identification (RFID) System(10000 tags)**

Average herd size, number of head

10,000

Interest rate, %

6.5%

**RFID Components<sup>1</sup>**

Description	Initial cost, \$ <sup>2</sup>		Useful life, yrs	Salvage value, \$	Annual Cost, \$	Percent to RFID	RFID Cost	
	Total	Per Head					Total	Per Head
<b><i>eID Transponder (electronic tag)</i></b>								
Electronic tag	---	\$0.50	---	---	\$5,163	100%	\$5,163	\$0.52
Tags for cows (one-time purchase)	---	\$0.50	5	0	\$1,203	100%	\$1,203	\$0.12
<b><i>Electronic reader</i></b>								
Wand/stick reader	\$850		4	0	\$248	100%	\$248	\$0.02
<b><i>Data accumulator</i></b>								
Laptop computer	\$1,000		4	200	\$247	25%	\$62	\$0.01
<b><i>Software / web-based analysis and storage</i></b>								
Computer software	\$700		5	0	\$168	50%	\$84	\$0.01
<b><i>Other</i></b>								
Internet access	\$480		---	---	\$496	25%	\$124	\$0.01
Subscriptions/upgrade fees	\$100		---	---	\$103	50%	\$52	\$0.01
Labor	\$500		---	---	\$516	100%	\$516	\$0.05
<b>Total annual cost</b>							<b>\$7,451</b>	<b>\$0.75</b>

From the figure No. (Vinh Hoan volume sales in tons), each year Vinh Hoan export 84.74 thousand tons of pangasius. Regarding to product description, each carton box contain 10kg of net weight. Therefore, if we equip one tag for each container, we will need 84740 tags. If the base of head is very large like our number, the price is still \$0.64 USD per tag.

<b>Total Annual RFID System Cost, \$/head</b>						
		Size of Herd, percent of base				
<b>RFID Components</b>	Base	40%	60%	80%	100%	120%
		Size of Herd, number of head				
Description	84740	33896	50844	67792	84740	101688
<b><i>eID Transponder (tag)</i></b>						
Electronic tag	\$0.52	\$0.52	\$0.52	\$0.52	\$0.52	\$0.52
Tags for cows (one-time purchase)	\$0.12	\$0.12	\$0.12	\$0.12	\$0.12	\$0.12
<b><i>Electronic reader</i></b>						
Wand/stick reader	\$0.00	\$0.01	\$0.00	\$0.00	\$0.00	\$0.00
<b><i>Data accumulator</i></b>						
Laptop computer	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<b><i>Software/ web-based analysis and storage</i></b>						
Computer software	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<b><i>Other</i></b>						
Internet access	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Subscriptions/upgrade fees	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Labor	\$0.01	\$0.02	\$0.01	\$0.01	\$0.01	\$0.01

<b>Total annual cost</b>	<b>\$0.65</b>	<b>\$0.67</b>	<b>\$0.66</b>	<b>\$0.65</b>	<b>\$0.65</b>	<b>\$0.65</b>

Table 7: The expected cost per head of each RIFD tag

Return expectation: Reduce the previous years costs due to traceability issues. In the year of 2017, once the problem of checking quality happened. A large contract of 20 container had to wait in the imported port due to Vinh Hoan could not explain where is the main issue and the rest of their product are qualified to import. The loss of late penalty by the client’s contract, Demurrage and storage charge came up to 50.000 USD for each day of delaying and 250.000 USD in total (5 days idle). Therefore, with the RIFD technology, they could have save that risks.

In addition, the cost of searching items in Vinh Hoan warehouse is very high. Since they could not control the size of the raw materials, the process of finding the fitted products base on customer orders are very expensive. In particular:

Lost/broken Items + Inventory Costs \$100,000 / year ( When the products come to the packaging stage, all would be in the carton boxes, the boxes have the same size however they contain the different size of products. Thus, it cost a lot of resource to manage, keep track the product categorize by sizes. As the result, lost and broken products in the warehouse will happened because they are keeping too long in the warehouse by the manually control and managed. With the new RFID systems, the size and the date of them would be managed and there is no more broken or lost products in the warehouse system)

Cost of Management/year

- Incremental replacement /expedite costs + \$2,000
- Search/audit costs (20 man hrs./wk ; \$50/hr.) x52 + \$52,000 / year ( searching for the suitable size based on the requirements of the different orders) – warehouse management cost

Ancillary Costs/year

- Production Idle and Inventory management Costs + \$20,000

Total Costs: \$174,000 / year

With the RIFD, apparently we could save 424.000 USD for the year of 2017 by the RIFD.

