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THE ANALYSIS OF EXPORT POTENTIAL OF THAI ORNAMENTAL FISH
INDUSTRY IN EUROPEAN MARKET

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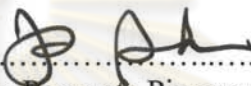
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อุตสาหกรรมปลาสวยงามของไทยนั้นเป็นธุรกิจที่มีการเติบโตอย่างสม่ำเสมอ เมื่อเปรียบเทียบกับประเทศอื่นๆที่ส่งสินค้าชนิดเดียวกันไปยังสหภาพยุโรป ประเทศไทยนั้นยังถือว่าเป็นผู้ส่งออกรายเล็ก จุดประสงค์ของวิทยานิพนธ์คือการวิเคราะห์ความเป็นไปได้ในธุรกิจการส่งออกปลาสวยงามของไทยในตลาดยุโรป โดยวิเคราะห์ผ่านเครื่องมือทางเศรษฐศาสตร์อันได้แก่ ดัชนีวัดความได้เปรียบโดยเปรียบเทียบที่ปรากฏ (RCA) ห่วงโซ่คุณค่า (Value Chain) และ ทฤษฎี SWOT การศึกษานี้เป็นการศึกษาเชิงคุณภาพซึ่งรวบรวมข้อมูลปฐมภูมิจากการสัมภาษณ์เชิงลึกกับบุคคลที่เกี่ยวข้องในธุรกิจปลาสวยงาม ส่วนข้อมูลทุติยภูมินั้นได้มาจากแหล่งข้อมูลต่างๆ เช่น หนังสือ บทความ เอกสาร และสิ่งตีพิมพ์ต่างๆ รวมถึงข้อมูลด้านตัวเลขและสถิติจากกรมส่งเสริมการส่งออกและกรมประมง โดยเปรียบเทียบข้อมูลจากประเทศอินโดนีเซีย ฟิลิปปินส์ เวียดนาม มาเลเซีย และสิงคโปร์

จากการศึกษาพบว่าผู้ส่งออกปลาสวยงามชาวไทยนั้นได้ดำเนินธุรกิจกับชาวยุโรปได้ดี โดยมีจุดแข็งในเรื่องของทรัพยากรและแหล่งวัตถุดิบที่สมบูรณ์ เพราะเมืองไทยเป็นผู้ผลิตรายใหญ่ในเอเชียตะวันออกเฉียงใต้ การศึกษานี้พบว่า นอกจากฟิลิปปินส์แล้ว ประเทศอื่นๆนั้นเป็นคู่แข่งและคู่เสริมของธุรกิจนี้ไปในคราวเดียวกัน นอกจากนั้นยังพบว่าประเทศไทยมีความได้เปรียบกว่าผู้ส่งออกรายอื่นๆในภูมิภาคเดียวกัน รัฐบาลจึงควรยื่นมือเข้ามาพัฒนาอุตสาหกรรมนี้โดยการปรับปรุงกฎหมายและข้อตกลง รวมถึงให้ความช่วยเหลือและสนับสนุนผู้ส่งออกให้มากขึ้น ส่วนผู้ส่งออกก็ควรเฝ้าติดตามเอกสารและข้อตกลงของสหภาพยุโรปที่มีการเปลี่ยนแปลงอยู่ตลอดเวลาเพื่อจะได้ตั้งรับกับสถานการณ์ได้ทันท่วงที ถ้ารัฐบาลและภาคเอกชนสามารถปฏิบัติและแก้ไขปรับปรุงดังกล่าว อนาคตปลาสวยงามส่งออกของไทยนั้นยังคงสามารถเติบโตได้อีกนาน

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KEYWORDS : ORNAMENTAL FISH / EXPORT / THE EUROPEAN UNION / THAILAND

PAVAPHON SUPANANTANANONT: THE ANALYSIS OF EXPORT POTENTIAL OF THAIL ORNAMENTAL FISH INDUSTRY IN EUROPEAN MARKET. THESIS ADVISOR: ASSOC. PROF. CHAYODOM SABHASRI, Ph.D. 98 pp.

Thai Ornamental Fish Industry is a business that has a constant growth rate. Comparing with other countries in exporting the product to EU, Thailand is still considered as a small supplier. The objective of this thesis is to analyze an export potential of Thai Ornamental fish business in European market. The study employs three economic methods: Revealed Comparative Advantage (RCA), Value Chain Analysis, and SWOT analysis. Primary Data are obtained from in-depth interviews with various people in the ornamental fish industry. Secondary data used come from sources such as books, articles, magazines, and publications, while statistics and numbers depend on the information of the Department of Export promotion and the Department of Fisheries and compared with Indonesia, Philippines, Vietnam, Malaysia, and Singapore.

The study finds out that Thai exporters work very well with the European importers. The strength of Thai exporters is the good source of product supply as Thailand is the best producer of ornamental fishes in Southeast Asia. The results shown that except for Philippines, other countries is both competitors and compliment in the same time. It also indicates that Thailand has a strong advantage over other Southeast Asian exporters in term of being a good producer. However, the government should keep document, law, up to date and support given to the industry. Traders who trade with the EU need to keep themselves alert by updating the new released documents all the time. If Thailand could keep itself up to date, it will be a great opportunity to a better achievement in the future.

Field of Study :European Studies.....

Student's Signature

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ศูนย์วิทยทรัพยากร
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CHAPTER I

INTRODUCTION

1.1 Background and Problem Review

Thailand has been known as one of the world best source of ornamental fishes for more than Thirty-years. On the early steps, Thai exporters mainly get their products by gathering wild fishes from natural sources around the kingdom due to the richness of aquatic fauna in the country. But when the business is getting better, more demand for tropical fish have lower down the supplies. There are improvements and increasing in production of captive raised ornamental fishes to support the industry. In order to make the business continue running successfully, more process and techniques are added to improve the quality of the products so that it would be competitive in the world market.

Looking back in 1982, the Ornamental fish export were only has a value of 16.7 million baht; but the number is increased to 29.2 in 1985 and followed by 38 million baht in 1986¹ on their first start. When time passed by, the value of the industry in Thailand is significantly increase to more than 1,000 million baht in 2001² and recent studies show that it is still increasing every year until now (Figure 1).

¹Meenakarn, W., Laohavisuti, N., and Supap P., **The Role of Aquarium Fish Enterprises in Thailand**. Bangkok: National Inland Fisheries Institute,1990. P1.

²Anonymous, 2001. **Ornamental Fish in 2001... Business creates job and income**. [Online]. November 10, 2009. Available from <http://research.kasikornresearch.com/portal/site/KResearch/KEconResearchDetail/?cid=4&id=2804>

Annual Series: 2003-2008 (Value in US \$ Million)

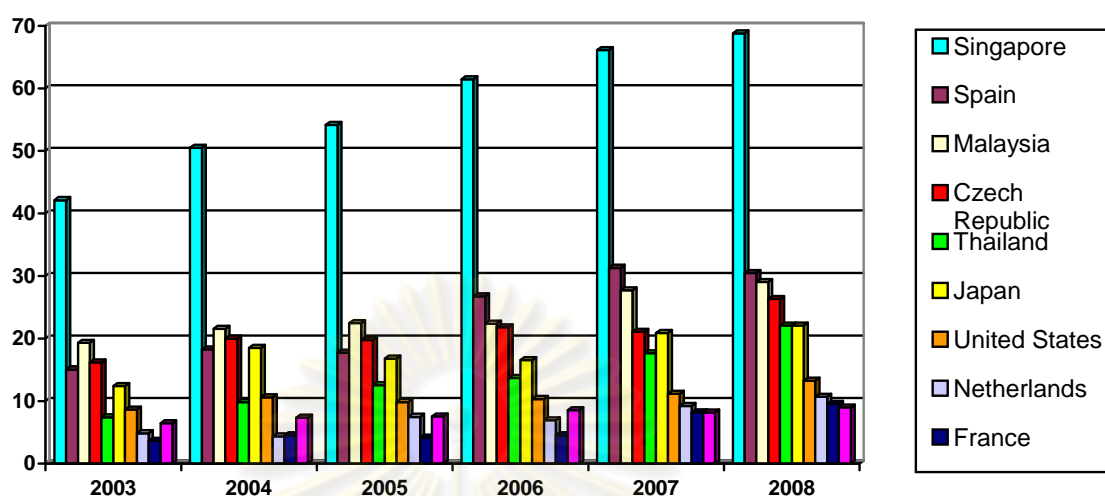


Figure 1: Reporting Countries Export Statistics (Partner Country: World)
Commodity: 030110, Ornamental Fish, Live (Source: Global Trade Atlas)

Exporting value has been growing non-stop over the past years. This is shown that the industry is expanding in numbers and having a significant change on the growth each year. Not only Thailand, but it is proved to be the same situation around the world, ornamental fish industry is growing up. FAO have been estimates that worldwide annual sales of the Ornamental fish are close to \$ 200 million U.S. dollar and the total wholesale value of ornamental fish and accessories is estimated at \$ 1 billion U.S. dollar with a retail price of \$ 3 billion³. The ornamental fish industry is proved to be one of a good business that could make a large amount of income for the country with a potential of growing to a larger scale.

When compared to the world export number, Thailand was ranking number seven in the statistic recorded on the earlier years, rank in number six on next three years, and number five in 2008 (Figure 1). Even though the number of Thai Ornamental Fish export is increasing; but if we compare to other top exporting countries such as Singapore and Spain, it could be seen that the amount that Thailand received is

³Sidthi Boonyaratplin. and Amonrat Sermwatanakul. **The Current State of Ornamental Fish Industry in Thailand.** National Institute of Coastal Aquaculture.

significantly different at least twice as the number. Counting as percent, Thailand will only have 5% of the market share compare to the rest⁴. Comparing with Singapore and Malaysia that is having higher rank in the statistic, both countries do not having advantages like Thailand. Singapore did not mainly produce the fish themselves, but importing from other countries to re-export to their customers.

While Malaysia is having all the facilities similar to what Thailand have, but they do have more export value⁵. This shows that Thailand still has a potential to grow and get more market share in the market. From the import statistics of living ornamental fish recorded, it is shown below in Figure 2 that Italy is the main importer that imports tropical fishes from various countries; followed by U.S.A. and the others. What interesting is the chart shows that six of the ten countries of the world ornamental fishes importers is in the European Union; Italy, United Kingdom, Germany, France, Netherlands, and Belgium. When sum up all the importing value of these countries together, EU would be number one in importing ornamental fishes from around the world as the total value is a lot more than United States that rank as a second. U.S.A. is an individual country that consume large amount of ornamental fish product, but if includes various countries forming a union like EU, an information gathered indicates that EU is the biggest market for all ornamental fish exporter around the world.

Annual Series: 2003-2008 (Value in US \$ Million)

[Online]. November 10, 2009. Available from : <http://www.nicaonline.com/new-205.html>

⁴Anonymous, 2008. **Ornamental Fish in 2008: Export expand 76.0% around 1,000 million baht.** [Online] November 10, 2009. Available from : <http://www.positioningmag.com/prnews/PRNews.aspx?id=72729>

⁵Sripraya, P. 2008. **The Study of Competitiveness of Thai Ornamental Fish.** Master's thesis, Thammasat University.

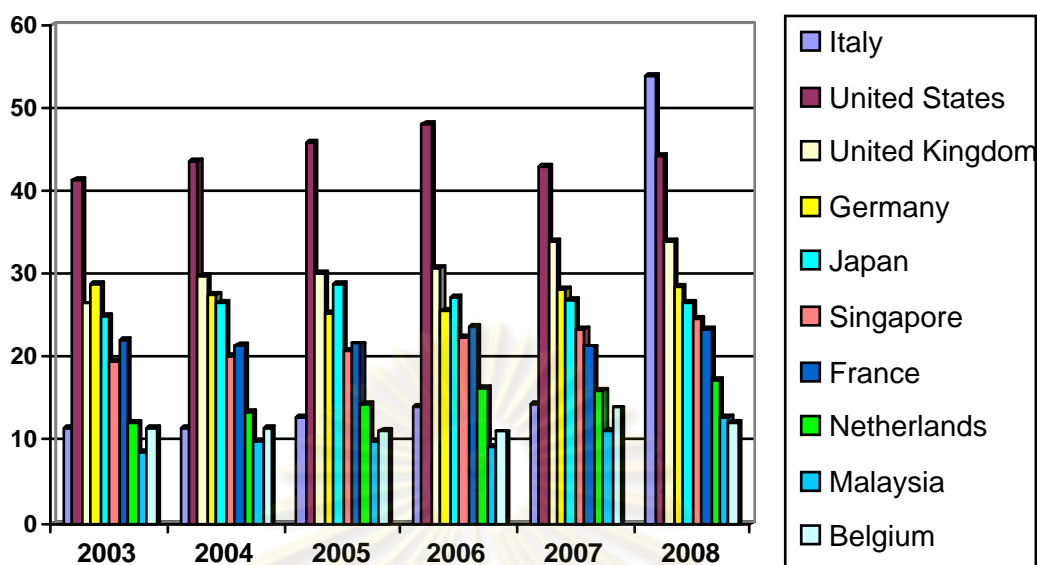


Figure 2: Reporting Countries Import Statistics (Partner Country: World)
Commodity: 030110, Ornamental Fish, Live (Source: Global Trade Atlas)

However, when we look into individual statistics of each country, Figure 3-7 indicates that most of the European countries mainly trade among the EU themselves with some Asian and South American countries such as Brazil, Singapore, and Japan. Singapore seems to be the primary source that every country used as a source for the supplies, while Thailand is not counted to be the top exporter for them. Even though the country location is very close together and Thailand also supplies fish for Singapore to re-export or middleman, Singapore is still the first one in exporting ornamental fish to the world market. Thai exporters look at EU as the main importer and target for their business⁶, but the statistic shows that Thailand is not the main exporter for them as it is not list as one of the top 5 in any of the countries on Figure 3-7. This means that Thai exporters still has a chance to expand their business and increase the number of production by looking at Singapore and other competitors to improve the quality and process aiming to be one of the best exporter in the world.