### 9.3 Process measurement and improvement

#### 9.3.1 Current workflow process

In this part, I would like to apply the method of value stream analysis to reduce wastes in Vinh Hoan supply chain.

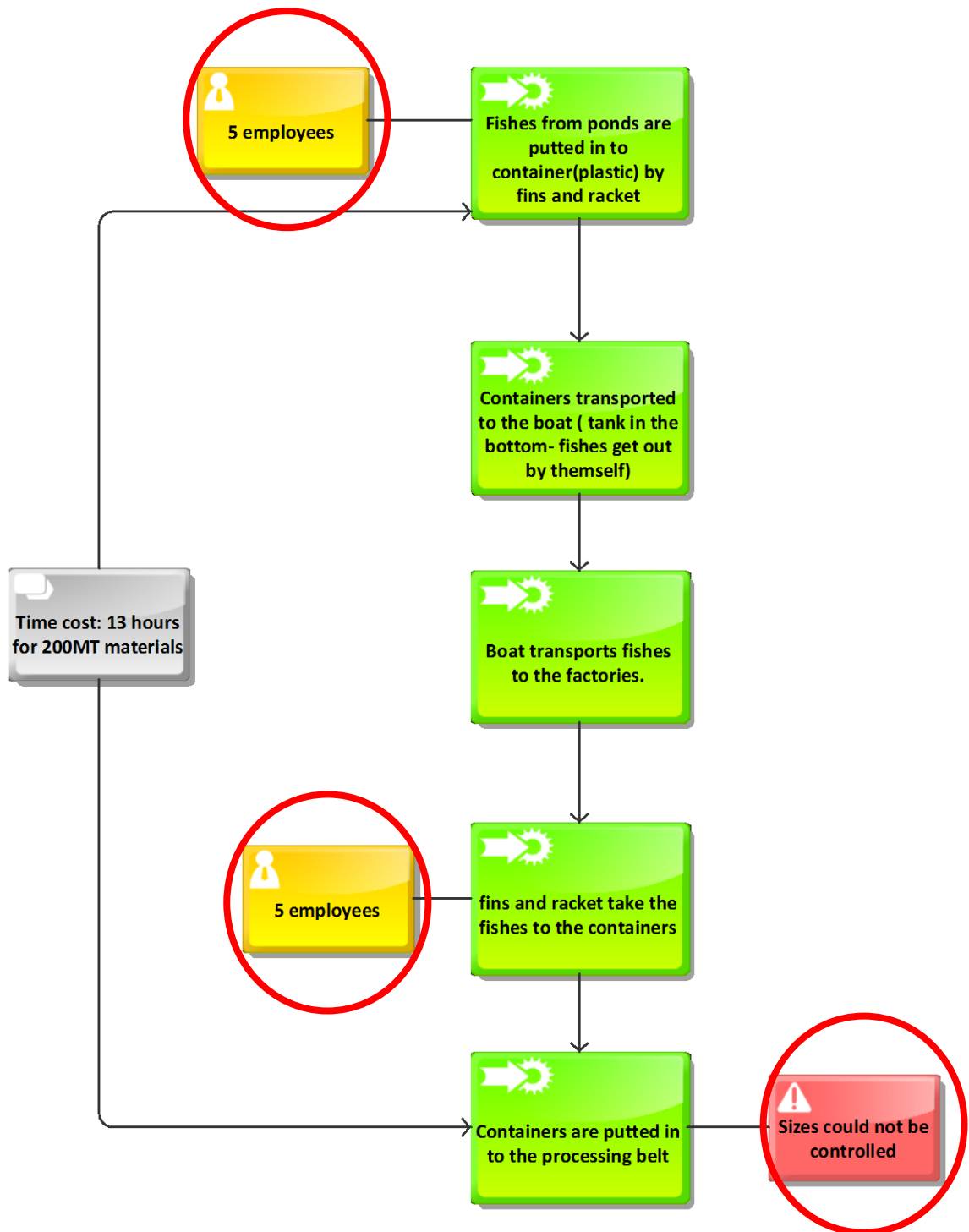




Figure 21. Processes in receiving material stage

In this current process, apparently we could see the added value stages while there are other non added value. In addition, we can identify the underutilized people and the risk of not controlling sizes. In fact, when the factory could not record the size since the pangasius fishes were harvested from the ponds, it is impossible to manage the production base on the requirements of the clients. The main reason is that each client would request a specific size of the fillets while the raw materials Pangasius are the combination of small and big size fishes. Therefore, the size recording is vitally important for the resource planning, warehouse management and the whole production process.