Annual Series: 2003-2008 (Value in US \$ Million)

⁶ibid.

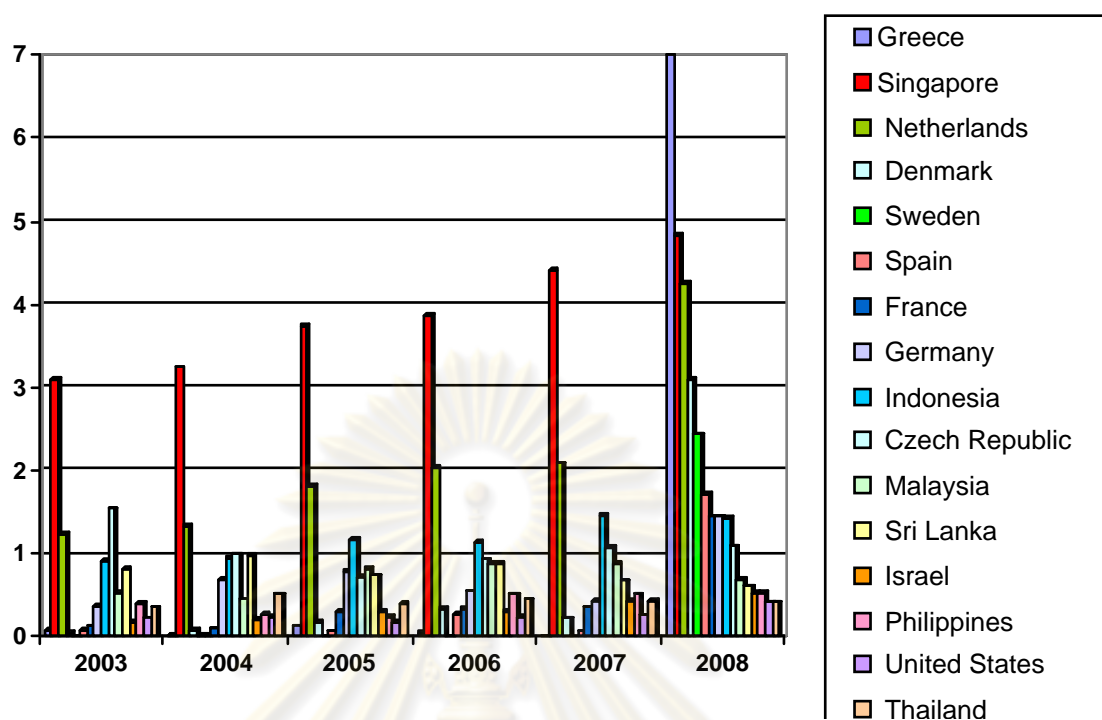


Figure 3: Italy Import Statistics - Commodity: 030110, Ornamental Fish, Live

(Source: Global Trade Atlas) Remarks: The 2008 data Greece is 2,7646,062.

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Annual Series: 2003-2008 (Value in US \$ Million)

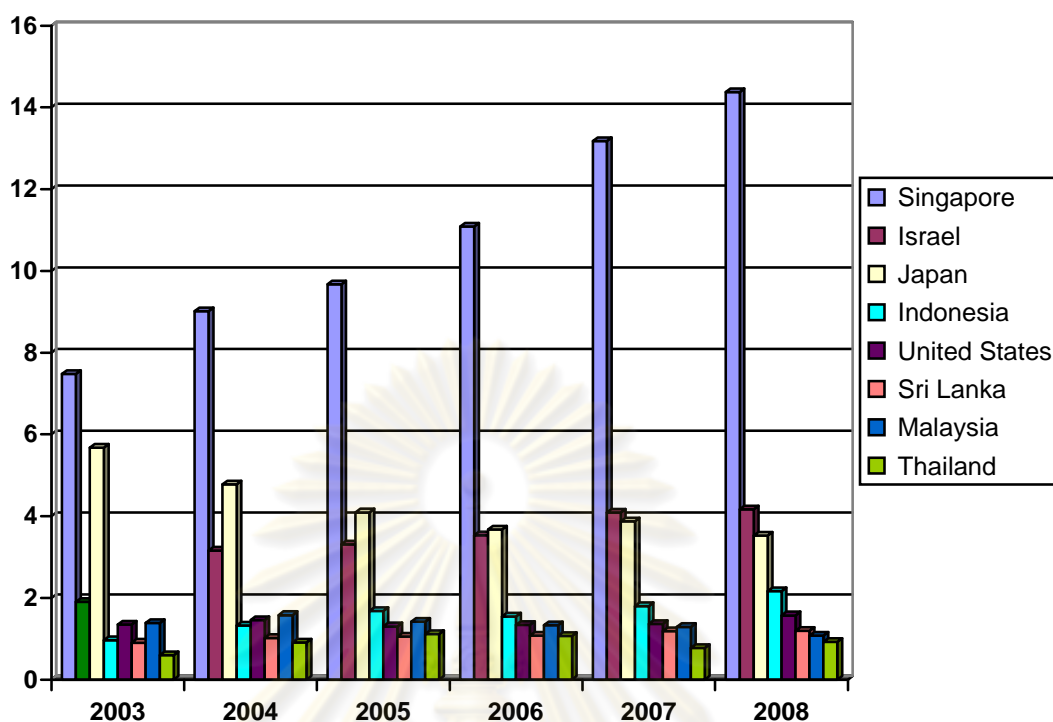


Figure 4: United Kingdom Import Statistics - Commodity: 030110, Ornamental Fish, Live (Source: Global Trade Atlas)

Annual Series: 2003-2008 (Value in US \$ Million)

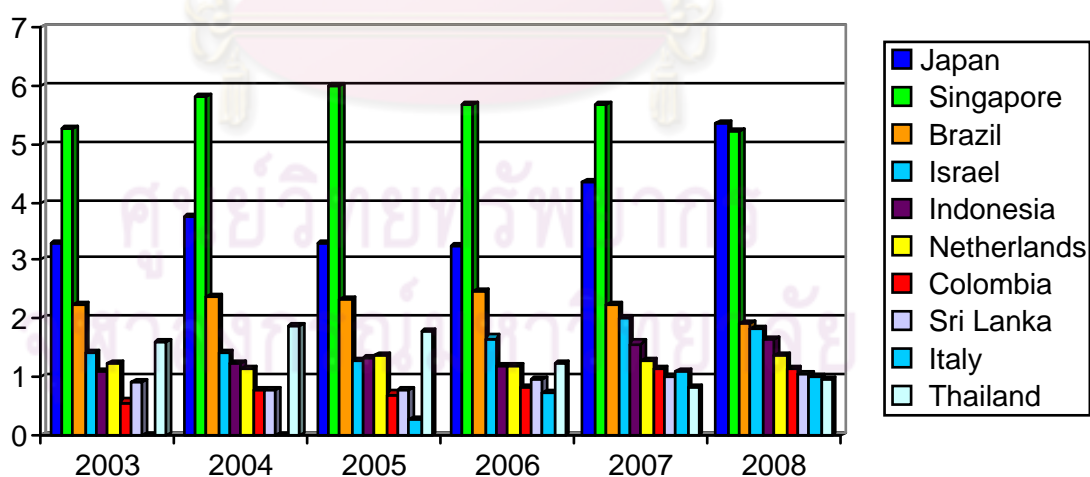


Figure 5: Germany Import Statistics - Commodity: 030110, Ornamental Fish, Live (Source: Global Trade Atlas)

Annual Series: 2003-2008 (Value in US \$ Million)

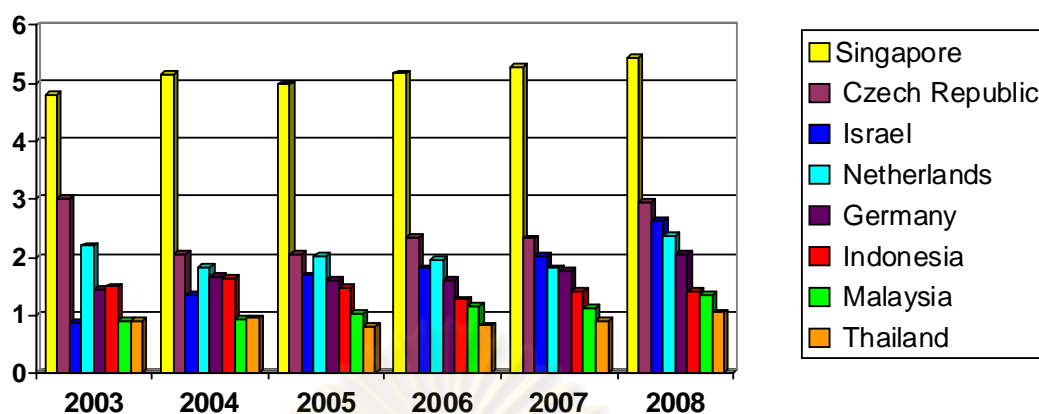


Figure 6: France Import Statistics - Commodity: 030110, Ornamental Fish, Live
(Source: Global Trade Atlas)

Annual Series: 2003-2008 (Value in US \$ Million)

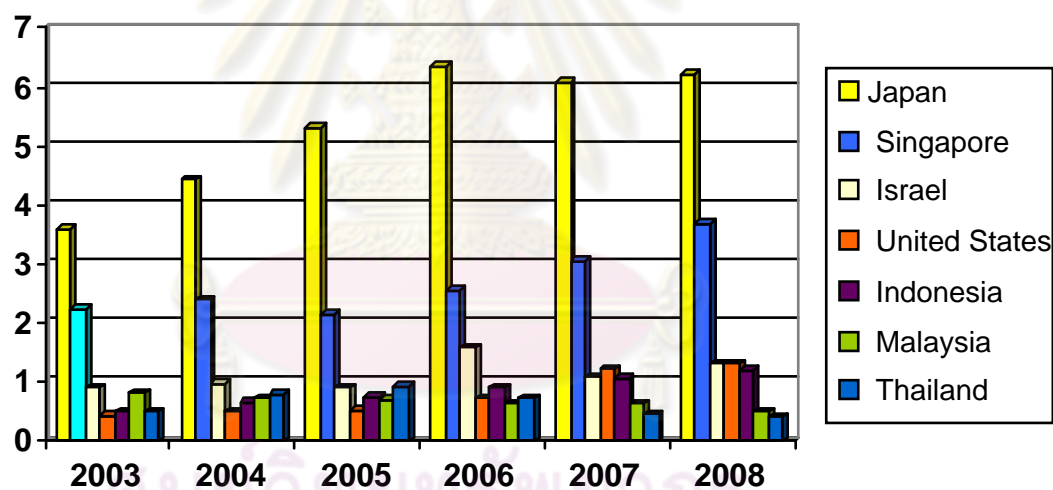


Figure 7: Netherland Import Statistics - Commodity: 030110, Ornamental Fish, Live
(Source: Global Trade Atlas)

European countries were unique in regulations and importing rules. Before the gathering of the union, they do have a specific terms and policy for animals & plants importing in the countries. Each country will be varying in regulation according to their government. But when all of the countries forming into one union; the regulation also changes into one standard, which is more specific and screen in details. On the first start, EU use Commission Decision 2003/858/EC as a standard in screening live fish. However, live tropical or ornamental fish was not listed as separate criteria. It only needed the health documents and regulations on live fishes or eggs and cells for culture and as food only. The new regulations that were adding up as Commission Decision 2003/858/EC⁷ of 21 November 2003 will be including terms & regulations specially design for importation of live ornamental tropical fish.

Under the developing world that everyone is always developing and becoming better and better, it is challenging for Thailand in terms of developing instruments, techniques, and process in order to make the products and services become competitive toward other competitors in the world arena. Thai people have most of the things need to make a quality product. The country itself provides a wonderful wide selection of fish species from the wild, plus fancy breed strain from the tropical fish breeders. For location, Thailand does have a good water supply and plenty of land to make a farm with good transportation to all over the country and around the world. Thailand also has know-how and traditional knowledge pass on from ancestor in culturing ornamental species. Not only a quality producer of ornamental fishes that we should aim to be, but we should hope to be a world hub and largest export center to all suppliers need. Further studies will lead to the examination of problems and guidelines to improve the situation and becoming a leader in this field. Since Thailand has all the primary sources needed for production; good environmental factors for fish farming, skill workers and producers, along with the old customers, long term relationship with other countries, and experiences in this area; Thailand would be able to stand up as number one exporter for ornamental fishes in the

⁷Anonymous, 2006. **EU policy on animal health with limitation and documents need for ornamental fishes exported from third countries.** [Online].

countries like the European Market that we already have a skill and experience in doing export with them.

1.2 Research Motivation

Nowadays, culturing of ornamental fish became commonly seen nationwide; from North to south, from west to east. Each province are varies in their productivity of ornamental fish product which is different in the amount and the number of species being breed, depending on the environment and target group provide. It could be said that this business could be done everywhere in Thailand with enough water supply. All kind of people who are interested could start their business and earn a living by breeding ornamental fish. Many entrepreneurs are staying in Bangkok and use only a little space to breed these colorful tropical fish and earn good amount of income each month. Since this business could raise a large amount of income to Thai economy and many people getting benefits from its outcome. It is interesting to observe the situation and study the business structure carefully. For the capabilities of production will be increase, creating more jobs for people, and lead to more exporting value to the country.

As mention earlier, Thailand still has a potential in becoming a great investor from this business. There are still a lot of market share for the Thais to work on in this area. Not only ornamental fish, but as more studies are made, the knowledge obtain might be expanding to other related field of business such as water plants, fish food, or fish medicine. More studies should be made and used it to make a good management plan. In order to make the farm more organize, which will be leading to more effective result with increasing of both quality and quantity. Good management and planning is needed to help lower the cost of production and earn more profit, for it is contributing to more export numbers.

Southeast Asian Region composes of several countries that also export their ornamental fish products to the EU market. These countries include Singapore, Indonesia, Malaysia, Philippines, and Vietnam; looking at EU imports on Ornamental fishes from the world, Thailand ranks fifth since the 2007 enlargement (Fig. 8). Singapore remains the first on the list, followed by Indonesia in the fourth. Trade value of Malaysia is lower than Thailand, but it still ranks third in the world market (Fig. 1). The Philippines is in capable of Marine ornamental fish trade as it is the second largest exporter in the world after Indonesia. The last one is Vietnam, a new comer in the business that should be given focus to. It is important to study and find out the strengths and weaknesses through comparing data with information obtained in order to compete with them in the future.

Annual Series: 2007-2009 (Value in US \$ Million)

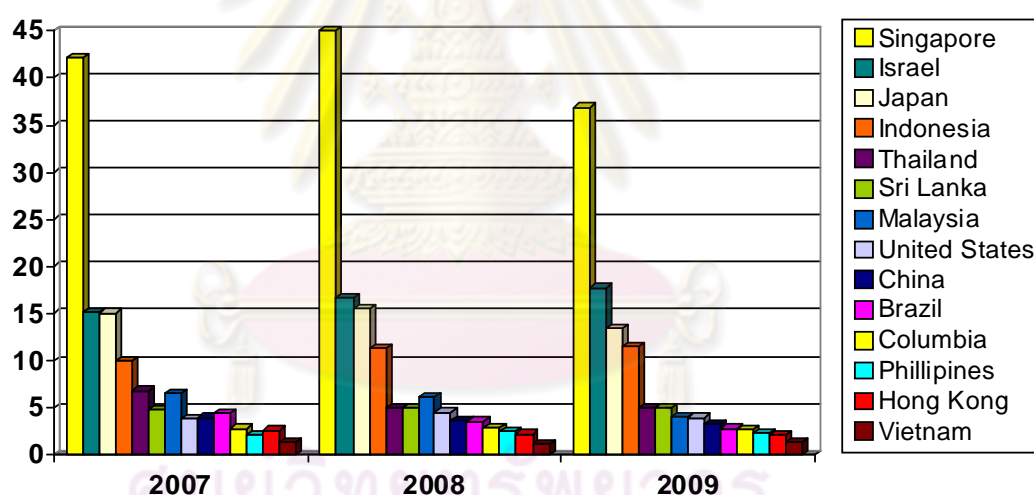


Figure 8: European Union External Trade - Import Statistics - Commodity: 030110, Ornamental Fish, Live (Source: World Trade Atlas)

European Union is composed of a countries complex that is different from the rest of the world. By having more than 10 countries in the union, making the EU became one of the biggest markets for Thai ornamental fish product. But with regulations and restrictions, EU became reclusive and restrictive for Thai traders. Even though Thailand exports a lot of ornamental fish to all over the world, but we do have only a few piece of work studying or making a research on this topic especially with the U.S.A. and Europe that was counted as the major market. I was motivated by the lack

and scattering of information within this area as it is one of the major exporting goods of the country.

1.3 Research Question

Thai Ornamental Fish Industry is a business that has a constant growth rate. Comparing with other countries in exporting the product to EU, Thailand still considered as a small supplier even though we have more advantages and supplies not less than the main supplier like Singapore. Then, the questions are how Thailand can get more market share by studying the competitiveness and analysis of Thai Ornamental Fish business in order to understand the problem and make a suggestion for improvement.

1.4 Objectives

1. To study about Export potential of Thai Ornamental fish Business in European Market
2. To identify and analyze the Strength, weakness, and opportunities of Thai Ornamental Fish Industry in European Market.
3. To provide useful information and guidelines for Thai Ornamental fish exporters.

1.5 Scope of Study

This study will examine the export potential of Thai Ornamental Fish Industry toward the European Market based on the record between 1985-2009. The study will mainly focuses on related EU regulations with examples and in depth interviews from various EU top importers and Thai exporters as well. Another focus of the study will be the comparison on export potential of various exporting countries such as Malaysia, Philippines, Singapore, and Vietnam. Value added of the product will also be examined. In term of methodology, this paper will use the Value chain and SWOT

analysis to analyze the potential of the business. Revealed comparative advantage (RCA) will also be analyzed.

1.6 Expected Benefits

With regard to the expected benefits, this study will provide useful fundamental data on Thai Ornamental Fish Industry for new entrepreneur in the business and in-depth information for those people who is in the field to improve the number of the product exported to the EU and aimed that this piece of work will make the reader know more about the situation of the Ornamental fish exported to EU during the past years.

1.7 Theoretical Framework

Concepts and Theories

1.7.1 Value Chain Analysis

Value Chain Analysis is a theory invented by Michael E. Porter used to explain and analyze the activity that could use to add more value to service and product through the primary resources. This show how products move from raw material stage to the customer as final. It is necessary to diagnose the competitiveness in one industry as all activities is connecting together and creates a system linkage and get rid of non value added activity.

Primary Activities:

Primary Activities is basic activities needed in order to produce a product or service, which some of it will play some role in competitive advantage. Porter divided the primary activities into five categories:

- Inbound Logistic- are activities that involves with receiving, storing, and providing information to the products such as warehousing, inventory control, and vehicle scheduling.
- Operations- are activities that made in order to transforming input into the final products such as testing, packaging, equipment maintenance, and etc.
- Outbound Logistic- are activities used to move and distributing the product to the hand of customers such as finished goods warehousing, material handling, scheduling, and delivery vehicle operation
- Marketing and Sales- are activities used to make the buyers concern of the product assistance and promote or induce the consumer to purchase the product such as promotion, sales fore, quoting, or advertising.
- Service- is activities which are in connection to maintain and enhance the value of the products to customers such as training, installation, and product adjustment.

Supporting Activities:

Not only supporting the primary activities, but supporting activities also needs to support among it. There are four activities fall into this category:

- Procurement- is activities dealing with function of purchasing to use in the production. This includes raw material, supplies, or machinery.
- Technology Development- is anything dealing with technology to make improvement of the production process. This also takes in many forms includes product design, basic, and media research.

- **Human Resource Management-** is associated with activities of human resource in the business. Activity includes hiring, training, development, or recruiting; which is mainly on people.

- **Firm Infrastructure-** is dealing with the support of entire chain. It can be a powerful source of competitive advantage. The work includes general management, planning finance, governmental affairs, and quality management.

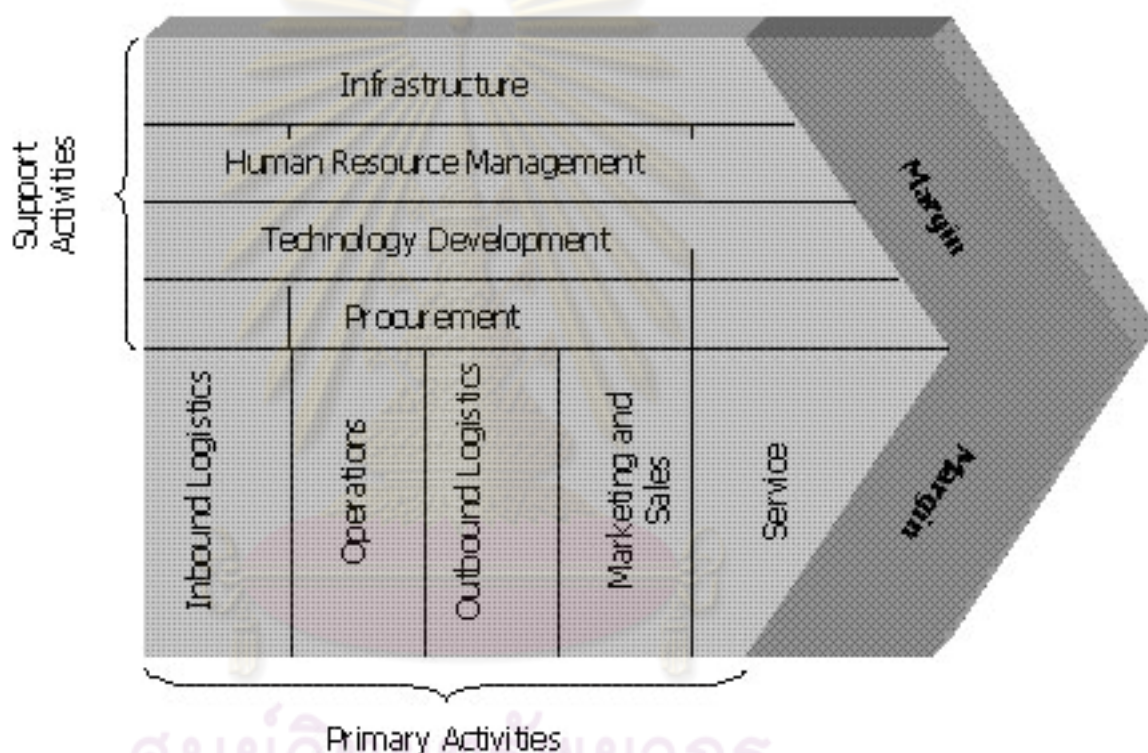


Figure 9: The Value Chain (Source: Porter, 1985)

1.7.2 SWOT Analysis

SWOT analysis is founded by Albert Humphrey from Stanford University a strategy use to analyze the Strength, Weakness, Opportunity, and Threats as the name stand for. This powerful tool is a theory widely uses to estimate the situation of the business. The strength and weakness also includes the similar type of business or industry that are co-related and having effect to each other. The theory will help the business entrepreneur to have more understanding of the weakness and opportunity they have in their hand as it is shown in figure 9.

Strength- is a good point that came from internal origin, which the business owner needed to use it as a source of success. It is a strong point when compare to other business competitors.

Weakness- is a weak point or problem that came from internal origin, which business owner needed to find the way to solve and get rid of it.

Opportunity- is occurring from an external origin, which is different from strength, which cannot be controlled.

Threats- are problems or limitation from external origin, which is needed to be solved comparing to the industry in the country itself and the others.