Total time cost/day: 130 hours

Cost:  $130 * 20\text{usd/h} = 2600 \text{ usd/day}$

Frequency: 0.325 hour/MT

9.3.2 The new process eliminating the less or non value stages:

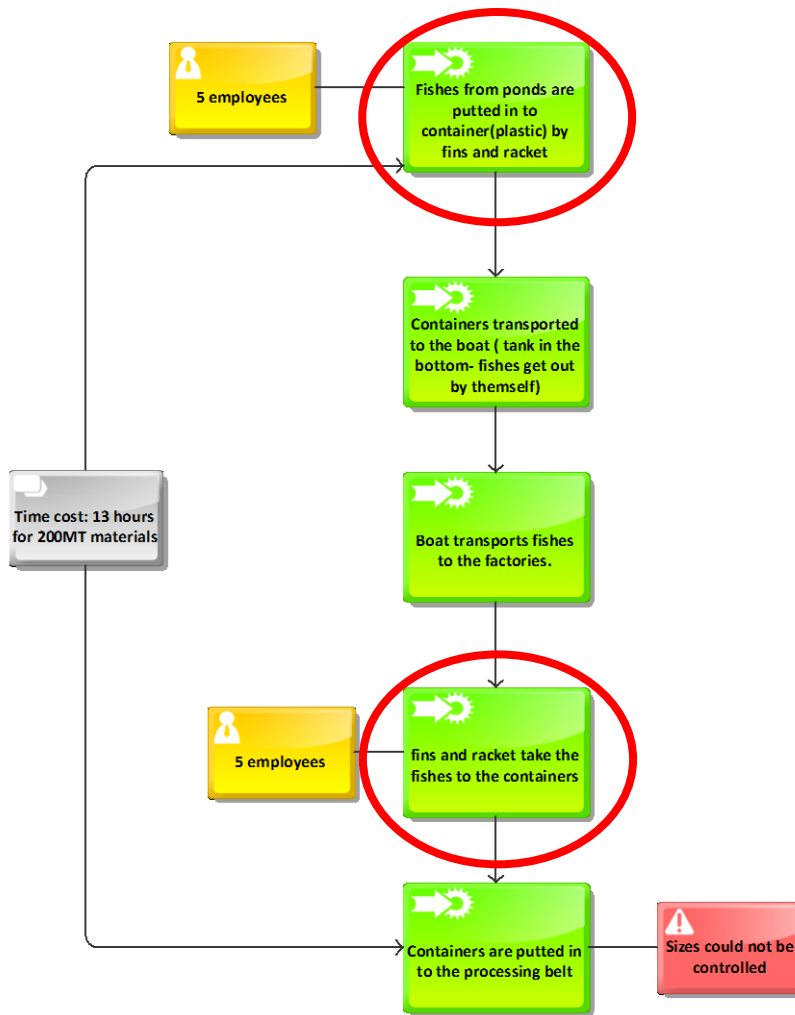


Figure 22. Identify the less and non value stages

Those stages have added value to the whole process however they cost too much with 5 employees each and totally manual work. The workers in those stages are using the basic equipments are fins and rackets to catch the fishes which is really inproductive and cost much time. Therefore, if we could just replace those stages by a not too expensive machine, it could be a good idea to improve the whole process. Let's do the analysis and propose the plan in the next part.

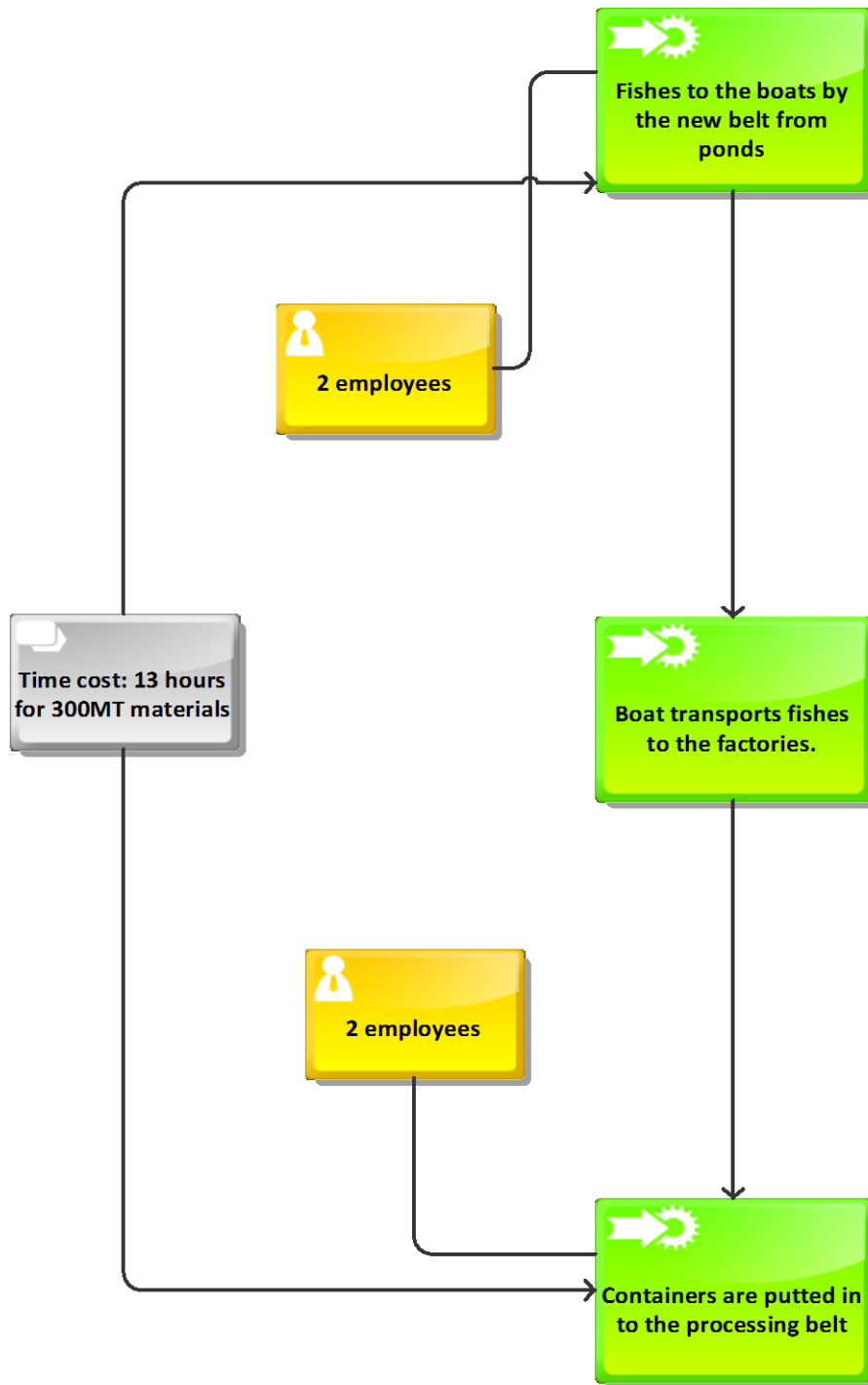


Figure 23. The proposal of new process in receiving materials in Vinh Hoan Corp

The new processes have been eliminated 2 stages and with only 4 employees, while the efficiency is increasing by 50%. It is the result of the new equipment to transfer raw fishes from ponds to boat and from boats to the first line in the factory. The point is the new way to conduct this stage is not only save the labour cost ( 78 hours/day) but also save the time cost of transportation, decrease idle time in production due to waiting materials in the peak

season. In fact, with the new process, the productivity is 300 MT/day comparing to 200 MT/day with the traditional method, therefore the efficiency is 50% rise.