SWOT ANALYSIS

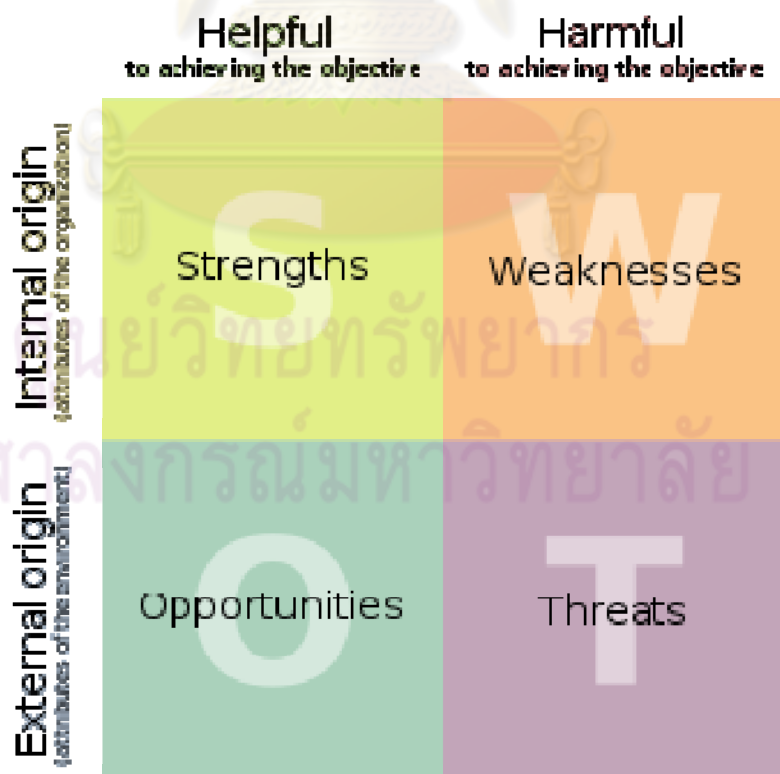


Figure 10: The SWOT Analysis

(Source: <http://www.khonbanna.com/img/images/swotanalys.png>)

1.7.3 Revealed Comparative Advantage (RCA)

Based on David Ricardo's theory of comparative advantage, the revealed comparative advantage (RCA) is used in calculating relative advantage or disadvantage of specific goods upon comparing trade flows of a certain goods or services in consideration. In 1965, the concept of RCA was introduced by Bela Balassa in his "Trade Liberalization and 'Revealed' Comparative Advantage."

The RCA measures relative export performance by country and industry, defined as a country's share of world exports of a good divided by its share of total world exports. The index for country i good j is $RCA_{ij} = 100(X_{ij}/X_{wj})/(X_{it}/X_{wt})$ where X_{ab} is exports by country a (w =world) of good b (t =total for all goods).

In this thesis, the RCA is defined as:

$$RCA_{Ornamental.Fish.Export.to.EU}^{EU} = \frac{\left(\frac{\text{Value.of.Thai.Ornamental.Fish.Export.to.EU}}{\text{Value.of.All.Thai.Export.to.EU}} \right)}{\left(\frac{\text{Value.of.all.Ornamental.Fish.import.to.EU}}{\text{Value.of.All.EU.import.}} \right)}$$

The RCA will be used chronologically in tracing year-by-year revealed comparative advantage.

1.8 Terms and Definitions

In this paper

1. Acclimatization means a period that the fish need in order to be adjust to the new environment after transportation by floating the bag in the container and slowly put new water into the bag. Sudden change of temperature will lead to the lost of shock fish.
2. Breeder means anyone who produce ornamental fish in quantity and able to supply the product to the market.
3. Brackish water fish means any fish that live in an environment that is in the middle between marine and freshwater such as the in estuary or spend part of their life in one kind of water before moving to another kind without a problem.
4. CITES means Convention on International Trade in Endanger Species of Wild Fauna and Flora
5. D.O.A. means an abbreviation of death on arrival, which is a phrase used to count the number of the fish that would not be able to survive from the trip to the hand of customer. The D.O.A. will be count as a credit for next shipment in the form of full credit refund.
6. Exporters mean the person who have the legal permit and work on sending ornamental fishes out to various countries.
7. EU means European Union of 27 member countries; Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Republic of Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and United Kingdom
8. Freshwater fish means any fish originating in freshwater; from stream, canal, and river through all of their life cycle.

9. Importers mean the person who have the legal permit and work on bringing ornamental fishes in to the country.
10. KHV means an abbreviation for Koi Herpes Virus, which is a very dangerous virus that can affect cyprinid fish; including Fancy carp (koi), goldfish, etc.
11. Importer means licensed importer of ornamental fish from the originated country to another.
12. Livebearer means any fish that gave birth to a new born baby without having a stage of egg outside the mother womb.
13. MAC- Stands for Marine Aquarium Council, which is an international, not-for-profit organisation that created a certification system to ensure a sustainable future for the marine aquarium trade, while providing a quality controlled and less-destructive way of collecting product to consumers and aimed to be a standard worldwide.
14. Marine fish means any fish originated in sea or ocean; from coral reef habitat to Mangroves area with high salinity through all of their lifetime.
15. Middleman means a person who gathered the fish from various source to stock and sell at higher price.
16. OFI- Stands for Ornamental Fish International, which is the worldwide trade association representing all sectors of the ornamental aquatic industry in 44 different countries around the globe.
17. Ornamental fish means any fish that being used for any purpose except consumption and have a value in tropical fish trade.
18. Quarantine Period means the period that ornamental fish need to be stock to make sure that it is free from diseases before it is shipped.

19. Retailer means a shop or individual who sell ornamental fish & products to the customer
20. Wholesaler means anyone who is selling ornamental fish and related products in quantity; either by importing, exporting, or breeding themselves.
21. Wild Caught means any fish that came directly from the wild, not from breeding process of human.



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CHAPTER II

LITERATURE REVIEW

There are several studies and research based on the topic of Thai Ornamental fish trade from different studies and articles. Documents published in the beginning of the business will be focusing mainly on the species of fish exports and the quality of the products. Only a few piece of work and literature is done in the 70's and 80's especially in Thailand that the studies on ornamental fish trade just started to be in focus around 90's. As the world is changing, more studies have been made on ornamental fish trade. Recently, more studies on this topic have been done by many graduates. At least four pieces of works have focus in this area between the years 2007-2009 from certain universities in Thailand.

Wanpen Meenakarn, Nongnuch Laohavisuti, and Supap Phromyot⁸ have begun to studies the role of Aquarium fish enterprise in Thailand back in the 90's. This earlier period of studies show that Thailand has been exporting out ornamental fish to several countries since 1982 and it is always increasing. The purpose of this work is aim to study the species of ornamental fish that Thailand import and export; including the importers, exporters, and the amount of the trade value by gathering information and conduct interview from traders and the export number from Thai custom department. The results of the studies show that there were 28 companies working on importation of at least 122 species and export at least 98 species of fishes to five continents. In 1988, United States of America is the number one importing Thai ornamental fish; while the European countries are West Germany, French, Belgium, Hungary, Netherland, United Kingdom, and Switzerland with the value of 45.945 million baht. And import value of Thailand in that year is having a total of 3,600,982 baht from Singapore and Hong Kong. Their studies mention that Thai Ornamental Fish Industry was not in satisfying point, since there is still having high potential in expanding the growth rate of the trade. But the breeder will only produced certain fish species,

⁸Meenakarn, W., Laohavisuti, N., and Supap P., **The Role of Aquarium Fish Enterprises in Thailand**. Bangkok: National Inland Fisheries Institute, 1990.

which will not make variety of strain and put more importance on quantity not quality. This is due to the lack of knowledge in ornamental fish among the breeders. There were several groups of fish like Arowanas and fancy carp that should increase the productivity in the country as it still have a high importation value. Thai breeder need to put more focus on the quality of the products and the exporter should group themselves into an organization to maintain the same standard of the fish export to increase the sales rate in the future.

Yoo-ee Getpech⁹ work about the effects of some regulated law to freshwater ornamental fish trade. The study applies two types of research methodology as review literature and interview traders. The data collection is conduct during October 1999 until September 2000. The findings reveal that the Fisheries Act, B.E. 2490 has power to control only the importation of aquatic animals by issuing two pieces of Royal Decree of B.E. 2525 and B.E. 2536 listed some aquatic animals species prohibited for importation. As the Fisheries Act, B.E. 2490 has no power to control the exportation of aquatic animals. For export of aquatic animals, Department of fisheries use the Ministerial Regulation no. 58 (B.E. 2534) that issue by Ministry of Commerce to protect certain species of rare aquatic animals. Until 1992, the government issues the Wild Animal Preservation and Protection Act, B.E. 2535 which deal with the importation and exportation of all kinds of aquatic animals. Species listed in these acts and CITES was similar to each other making the duplication of law which creates confusion and difficulties for the officers to follow. The law also prohibit the exportation of marine which, which is effected certain kind of Brackish water fishes such as the Archer and puffer fish. The author suggested that the government should put more attention in this issue and provide budget to enhance the quality of the product being export. It should be well plan and organize in order to support the breeding program of certain species to replace the overuse of natural resources and fish quarantine to stop spreading of diseases.

⁹Getpech, Y., **Study on effects of some regulated law to freshwater ornamental fish trade.** Bureau of Fisheries Administration and Management, Bangkok: Department of Fisheries, 2002.

Supattra Tharnpanich¹⁰ has been studies about the competitiveness of Thai ornamental fish in European Market by using various methods such as Five Forces Model, SWOT, Environmental and Internal Analysis along with data collected from interviewing with Director of Centre of Ornamental Fish and water plant for export and one Thai ornamental Fish exporter. The work is aim to identify the strength, weakness, opportunities, threats, and competitiveness of the industry. It was concluded that Thai exporters have a moderate competitive level in EU market. Competitors could be able to have market share in the market easily, due to the high growth rate of European market and the low competitive rate. Even though the study result from Five Forces analysis showed that the threat of new entrants was high, the competitiveness among rivalry was quite low as the study indicated that the EU market had high growth rate. Increase of the oil price will raise the cost of production, which will effects Thai exporters, so they need to group together to gain more power in bargaining with transporters. The results also shown that internet is a good way in entering the market as there were the growth of internet users and the high spending rate of internet users. Thai exporters should not be overlooked of this method.

Pattasak Charoensri¹¹ made an analysis of key factors of one Thai Ornamental Fish Exporter by using Value Chain theory by Michael E. Porter and Key Success Factors of Cullen & Parboteeach. It is descriptive analysis based on the primary data from interview of one Thai Ornamental Fish Exporter, which supplies by secondary data from various publications. The objective is to study the background information, identify, analyze key success factor, and providing guidelines for new entrepreneur in the business. The study showed that Thai Ornamental fish business key success factors can be described into 8 factors which are price, product variation, quality, capacity, supply consistency, service, capital, and promotion. However, the most important factors from the study are price and quality which need to be improved by

¹⁰Tharnpanich, S., **The Study of Competitiveness of Thai Ornamental Fish in European Market**. Master's thesis, Kasetsart University, 2007.

¹¹Charoensri, P., **The Analysis of Key Success Factors of one Thai Ornamental Fish Exporter**. Master's thesis, Kasetsart University, 2008.

exporter in order to be competitive in a global market. Government should play more important role in giving more support on the business.

Pajya Sripraya¹² identified the competitiveness in Thai Ornamental fish Industry, this study aim to find the strong point and weakness of Thai competitors comparing to the main competitors and improving the potential in exporting. She had analyzed about the effects and chances of the business by using RCA (Revealed Comparative Advantage Index) and CMS (Constant Market Share Analysis) as the method with Diamond model and the secondary data from various organization and related department. Most of the information will be gathered during the year 2003-2008. The results of the study shown that Thailand has more advantage in ornamental fish exporting when compare to Singapore and Malaysia by using RCA, while the CMS is showing that the growth of Thai ornamental fish export is increasing by three factors; an growth of the world business and trade, result of the competition capability, and expansion of the market. The author also founded that Thailand have an advantage in producing capability and source, but the demand in the country is not reach to the point that will lead to more development. Thailand have a few related organization or institute that is involving in the area. Even though the country paid more interest about the quality and government was having more attention on this topic, but everyone involving should take part and cooperate for the best result.

Department of Fisheries, Kasetsart University¹³ has conducts a studies about Thai Ornamental fish trade on Development of Business based on biodiversity project. The publication states that even there was an expansion of the market both in the country itself and in the world state, but Thai ornamental fish Industry still cannot being compete with certain countries in becoming the first number due to various reasons and problems in production and marketing like low quality of fish being produce and lack of product variability. The study is focusing on the species with

¹²Sripraya, P., **The Study of Competitiveness of Thai Ornamental Fish.** Master's thesis, Thammasat University, 2008.

¹³Department of Fisheries, Kasetsart University, **Development of Business based on biodiversity (Ornamental Fish Business).** Bangkok: Biodiversity-Based Economy Development Office (Public Organization), 2009.

high market need and it is not focusing on EU countries. The information is gathered under different techniques and theories; SWOT analysis, Porter's Value Chain Model, Five Forces Model, STEP analysis, Tows Matrix, Supply Chain Management, Market Performance Approach, Reveal Comparative Advantage Index (RCA), and Optimal control. Various methods is conducted in order to make a complete study in market share, product variety, demand & supply, competition, risk, marketing plan, sale strategy, distribution channels, logistics, advertising & promotion.