Figure 24. Picture of the new harvesting equipment

### 9.3.3 The new equipment for harvesting:

Cost and return analysis:

No.	Description	Price	Quantity	Total cost
1	Fish Harvesting Equip-ment	19000 USD	2	38000 USD
2	Technical engineers	15000 USD/year	2	30000 USD
3	Workers	8000 USD/year	2	16000 USD
	<b>Total</b>			<b>84000 USD</b>

Table 8: Cost and expected returns of the new harvesting machine

The total expected expense for the new machines and the operation cost for them are approximately \$84.000 USD, however, in consideration with the expected returns, the labour

cost will decrease at least \$48.000USD ( 6x 8000USD/year) while the production has 50% rise in productivity( 200MT/day to 300MT/day)

Figure 25. The new machine for harvesting



**9.4 Analysis of current and forecast data**

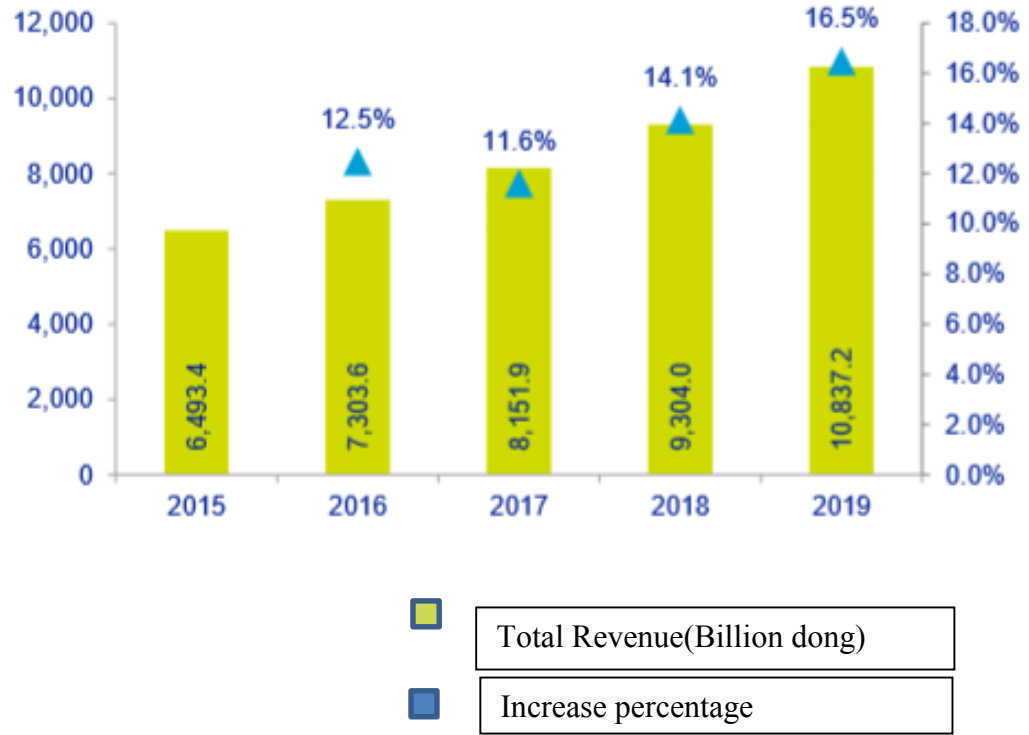


Figure 26: The expected changes in total Revenue

Figure 26 indicates that the expected Revenue in 2018 increase 14.1 % by the projected investment the RFID system, the new equipment’s for harvesting and the project of relationship establishment with the suppliers. The project proposals shall be decided by the operation manager and procurement manager who will conduct the final evaluation on those project and compare to the company’s own retained earnings.

**Percentage Increase Formula:**

$$\text{Percentage Increase} = (Final Value - Initial Value) / Initial Value \times 100$$

The percentage of total revenue(mainly from sales of fillet basa) will increase significantly in 2018 and 2019 as the expected returns on the new project of sales and marketing but it would be the result of the better customer services because of the investment in logistics and supply chain management.

## CONCLUSION

Despite the fact that Vinh Hoan is the market leader currently in the Pangasius exporting industry, it is the hard industry to run and keep the business developed. Not only there are more and more competitors both domestic and foreign, but also the tough conditions and requirements from the clients put Vinh Hoan into a huge pressure permanently. Therefore, the company need to focus on continuous improvement in the whole business include sales, marketing, finance, human resource and especially supply chain management. Since Vinh Hoan main activities are buying the raw fishes and export the manufactured ones, supply chain management play a key role in their business. After the analysis and the comprehensive research, I propose the project of final master's thesis to the company with the purpose of improving the supply chain system and logistics processes. Thesis as a whole is divided into 3 main parts: Theoretical part, analysis part and the proposals. The theoretical one mentioned the concept of logistics, supply chain management and described in details, the tools of process improvement, lean production, . . . on the basis of the literature review. The latter consists of the analytical part which present the current status of the company and the production system and the project part delivering some recommendations to address the problems which listed in the analysis, in particular, Vinh Hoan has 3 suggestions which are the relationship establishment with suppliers, traceability system and new harvesting method. The proposals are evaluated in the general perspective, based on the historical data and the issues in the past. Therefore, the process of conducting the proposals must be : Ideas – Build – Action – Measure – Learn – Ideas -. The combination of implementation the ideas and measurement the ideas would be the best way to run the logistics system since it is impossible to calculate everything before invest to something. Vinh Hoan should think carefully and conduct the deep research before making decision but doing business have to take the risks. It does not work the way that we could analyze and make sure that a proposal will be profitable. To sum up, the master's thesis aims to enhance the productivity in one of the strongest company in Vietnam economy with the hope of contributing to Vietnamese economy as well as introduce the case study in Viet Nam to Tomas Bata University.

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## **LIST OF ABBREVIATIONS**

VHC Vinh Hoan Corporation.

VH Vinh Hoan.

SCM Supply Chain Management.

3PL third-party logistics

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## APPENDIX P I:

Exporting enterprise	Year 2017		Year 2016		% changes	
	Vol- ume, thou- sand tons	Value, million US\$	Volume, Thou- sand tons	Value, million US\$	In vol- ume	In value
Vinh Hoan Corp	84.74	264.13	85.67	242.71	-1.08	8.82
I.D.I Investment and Multinational Develop- ment JSC	51.95	96.82	36.34	60.36	42.97	60.40
Nam Viet JSC	44.16	80.57	46.09	71.05	-4.19	13.40
Hung Vuong Corp	43.68	123.26	52.78	101.64	-17.25	21.27
Bien Dong Seafood Co., Ltd	34.17	112.77	46.06	132.95	-25.80	-15.18
Godaco Seafood Joint Stock Company	32.87	61.10	22.06	39.66	49.02	54.08
Dai Thanh Co., Ltd	29.34	54.91	23.63	39.45	24.18	39.20
Truong Giang Fishery Holdings Corporation	27.07	60.28	23.59	45.11	14.71	33.63
Hung Ca Co., Ltd	26.54	47.76	35.75	53.91	-25.75	-11.40
An Giang Fisheries Import &	24.38	52.13	27.30	57.51	-10.70	-9.37

Export JSC						
Phat Tien Seafood Co., Ltd	22.30	36.63	21.24	31.04	5.01	18.01
Cadovimex II Seafood Import - Export and Processing JSC	20.61	39.70	18.21	30.58	13.16	29.79
Cuu Long Fish Import-Export Corp	19.87	37.20	15.50	25.71	28.18	44.70
Hoang Long Seafood Processing	19.12	39.77	8.95	16.49	113.54	141.23
Cuu Long An Giang Seafood Import Export JSC	17.92	30.95	19.08	29.72	-6.07	4.14
An Phu Seafood Corp.	16.54	34.33	18.95	31.26	-12.72	9.82
NTSF Seafoods JSC	13.51	38.13	11.64	28.13	16.07	35.56
Van Y JSC	12.61	24.10	20.37	29.96	-38.08	-19.58
Hai Duong Seafood JSC	11.35	19.78	14.94	22.52	-24.03	-12.18
Hiep Thanh Seafood Corp	10.15	17.07	12.53	18.11	-18.96	-5.71

Other	268.82	493.92	315.41	578.14	-14.77	-14.57
<b>Total</b>	<b>831.73</b>	<b>1,765.31</b>	<b>876.11</b>	<b>1,686.02</b>	<b>-5.06</b>	<b>4.70</b>

APPENDIX PII: Pangasius exports of top 20 enterprises exporting pangasius to North America in 2017 vs. 2016

Exporting enterprise	Year 2017		Year 2016		% changes	
	Volume, thousand tons	Value, million US\$	Volume, Thousand tons	Value, million US\$	In volume	In value
Vinh Hoan Corp	84.74	264.13	85.67	242.71	-1.08	8.82
Bien Dong Seafood Co., Ltd	32.92	108.66	43.92	126.44	-25.06	-14.06
Hung Vuong Corp	21.14	73.02	8.30	19.58	154.78	272.97
I.D.I Investment and Multinational Development JSC	7.45	13.47	6.45	10.68	15.51	26.09
Nam Viet JSC	7.02	11.96	7.28	10.21	-3.56	17.16
Cadovimex II Seafood Import -Export and Processing JSC	5.39	9.88	2.37	3.75	127.54	163.43
Cuu Long An Giang Seafood Import Export JSC	5.10	8.91	5.44	8.47	-6.36	5.21
Dai Thanh Co., Ltd	4.99	7.55	2.53	3.39	97.41	122.48
NTSF Seafoods JSC	4.09	13.05	0.62	1.48	562.90	784.35
Van Y JSC	3.09	4.79	5.03	7.31	-38.57	-34.42