From all of the literature reviews, the studies show the complete information and survey conducted on the overall picture as a whole. This research that going to be made will be focusing on EU countries as it is the main importer of the products. As the region is having different regulations and term in various ways, according to the different of cultures and people, for example the law of importation on live ornamental fish is changing during these few years. The research will also be focusing on the species which the market is not in demanding, but having potential of being a new product in the future in order to make a substitution of any product that need replacement.

Some source of information may not be strong enough to conduct a survey or interviews. More interviews will be made in order to get the most accurate and complete information before the analysis was made. The work will be focusing on EU regulations and law of import, as it is one of the main thing to make a complete cycle of the business with accurate information and sources.

Author	Title	Instrument	Conclusion	Year
Wanpen Meenakarn, Nongnuch Laohavisuti, and Supap Phromyot	The Role of Aquarium Fish Enterprises in Thailand	Gathering information and conduct interview from traders and the export number from Thai custom	Thai Ornamental Fish Industry has high potential in expanding and growth. But the breeder will only produced certain fish species, which will not make variety of strain and put more importance on quantity not	1990

		department	quality.	
Yoo-ee Getpech	Study on effects of some regulated law to freshwater ornamental fish trade	Reviewing of literatures and interview traders	<p>- The finding reveal that the Fisheries Act, B.E. 2490 has power to control only the importation of aquatic animals by issuing two pieces of Royal Decree of B.E. 2525 and B.E. 2536 listed some aquatic animals species prohibited for importation. As the Fisheries Act, B.E. 2490 has no power to control the exportation of aquatic animals. And in 1992, government enacted the wild animal preservation and protection act, B.E. 2535 which listed species prohibited from import and export.</p> <p>- The interview also show that the Wild Animal Preservation and Protection Act causes some impacts on ornamental fish traders and aqua culturists due to complicated procedures of granting permit.</p> <p>- Another result reveals that government should pay</p>	2002

			much attention in protection and control fish disease.	
Supattra Tharnpanich	The Study of Competitiveness of Thai Ornamental Fish in European Market	Five Forces Model, SWOT, Environmental and Internal Analysis	It was concluded that Thai exporters have a moderate competitive level in EU market. Even though the study result from Five Forces analysis showed that the threat of new entrants was high, the competitiveness among rivalry was quite low as the study indicated that the EU market had high growth rate.	2007
Pattasak Charoensri	The Analysis of Key Success factors of one Thai Ornamental fish exporter	Value Chain theory and Key success factors	The study showed that Thai Ornamental fish business key success factors can be described into 8 factors which are price, product variation, quality, capacity, supply consistency, service, capital, and promotion. However, the most important factors from the study are price and quality which need to be improved by exporter in order to compete in a global market.	2008
Pajya	The Study of	Revealed	Studies of CMS founded that Thai ornamental fish export was increase in the period of	

Sripraya	Competitiveness of Thai Ornamental fish Industry	Comparative Advantage Index (RCA), Diamond Model, and Constant Market Share Analysis (CMS)	<p>2002-2004 by 6,718.55 US dollar when comparing with the years 2005-2007 because of three factors:</p> <ol style="list-style-type: none"> 1. The expansion of world trade making the value of Thai ornamental fish trade increasing by 19.85% or 1,333.31 thousand U.S. dollar. 2. The ability in competition is increase by 80.56% or 5,412.70 thousand U.S. Dollar. 3. The market was scattered making the value of export decrease 0.41% or 27.46 thousand US. Dollar. <p>The study also founded out that Thai have advantages in productivity by the position of the breeding site. But it still needs more improvement from several factors.</p>	2008
Department of Fisheries, Kasetsart University	Development of Business based on biodiversity (Ornamental Fish	SWOT analysis, Porter's Value Chain Model, Five Forces Model, Step	Ornamental fish business is a business that always expanding every year. Singapore is the biggest exporter of ornamental fish in the world, even though the	2009

	Business)	analysis, Tows Matrix, Supply Chain Management, Market Performance Approach, Reveal Comparative Advantage Index (RCA), Optimal Control,	country itself has only a few natural fish resources; next two top exporters are Malaysia and Spain.	
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Figure 11: Literature Review Summary

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CHAPTER III RESEARCH METHODOLOGY AND DATA GATHERING

This chapter will explain the research methodology and source of data with the summary of an interview from various people who were in the field.

Study Design

This thesis is conducted by adopting various descriptive methods to identify and analyze the information on Ornamental Fish export of Thailand to European Market. The primary and secondary data used in this study is obtained using standards of several descriptive methods.

Sources of Data

Primary Data

Primary data are obtained from in-depth interviews with various people in the ornamental fish industry: both wholesalers and retailers of importers and exporters in Thailand and selected major European Countries and ornamental fish producers. (see the list of an interviewers in Appendix 1.)

Secondary Data

Secondary data used in this study are obtained from sources such as books, articles, magazines, and publication related to the research questions. The data includes analysis of the situation and interview section with various Thai ornamental fish exporters from Magazines of the Department of Fisheries, while statistic and numbers will mostly depend on information given by the Department of Export promotion and the records from the Department of Fisheries.

Summary of Interview

In-depth interviews are conducted on various European Importers who import their products from Thailand to obtain the analysis of export potential of Thai Ornamental fish to EU market.

Breeding

Most of them state that Thailand benefit highly as a major breeder of Freshwater ornamental fishes in Southeast Asia. Thailand supplies the market with good product price, inexpensive to the European importers when compared with other countries. Due to the location of the country, Thailand also has a wide range of natural habitats that are suitable to various kinds of native fish and this makes Thailand an originator of many fish that are exported to European Countries.

Product Quality

In term of packaging, Thailand has been improving with the quality of the work. Ornamental fish transported from Thailand to Europe usually arrive in good condition. Less DOA is processed in each shipment. It could be said that the current situation is much better when compared to the past. Thai exporters also provide customers with a wide variety of products in their stock lists. Some of which includes rare items and prized species that are highly sought after by collectors and professionals who value exotic. These products could be sold for high prices.

However, Thai exporters do need to improve the standard on the size and quality of each shipment that should be screen to get the same size of fish in every shipment. The stability of the fish size is another problem that usually happens when the customer orders a certain type of fish from the exporter in Thailand for several times. Instability of fish size causes the problem of reliability to the Thai exporter and lowers down their credibility. The wholesale company in Europe will not be able to tell their customer why the fish they bought in the last shipment was smaller than those arrived recently since they were offered at the same price.

For quality of health, Thailand can maintain a good standard in this category. So far, there has been no serious problem about the disease from Thai fish imported to the EU. However, the guppies which are cultivated from Thailand have a serious problem in making their ways to the EU market as the EU mostly banned most of Thai guppies. The reason is that most of the guppy breeds raised as a mass product in Thailand are usually grown in brackish water for they are more tolerant to diseases. The problem will appear as soon as the fish are sent to the hand of the Thai exporters. The fish will start to die by showing the rot of fin and loss of scales as the exporters do not switch water properly. The fish are not strong enough to recover from the change. The EU importers also avoid guppies from Singapore as well, for it would probably be a re-export from Thailand. As a result, the European importers turn to guppies bred in the Czech Republic. Even though they are not as beautiful as those from Thailand, at least they survive in a long term.

Thailand can still send ornamental fish products to the EU without the problem of ban of certain fish species that other countries such as Malaysia faced a while ago. This is because there are strict rules and regulations of the export department, which requires a fish sample from the product to be screened every time the fish are exported.

Importers observed that fish with low market value or cheap products are the one that have problems. Some start to die after keeping for a while without any known reason. Those fish with high price on the other hand usually perform much better than the cheaper ones. These may be due to the lack of interest and care when the fish is hold in the export tanks as they do not have significant value. Cheap fish are usually housed in a dense tank with high stocking number. this could lead to an inappropriate or even the lack of care.

Price

European Importers think that Thai ornamental fish price is already in a good place when comparing to other supplier. If look together with quality, most exporters is concerning more on the quality of the fish exported. They said that it is no use to have the fish with cheap price that lacks in quality. As the exporters will only guarantee the live of fish until reaching the importers not the time spending in quarantine before selling to their customers. Cheap fish with low standard will start to die from diseases or other several reasons during the quarantine period. This makes the costs of operation higher as they need to maintain these fish and wait for them to recover into good condition. The operating cost is much more expensive in total if the fish have problem after the sale. The companies will also lose their credits. Because of this, most companies prefer the best fish with good health at a reasonable price than the cheap ones with low quality and bad health.

Variety of the product

In terms of the variety of products, Thailand does not have any problem within this category. Thai exporters have a wide range of local products to offer, ranging from Freshwater to Marines. As Thai ornamental fish breeder could breed all of the main species in the trade such as red tail black shark, Albino shark, Bala shark, fighting fish, which are native to Thailand. They also have a success in improving a new strain of foreign tropical fish such as Cichlids, Discus, and Goldfish. There are many farms that reach the standard set by the Department of Fisheries and are able to supply a huge amount of live fish to support the business each year. There are also comments that Thailand should maintain the variety of the fish in stock. Sometimes the fish that does not rank a good sale number disappears and hardly come back into the market. This shortens list as well as makes Thailand less interesting. As the world constantly develops, exporters need to look for new export products. New items will help increasing the sale rate and give advantages over competitors.

Logistic

Thailand has many problems with the export of ornamental fish as well. Thai exporters usually require shipment of large quantity or else the company would not make profit. The expensive freight charge is another major problem when compared to the biggest exporter like Singapore. All Thai exporters agree that the only big problem is the freight charge, which is much more expensive than others as Thailand have less airfreight per day than the competitors such as Singapore. Government should support the industry through export promotion and reduction of bureaucratic process.

Competitors

Considering competitors such as Singapore, Hong Kong, Philippines, Indonesia, and Vietnam, some of them are very strong, but some are weak for several reasons. This will be examine and explain more in Chapter IV. Moreover, Thailand has recently started to produce aquaculture marine ornamentals. Even though it is not widely distributed and has a smaller range of species that can be bred for trade, Thailand is the first exporter in Southeast Asia that supplies the world market.

The interview results also show that Thai exporters lack a chance to promote themselves or introduce their companies to the world. Most European importers have a long-termed good relationship with Singaporean exporters. The bond between them is strong. If the price in other countries is slightly lower; the importers will choose Singapore due to their reliability and the strong connection with them. If there is a significant difference in price or an interesting species that could not be found elsewhere, the European will turn to Thai companies. All left is to maintain the relation.

Trends & Marketing

There is also a suggestion that the trend of pet fish in United Kingdom changes a lot from the past. In the past the industry is limited within the circle of fish enthusiasts. Increasingly, more people join clubs and association. This leads to competition and movement of the market for new kinds of products. These people seek rare and unusual items with budget per item. At the same time, most of the people coming in fish store are looking for something pretty and cheap. They want something nice for home decoration. It could be said that the trend is moving from fish keeping as pet to just only a piece of living furniture.

Law and Regulations

In terms of law and regulations relating to the fish export, there are a number of concerns. Health certificate and process must be checked and completed before sending the fish out of the country. There are certain kinds of diseases that Thailand are monitoring: KHV (Koi Herpes Virus), EUS (Epizootic Ulcerative Syndrome), and SVC (Spring Viraemia of Carp). These diseases much be observed to prevent a ban of ornamental fish product from Thailand. The EU has strict laws concerning fish disease. Any prevention made in advanced will be safe for both Thai exporters and the EU importers. If all of the products are up to the EU standard, they can be distributed anywhere in the world. The EU regulations keep on changing and adjusting the law according to the real use. Like what happened with 1991/67 EC, the regulation was changed because the EU believed that it was too strict and not practical. The new replacement for standards of goods relies on the world standard of the world trade organization (WTO). Good product quality not only needs to be maintained in doing trade with EU, the producers also must keep updating on the regulations and rules that always change from time to time to prevent problems from occurring in the future.

Future of Thai Ornamental fish Industry in European Market

Many exporters point out that if Thailand could solve the problems about transportation cost and size accuracy, there will be more customers who are willing to order and the number of sales will increase. This will be a supplement to the areas that Thailand is doing well: the production source, the packaging service and the wide variety of products. It is true that EU is a big market when compared the EU as a single market with the largest market of the USA. The Ornamental fish products sent to the EU need to be carefully selected due to the requirement for high standard. However, if all of the products reach the EU standard, they could be exported to anywhere in the world.

Marine Ornamental fish

An interview result show that Thailand still have a lot of opportunities in cultivating marine ornamental to support the industry. The Marine Ornamental fish Cultivation has seriously started in Thailand just a few years ago and they are all originated in the eastern part of Thailand. Therefore, the fish in the market will only come from wild caught livestock, both in the country and import specimens. For example, two marine ornamental fish farms, which started its operation only five years ago, started from a basic pair of False Ocellaris Clownfish (*Amphiprion ocellaris*), which considered as the easiest one to be cultivated. Now, they could breed at least 8 species of clownfish in five years. These successes do not include the researcher from Burapha University under the interviewee's supervision who started to look for more species with a business potential: the one with high growth rate and low mortality. For example, seahorse and gobies are a good selection that the university needs to keep on researching until the result is satisfied before distributing information. Now, the government allows people to export ornamental marine fish that come from cultivation to the world market under conditions that the farm should be registered and checked in order to make sure that the specimen really come from the breeding program, not wild caught. More programs are provided to support customers in

buying breeding livestock as these specimens help saving marine fish from being caught from the wild.

Exporters also think that marine ornamental is another good export product to run a marketing campaign in EU market. Thai breeders have just started the Marine ornamental culture, so there are not many different products. Export of marine ornamental from Thailand is limited only to cultivation. This could be raised as a strong point that all of the fish exported from Thailand are all captive breeds. No wild fish are sent to customers, which mean that customers can help protecting the environment through choosing Thai products.

Producers of Marine ornamental fish say that most of the fish produced will be exported to the U.S., while the EU countries are the secondary market. In the EU, the Thai interviewee frequently shipped to United Kingdom regularly with a few other European countries occasionally. The customers usually come from two sources: one is from Thai fish exporters and another direct order from abroad. The customer will usually come and see the condition of the farms in estimating their quality from looking at the products. After that, they will place an order by phone or through the Internet. Once the farms have received an order, the fish will be packed one hundred fishes per box. If the order is small, the farm will send them by bus from Chonburi to the nearest station and the exporters need to pick them up by themselves. If it is a large shipment, there will be a direct delivery offered.

Clownfish farm usually have around one hundred pairs of various species of clownfish parents. These parents lay eggs all year round. Staff will harvest the offspring to the hatchery. The fish need approximately about two months to grow up to a saleable size. However, this depends on the species of the clownfish. The larger the species, the longer it takes. There will be some seasons that the fish produce fewer eggs, especially in winter. So the farm needs to produce the clownfish all year round in order to maintain the product availability. Each month, the farm exports at least one thousand clownfish to customers in UK directly. The number does not include customers from other countries and the demand has been still increasing until

now. There will be more development to introduce more species into a market in the future for the goal is to provide customers more choices and variety.

Freshwater Stingray: product development

Freshwater fish like Freshwater Stingray from Amazon River in South America are good candidates for the one interested in breeding ornamental fish as they will do well in Thailand. When the fish appeared in the trade, it commanded high price around 10,000 baht for a pair of small juvenile. As more people breed the fish and more fish are imported; then the price has become lower. However, he says that the fish could still be sold all year round while maintaining high market demand. The cost of maintenance is a little high compared to other smaller species since they feed on shrimp and aquatic products, but it could be sold at high price depending on the species and the body pattern. This is the job of breeder to develop new strain for the market. The price of this fish in the EU is higher than in the US, especially in Germany where people prefer bold pattern, which comes with a high price tag. Popularity of this fish grows every year. This can be seen from the sales rate and the good price, which is at least thousand baht per fish. Even though the fish are not susceptible to many diseases, demand less care and are highly demanded, not many people breed them.

Data Analysis

Data Analysis will cover the following topics of study:

1. The Analysis of Export Potential of Thai Ornamental Fish to the EU market is conducted by using the primary data obtained from the interviewee and supported by the secondary data obtained from various publications.
2. Primary and Secondary data will be used together with the framework and documents regarding to the topic to analyze the Strength, Weakness, Opportunity, and Threats (SWOT) and the Value Chain of Thai Ornamental fish Industry to the European Market.

3. Secondary data and statistics from the department of export promotion will be used in finding the Revealed Comparative Advantage (RCA) to find out
4. The analysis will be done by comparing Thailand with the five main exporters of ornamental fish in Southeast Asia: Singapore, Malaysia, Philippines, Indonesia and Vietnam.



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CHAPTER IV

BACKGROUND OF ORNAMENTALFISH TRADE IN SELECTED SOUTHEAST ASIAN COUNTRIES

Southeast Asia is the main supplier of World Ornamental fish to the European Market. According to Fig. 13; six out of fourteen countries are listed or it could be said that almost half of the exporters was in this region. So it could be said that the region supplies a large quantity of ornamental fish to the European Union. To make an analysis of Thai export potential, countries such as Singapore, Malaysia, Vietnam, Philippines, and Indonesia should be observe to make a comparison and study on their achievement. These countries were in the same region and share certain similarities as well as differences. Background of Ornamental fish trade in these countries will be provides with certain information as well as the strength and weaknesses.

Singapore

To examine the export potential, it is important to examine Singapore as the country is known as a hub of World ornamental fish. It rank as number one in supplying the product to the world and to EU, even though Singapore only produce about 44% of the ornamental fish it exports or less than half of the full amount. The reason that they need to produce their own is to guarantee a more stable supply as well as to have better control of the quality¹⁴. Singapore only breed freshwater species; the breeders do qualified for livebearers such as swordtails, mollies, or platy as these fish exported comprised one quarter and it is accounted for 48% of the fish varieties being breed in the country¹⁵. Other kind of fish that Singapore breeders are focusing is the guppy, discus, and Arowanas. However, the fish Singapore was producing is not the main

¹⁴ Ling, K.H. and Lim L.Y. 2005/2006 “The Status of Ornamental Fish Industry in Singapore.” *Singapore J. Pri. Ind.* 32: 59-69

¹⁵ Ibid.

product the country's export. According to the table below; platy and molly rank as number five and six, arowana at tenth and discus is not listed.

Top Ten Species of Fishes Exported in year 2002

1. Tetra
2. Guppy
3. Catfish
4. Goldfish
5. Platy
6. Molly
7. Gourami
8. Cichlid
9. Loach
10. Arowana

Source: Ling, K.H. and Lim L.Y. 2005/2006 "The Status of Ornamental Fish Industry in Singapore." Singapore J. Pri. Ind. 32: 59-69

Strength and Weakness

The strength of Singapore is that their exporters have an ability to supply their customer a huge amount of ornamental fish product; both in term of quality and quantity. They will find the source to meet their clients demand. By this reason, they were trusted by their clients that the product they exported was qualified and free from disease. Singapore government also put full supports to this industry. The Agri-Food and Veterinary Authority of Singapore (AVA) have set a department called Ornamental Fish Business Cluster in 2003 to foster closer on industry integration between private sector and government sector to maintain the top position in world exporter of ornamental fish products and aim for an Ornamental fish industry and export centre¹⁶. The committee will be includes representatives from two of the

¹⁶ Anonymous. 2006. "Agri-Business Clusters & Directory." [Online]. Available: <http://www.ava.gov.sg/Resources/AgriBusinessClustersAndDir/>

Singapore fish Association; Singapore Aquarium Fish Exporters Association (SAFEA) and Singapore Tropical Aquarium Fish Breeders' Association (STAFBA) as a representative from both exporters and breeders.

Singapore government held up an Ornamental Fish Trade fair called 'Aquarama' that will be held once every two years. This expo opens a channel of distribution as well as the opportunities to meet importers from various countries. The government also uses the 'tradenet' as one stop when importing or exporting products instead of working from documents that usually take a long time to complete the process. This system will only takes less than one minute in processing time for permit to the government office and lower cost of operation. However, Singapore still needs to rely on the product supplies from other countries such as Thailand and Indonesia. The operation cost is high and limited natural resources

Vietnam

According to the UNcomtrade database (2009), it is founded that the information of Vietnam ornamental fish trade is just appeared in 2005. But after the information is appeared, the export rate is growing up each year. Vietnam mainly import more than half of their supply to the European market¹⁷ The country does have around 120 species of fishes for ornamental fish trade, which is too few when compared with other exporting countries. Vietnam does produce their product all over; from north to south with the center of the trade in Ho Chi Minh, which is central part of the country. By now, Vietnam did not focusing on breeding of any species. They just work on the species that the market is in demand all the time such as Koi, Goldfish, Cichlids, Bettas, and guppies. However, importers around the globe and also in Europe were focusing on the wild caught fish that was coming out from Vietnam as an ornamental fish, for they have wide range of new species that never appeared in the trade

¹⁷ Anonymous. 2007. "Ornamental Fish Business: Growing market demand.. with high export competition." Thai Farmers Research Center Co., Ltd. [Online]. Available:<http://www.positioningmag.com/prnews/PrintPRNews.aspx?id=55714>

elsewhere and have a great potential in becoming one of the products¹⁸ such as the Vietnam White Cloud Mountain Minnow (*Tanichthys micagemmae*) and several loach with strike markings.

Top Species of fishes exported in year 2004

1. Puffer
2. Guppy
3. Bettas
4. Koi
5. Glass Catfish
6. Goldfish
7. Discus

Source: [Online]. Available: <http://papussa.org/publications/Orn%20Fish%20UAF-Ornamental%20fish%20outputs%20powerpoint.pdf> Retrieved April 10, 2010.

Strength and Weakness

Vietnam ornamental fish people do believe that they do have abundant of water supply and abundance of fish food with low cost of operation, which made it a great location for fish farming. For these reasons, ornamental fish product from Vietnam does have a low price when compared to neighboring countries. The breeders in Vietnam also started to focus on breeding the quality ornamental fish as it could be seen from the winning of the awards in the competition and started to group together in an association called “Vietnam Aquaculture Association” that have been registered as a member of OFI. They do also have an advantage from the Wild caught species that could not be found for export from anywhere else as it is new in the trade.

¹⁸ 2006d. “Vietnam fish exports booming.” Practical Fishkeeping. [Online]. Available: <http://www.practicalfishkeeping.co.uk/content.php?sid=817>

The government is trying to support the industry in many ways; the government has a plan to build an Ornamental fish village in the province of Cu Chi, which is the most important producing source and boost up the export industry in Ho Chi Minh City as it provides all the things need for export with a good transportation. They also plans to cancel the tax on the importation of the fish being import for breeding purpose and lower the interest for the loan that put into this business.

However, from the statistic record, it shows that Vietnam still rely on the wild fish stock at least three of the seven top exporting species. This will creates a huge effect if the number of the fish harvested from the wild is decreasing, also the quality and quality of the supply couldn't be control. For the breeding species, the quality of the fish breed could not be compared to Thailand and other several other countries of the same region yet. Vietnam also faces the same logistic problems as Thailand for they have a high cost of the transportation cost to Europe.

Malaysia

Breeders in Malaysia mainly focus on certain species of fish for they have been divided into three clusters. First, Penang and Kedah will be focusing on Discus. Second, northern states such as Perak and Selangor will concentrate on cyprinids fish. Third is Johor and southern states that were focusing on Arowanas and other species. Malaysians were also an originator of crossbreed cichlids that is being popular for a period as a lucky fish. While Cyprinids fishes like barbs, koi, and goldfish were making up of 25% of the fish number being produce in the country. However, these were a fish that have a low market value. The three group of fishes listed above that the country is focusing was an expensive fish that command a high price individually. Currently, Malaysia is focusing to supply other countries for re-export as more than 26% or one third of the Malaysian ornamental fish product is sent to Singapore¹⁹ and

¹⁹ Anonymous. "Malaysia aims to produce 800 million ornamental fish annually by 2010." [Online].

Available: <http://cafearrowana.com/downloads/Malaysia-aims-to-produce-800-million-ornamental-fish-annually-by-2010.pdf>

their main policies and support from the government is also focus on the improvement in quality of the product and mass production instead of promoting their export industry. However, the Ninth Malaysia Plan, spanning 2006 to 2010, targets 21.5 growth for aquaculture, as compared with 8.3% recorded during the previous five years with a decision to allocate 39 Aquaculture Industry Zones (AIZs) with 25,000 ha of land throughout the country and to provide the necessary infrastructure and support services for the development of the sector²⁰. This means that they need to turn their interest to increase the number of their export themselves.

Strength and Weakness

Malaysia is having similar climate to Thailand, which is good for ornamental fish culture with a similar cost of production. This make the country became one of the best spot for ornamental fish culture. Their government also has a strong support in an Ornamental Fish Industry as they were contributing helps and support to make the business move further. Because in their viewpoint; the business is one of the growing businesses that have a good potential to grow up in the future²¹. The government was promoting their fish industry in various trade fair; ranging from the trade event in the country itself to Aquarama in Singapore and Pet Industry trade show in Paris. The country also focusing on the fish with high market value such as Discus and Arowanas, which is selling the quality product with more money in each individual. Now, Malaysia is the largest breeder of Asian Arowana in the world.