Co May Import-Export Co., Ltd	2.98	5.75	-	-	-	-
Truong Giang Fishery Holdings Corporation	2.80	6.10	2.30	4.26	21.83	43.30
Godaco Seafood Joint Stock Company	2.39	5.33	2.11	4.92	12.94	8.35
Hoang Long Seafood Processing Co., Ltd	2.05	3.78	1.01	2.78	103.61	36.06
Cuu Long Fish Import-Export Corp	1.68	2.80	0.29	0.58	471.60	385.81
Vietnamfish Co., Ltd	1.61	3.11	0.45	0.89	258.80	250.53
An Phu Seafood Corp.	1.57	2.86	3.06	4.76	-48.76	-39.93
Hiep Thanh Seafood Corp	1.19	1.80	0.25	0.40	378.32	346.19
Hanoi - Can Tho Seafood JSC	1.18	2.76	1.58	2.84	-25.76	-2.71
An Giang Fisheries Import & Export JSC	0.84	2.10	1.13	2.39	-25.87	-12.05
Other	11.67	26.30	52.71	128.43	-77.87	-79.52
<b>Total</b>	<b>175.26</b>	<b>486.69</b>	<b>204.24</b>	<b>507.61</b>	<b>-14.19</b>	<b>-4.12</b>

**APPENDIX PIII: Pangasius exports of top 20 enterprises exporting pangasius to the EU in 2017 vs. 2016**

Exporting enterprise	Year 2017		Year 2016		% changes	
	Volume,	Value, million	Volume,	Value, million	In volume	In value

	thou- sand tons	US\$	Thou- sand tons	US\$		
Vinh Hoan Corp	84.74	264.13	85.67	242.71	-1.08	8.82
NTSF Seafoods JSC	6.26	17.73	7.27	18.13	-13.83	-2.19
Hung Vuong Corp	5.00	11.98	14.33	32.03	-65.15	-62.59
Godaco Seafood Joint Stock Company	4.93	11.27	4.84	10.99	1.85	2.50
Nam Viet JSC	4.53	7.98	8.64	14.24	-47.50	-43.98
Hoang Long Seafood	4.27	9.34	2.00	4.00	113.67	133.61
Phat Tien Seafood	3.46	5.80	5.30	8.45	-34.71	-31.37
I.D.I Investment and Multinational Development JSC	3.39	5.34	1.11	2.41	204.56	121.97
Dai Thanh Co., Ltd	3.23	7.66	3.92	8.24	-17.48	-7.06
An Giang Fisheries Im- port & Export JSC	2.83	8.22	5.03	13.28	-43.73	-38.15
Hung Ca Co., Ltd	2.72	9.41	3.91	10.39	-30.43	-9.43
Vinh Quang Fisheries Corp.	2.39	6.52	2.90	8.36	-17.70	-22.08
Cuu Long Fish Import- Export Corp	2.18	4.10	4.81	7.94	-54.62	-48.37
Hiep Thanh Seafood Corp.	1.87	2.74	1.63	2.30	14.69	19.11
Mekong Fisheries JSC	1.72	2.64	2.10	2.66	-17.74	-1.00
Hai Sang Seafood JSC	1.67	3.29	1.59	2.79	4.95	17.86

Ngoc Ha Food Processing and Trading Co., Ltd	1.67	4.49	3.26	7.52	-48.80	-40.34
An My JSC	1.57	3.24	1.41	3.48	11.09	-7.07
Bentre Aquaproduct Import and Export JSC	1.57	5.15	1.72	4.97	-9.04	3.66
Hanoi - Can Tho Seafood JSC	1.48	2.80	2.02	3.61	-26.66	-22.59
Other	16.76	34.39	27.65	54.20	-39.38	-36.54
<b>Total</b>	<b>84.50</b>	<b>203.46</b>	<b>117.60</b>	<b>260.83</b>	<b>-28.15</b>	<b>-22.00</b>