²⁰ Oh, E. 2007. "Xian Leng shows that ornamental fish is big business" [Online]. Available: <http://biz.thestar.com.my/bizweek/story.asp?file=/2007/12/29/bizweek/19862279&sec=bizweek>

²¹ Anonymous. 2004. "Ornamental Fish Industry to grow over 10pc this year." [Online]. Available: <http://www.dailyexpress.com.my/news.cfm?NewsID=29815>

But even though Malaysia is one of the world top exporters of ornamental fish, it does have a low export number of ornamental fish products to EU and it is decreasing since 2008 as there was a banned of certain species of ornamental fish that is contaminated to the disease from Malaysia; this show that a network of five Quarantine and Fish Health Centres at the exit points does not work effectively. Another weakness of Malaysian fish exporters is that they have less variety of fish, for the country only breed around 250 fish species and less dependant on the wild species for 90% of the fish exported are captive bred. Malaysians exporters also need to rely on imports from Indonesia as a top supplier, followed by Taiwan and Thailand.

Indonesia

According to figure 8; Indonesia is ranking as the fourth number, which is also gain higher export value to EU than Thailand. Indonesia is the world largest supplier of Marine Ornamental, due to the location of the country that is was rich in flora and fauna with a great biodiversity. The country is not only supply marine fishes to the trade, but it also one of the largest producer of certain freshwater species such as the Arowanas and the Clown Loach. Freshwater species that Indonesia exported were mostly came from breeders in the country, only a few will be harvest from the wild; while the marine ornamental is relies on the wild caught specimens that the suppliers gathered from the villagers and collectors throughout the country and nearby islands.

Strength and Weakness

Indonesia does have a strong point in the variety of the products. It is known as an originator of certain freshwater and marine fish species and this cause the country to become one of the best exporters in the world which supplies the trade around the world with both freshwater and marines. Exporters do have strong associations that were cooperate their activities with the support of the government such as Indonesian Ornamental Fish Exporters Association (INAFISH), Indonesian Fisheries Federation, Indonesian Aquaculture Society, Indonesian Ornamental Fish Association, and Indonesian Coral, Shell, and Ornamental Fish Association (AKII). Some of these were also registered with the OFI to guarantee their standards in the European market.

Several villagers that earn their living by gathering marine fishes that was collected from the wild will have been guarantee by The Marine Aquarium Council (MAC), which will be a western standard for the quality of fish that was being caught.

The Ministry of Marine Affairs and Fisheries also supports by holding up a fish show called “Raiser Expo”, which is creates to push up commodity market in the country’s ornamental fish products. The expo will hold exhibitions and ornamental fish technology exchanges for breeders and people in the country with an opportunity for manufacturers and exporters to exhibit their products to the customers. The committee also provides free both for any fish breeder who want to display the fish in the arena, under the first come first serve basis.

There were several weaknesses for Indonesia; first, is the European Union imposed a ban on national airline “Garuda Air” to fly to the continent. The exporters found difficulties in finding replacement airlines that have a direct flight to the destination of their customers. Second, certain fish collector still practices the use of cyanide to harvest the marine fishes from the wild. This makes the fish being caught became unhealthy and soon died with a destruction to the reef environment. The number of the fish caught and the supply of the fish is unstable and varying. Some fish was seasonal and will only catch in certain time of the year. So far, there was no effort in breeding marine species yet. All of the export livestock is depend from the harvest.

Philippines

The Philippines is the world second largest supplier of Ornamental fish due to the location of the country which is a group of islands lying on the Pacific Ocean. The country richness of marine fauna creates great advantages for ornamental fish exporters in the country. Freshwater species seems to be a minority that is less talk about and almost ignore from the Europeans as it is not popular and being exported to the European market. The government just started a plan to support the breeding industries of freshwater species in their two major lakes and aim to produce bread-

and-butter fishes like platy and goldfish mainly to supply in the country, but also plan to make it as an export product in the future²².

Strength and Weakness

The Philippines do have strong advantages on the variety of marine fish that could be caught on their reef. The country is filling with a great marine biodiversity; from the smallest gobies to the largest fish in the world like Whale shark. There was also an organization like The Marine Aquarium Council that aims to educate people for a better practice and set a higher standard in collecting animals came and work with the villagers. A fish that is being caught by a fisherman who get train from these people will be guarantee with a good health, which will ensure the exporters in Europe that they will get a quality products in their hand when they see the logo of the organization. For the country is specializing in exporting marine fishes for more than 35 years, Philippines Tropical Fish Exporters Association (PTFEA) is founded to initiated and maintains programs for training & educating fisher folks. It is dedicated to the development of aquarium fish collecting by using legal techniques and to the preservation & rehabilitation of endangered reefs²³.

There are several weaknesses of the Philippines exporters. The country only supplies Marine species to the trade. This means the customers will only provide with small choice to choose when comparing with other countries. None of an association or group cluster is working with the freshwater species; either breeding or gathering. Even though there is Philippines Discus Association, which is the only freshwater group that is founded; but the fish is not popular as an export product. Some other problem is similar to the Indonesians, as they were relies on the natural resources.

²² Anonymous. 2009. "Ornamental Fish Production Gets Long-Deserved Attention." Agriculture Business Week. [Online]. Available: <http://www.agribusinessweek.com/ornamental-fish-production-gets-long-deserved-attention/>

²³ [Online]. Available: <http://ptfea.org/about.html>

People still practice cyanide in certain area, which causes reef destruction and low quality of fish that is being collected. The supply of the fish also needs to depend on nature and the weather. If there were a storm or the boat could not get off shore, than no fish will be collect and supply to the trade. But the Philippines is worst than an Indonesia as the country main exports was only marine species. More details will be explained in Chapter V on Result and Analysis of the Value Chain.



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CHAPTER V

RESULT AND ANALYSIS

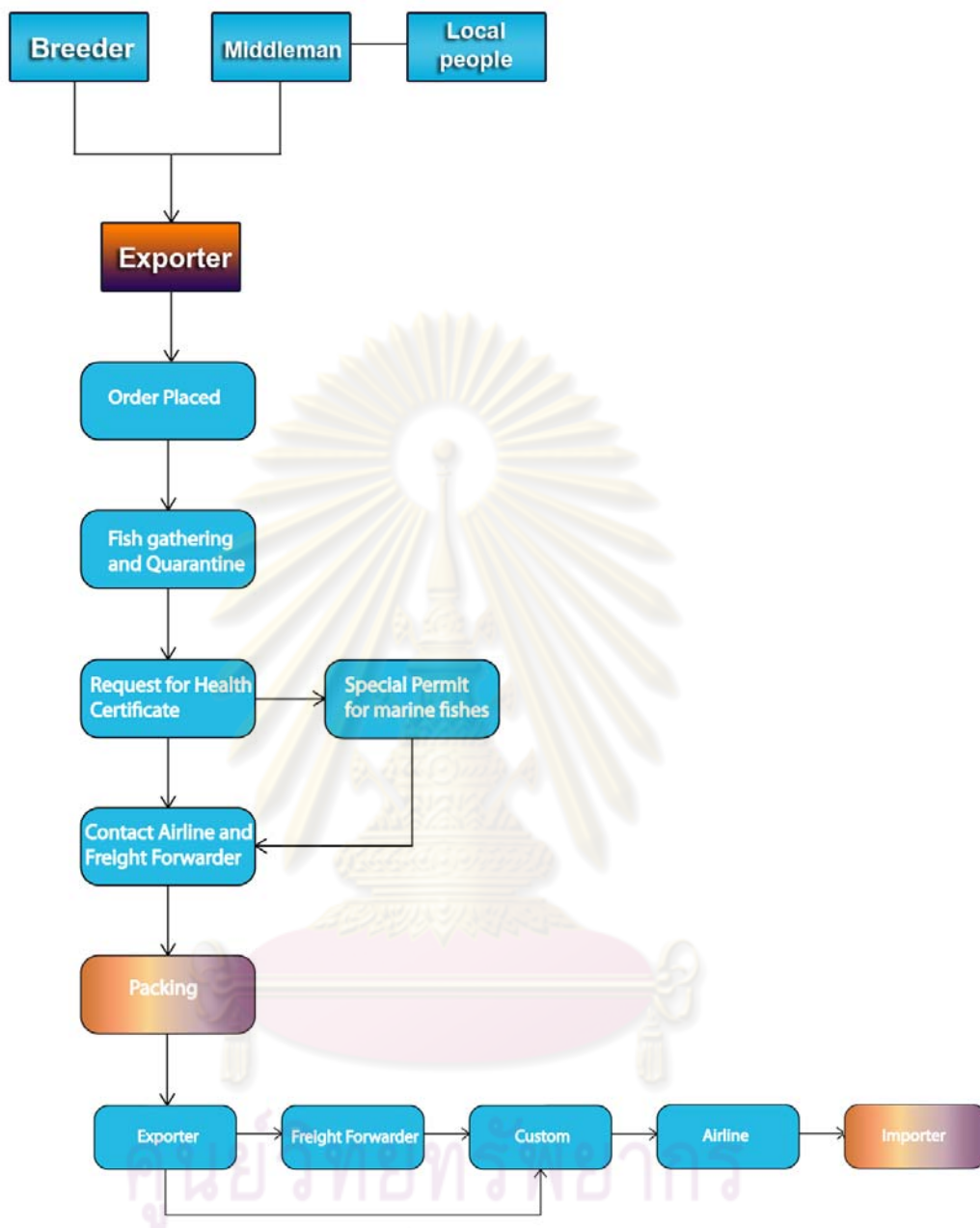
In this chapter, the results from an Analysis of Export Potential of Thai Ornamental Fish to the European Market will be shown by the use of three methods; Value Chain Theory, SWOT analysis, and Revealed Comparative Advantage (RCA). Within this research, the information will be described in order to make the exporters become more successful in the European Market.

5.1 Value Chain Analysis

Analysis using Value Chain Theory will contribute to the achievement of the Thai Ornamental fish business in order to add more value to the products and services through primary resources. Production and trade structure of the business will be observed and illustrated.



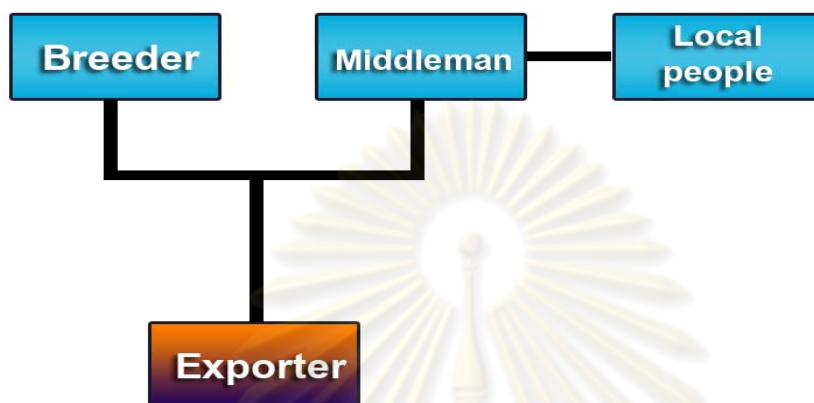
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5.1.1 Primary Activities

5.1.1.1 Inbound Logistics



Exporters usually do not produce ornamental fish products by themselves. There may be a few who raise the market species as a substitute or replacement when the fish exporting run out of stock. However, most of them are middlemen who gather ornamental fishes from various sources and sell them to the customers. The exporters will not hold the fish in their facility for a long time, as it increases the level and cost of maintenances.

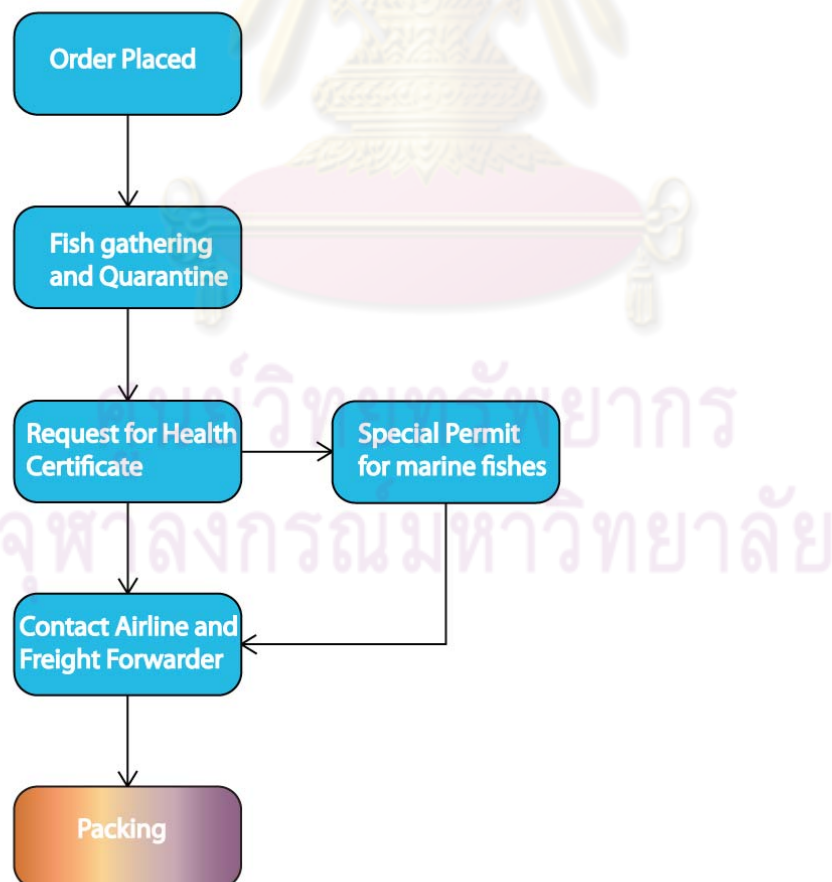
After the placement of order, exporters will call order fish from breeders. The fish ordered will arrive in either of the following ways: picking up by the company's staff or direct delivery to the exporter office. This depends on the breeders. Sometimes they charge extra transportation cost or sometimes they do not if the quantity is large enough. Exporters need to have facility to maintain the fish during the waiting period before they send the fish to the customers abroad. For most of the exporters located in the sub-urban areas and outskirts of Bangkok, this makes the traveling and transportation easier and cheaper.

Certain fish are produced year round, but some are produced seasonally. Exporters could either remove them from the stock list or stock them for sale or. The first way will help save the cost of operation, while the second choice will bring the customer more variety of the species number in stock list. However, the fish needs to be

quarantined for a few days, in order to keep the process of testing with the Department of fisheries running to get the guarantee papers and certificate needed in the export process.

Through the process of inbound logistics, exporters who stay around city outskirts have more advantages in operating the business. Exporters who have their own cars to pick up fish from breeders also have more convenience, but surely they have more operation cost. What the exporters could do is to set a meeting place for all the breeders to gather and send a car to pick up all the products at once to save cost and time. For example, some exporters also do this on Wednesday night or Thursday morning at Sunday Market near Jatujak Weekend Market, which many fish breeders gather and participate in a wholesale market every week.

5.1.1.2 Operation Management

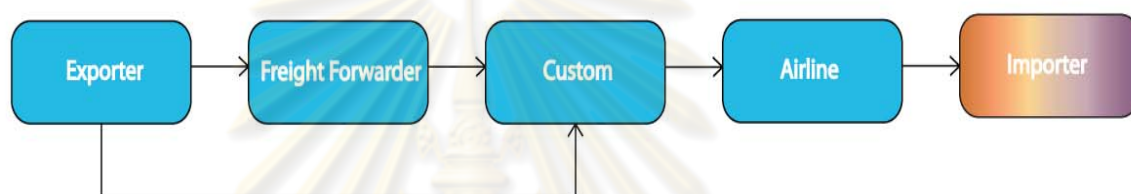


There are several documents that exporters need to deal with to export fish out of the country: mainly health and farm certificates. The operation management begins with a registrant with Department of Fisheries in becoming a person with an occupation in fisheries. This is a permanent license that will work until the company is close down. Every time an exporter exports the product, they need to make sure that all of the fish being prepared for export is not listed on the CITES or protected species of Thailand and inquire for a Health Certificate from the Aquatic Animal Health Research Institute because the EU requires an Annex of Health Certificate of their own. Next is the document requesting shipping and related documents such as invoice, Air waybill or Bill of Lading, and packing list if they are available. If it is marine ornamental, then it needs a special document in screening that the fish come from captive breed program to get a special permit. Documents and aquatic animal will be inspected by the fisheries officer. Species, size, and quantity of the export product need to be the same as what is stated on the permit. After the process is reviewed, fish will be ordered and moved through customs formality.

Exporter must select the fish with good quality for export using the standard set by the Department of Fisheries. If the fish pass the requirement set, then the process starts. Once the fish arrives at the company, the whole bag will be floated on the container to make acclimatize the fish with the water temperature before separating into two tanks: to the concrete container outside the building and to the glass tank. These fish will stay at the farm for a while to make sure that they are free of disease before sending some of them to test for disease and making export document at Department of fisheries. The process requires two to three days before the shipment date. While the document is during process, the fish will be treated with medicine and food to make them healthy and to prepare them for export. Food will be different according to each species. Normally, exporters will feed the fish with pellet food as it is convenient and inexpensive. But some fish will only feed on small animals and meaty products, so it varies according to the types of fish. Before export, the fish will not be fed with any food to prevent themselves from creating waste during the travel. If the waste is produced in the bag, the water quality will be dropped and could pollute the fish.

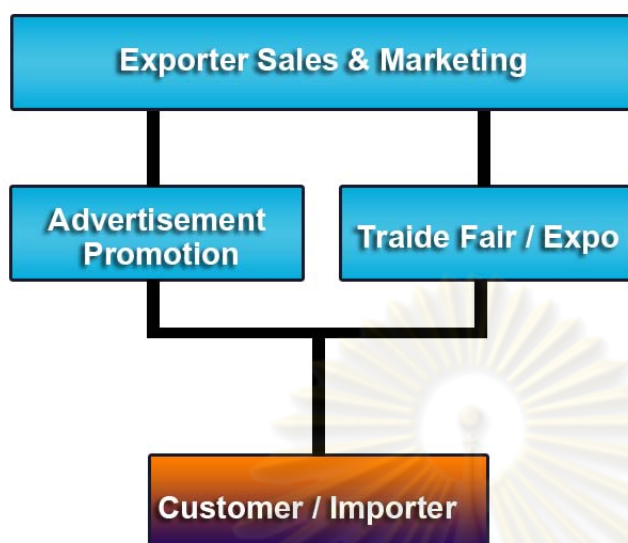
Once the documents are ready, the fish will be packed in plastic bags. Bag size will vary according to the size of the fish. Some small fish such as Betta will be packed in individual small plastic bags to prevent them from fighting each other. Big fish will also be put in large bags individually and then in separate box. Small fish on the other hand will be put together. Each bag is filled with oxygen. The process continues with arrangement of all fish bags into a Styrofoam box in order. Inside the box, there will be a heat pack in case the fish are transported to cold places.

5.1.1.3 Outbound Logistics



Normally, outbound logistics could be done in two ways; export through an agent or directly by the exporter. In some countries, exporter could export their product through freight forwarder or rely on shipping service to work on a process. But for the EU, the regulations demand the exporter to export by themselves as all of the documents must be reliable and information could be traced back. Exporters need to have a permit and must register themselves with the Department of Fisheries. Each week, fish will be updated in the stock list and sent out to customers. Within a few days, questions will be asked for further information or direct order placement will be made. In this process, the exporter needs to reserve and arrange the shipment with airlines directly or contact freight forwarder in advanced to get an Air Way Bill and inform the number to the customer. Once the fish is being pack, freight forwarder will come and pick the fish to the transportation service from the exporter and work with all the custom documents for them. Only a few exporter will do these thing themselves as it will requires times and process.

5.1.1.4 Marketing and Sales



Marketing and Sales is the most difficult process of all, especially when they first start the business. New companies need to find customers to earn profits to survive. Old companies also have to look for new customers to earn more profits so that they will be more stable. Both of them need to work out to make their company become well known and are able to gain trust from customers. There are several ways to promote the companies such as advertisement and sales technique. Advertisement in Ornamental fish Magazine also helps customer getting to know the exporters better. More exporters would like to have a website, as it is more worldwide and could reach the target group more directly.

Advertisement on pages and web pages are not the only ways, people in the ornamental fish business also have trade fair. The most important trade fair for ornamental fish in Europe is the Interzoo, which is held in Germany. Various pet products are available for wholesalers on early days and later for public after. The second largest trade fair is Aquarama, which is held in Singapore every two years alternating with the Interzoo. Export companies that want to promote their business could rent a space for a booth and make an advertisement. The companies could bring interesting fish as a product sample or give handouts and fact sheets about the companies. Sale manager and marketing staff can stay at the booth to provide any information about product or service to clients who are interested. This is a direct

way to reach certain customers and further trade among export companies of different countries.

The study finds out that all are effective but the results vary. Different ways of marketing and sales receive different feedbacks. Road show and trade fair have more potential to meet clients directly and the result can be seen in a short period of time, but great expense is involved. Magazine advertisement and Internet pages that have much lower expense might take a longer time until the effect can be seen. The groups of customers from these sources are hobbyists. However, magazine could be used in creating a good image of the company in terms of being a well-established and well-known company in the country. There is no magazine for fish exporter available with an exception of the one published officially for a big trade fair like Aquarama.

For some companies, when they have an interesting fish available as a new product, they sometimes will send a small number of these fish as sample products to their clients together with other shipment because picture could not show every detail of the fish especially the color and their behavior. If the clients find them interesting and believe it could be a salable product, order placement will follow. This sale technique is often effective.

If sales and marketing receive an order of certain fish that is currently not available on the stock list, problem might arise especially when the customer compares other exporters' stock lists at the same time. Fish are sometimes limited to one source and are available to only one exporter. If the company can acquire the ordered products in time, it will increase the sale number and maintain the status of a good trading partner. If not, importers have to look for other exporters have the products thus increase that company's market share.

Sales promotion will be made occasionally according to the time and availability of the product. New fish will be marked or highlighted on the stock list to grab importers' attention. Seasonal fish will be on sale in a little lower price than normal, depending on the quantity of fish available each year.

5.1.1.5 Service Management

There are many activities for exporters to keep and maintain connections with their customers. Sometimes, the company could be asked to hold fish for awhile if the importers are not sure about the condition of the fish to give them confidence that the fish could survive the time period and therefore is in a good health and ready for transport. Special request such the balancing of sex ratio in Livebearer will also made on occasion when the fish could be sale much easier in pairs. However, the primary service that every company offers is a DOA or Death on Arrival, which acts like a guarantee that the fish will be alive upon on the arrival to the customers. Normally, the DOA needs to be reported within 24 hours after the shipment is received. Importer who receives the fish should take a photo and count the number of the fish that could not survive the journey. Full costs of the fish that are dead will be credited and subtracted from the next order. This is a responsibility that every export company should do for their clients. Still, customers need to pay the cost of transportation. Some exporters will guarantee the fish for two days and have replacement fish instead of credit refund.

5.1.2 Supporting Activities

5.1.2.1 Procurement

Procurement of the ornamental fish for exporters can be done in two ways: direct call to the farm or breeders and checking through the Internet before making a contact. Functions of procurement depend on the price and quality of the fish. Exporters prioritize quality therefore before making an order the exporters will check whether the farm is certified by the department of fisheries or not. If not, the fish need to be scrutinized to make sure that they are free of diseases. But if the fish is of good quality, the exporter will proceed with making order.

Each year, Thai ornamental fish trade has been developing rapidly with an improvement in their business. Therefore, only freshwater species are bred and found for export. But now, marine species are more widely bred with encouragement from

the government. This makes the area of ornamental fish production expand from the central part of Thailand to the east, while freshwater species will come from breeders gathered mostly in the central plain, both in outskirts of Bangkok and nearby provinces. According to the Department of Fisheries, Ratchburi is the place where most fish farms are located, followed by Nakorn Prathom and Cha-Cheng-Sao, while the rest scatters all over. The study finds out that most of the inexpensive fish are produced outside of Bangkok, especially with the mass production that needs to be bred in number to support the wholesale market such as certain fish species with low market value as the countryside will have the lower cost of production. Fish produced in the central part usually are the species that require a lot of space; concrete containers and ground pools are the basic needs because breeders need to raise young fries until they can be sold.

Expensive and prized species are usually bred in Bangkok under the care of a specialist or hobbyist. This type of production will only be seen in certain fish species, for example Discus and certain species of cichlid which does not require large space. There were several reasons that the fish is not produced in the city outskirts as the production number is suitable with the market need. Moreover, these fish requires specialist care. Most of expensive fish farm is working in form of family system that family members have a passion and do care for these fishes. So they do not need much space to breed their product. Another condition that fish breeders need to concern about is the water quality. Tap water in the city is good for prized fish like Discus and other tropical fish as it is clean and easily controls the quality of water. If the farm is moved to the city outskirts, then the source of water is changing to the underground water or from the storage; which will cause a negative impact on fish health.

Other kinds of Freshwater species that could not be bred are gathered from the native waters around the countries. There are suppliers specializing in the wild caught fish that are gathered from all over the country. They buy the fish from local villagers or hire local fishermen to gather the fish in number. After that, all the fish caught will be sent to the middlemen in Bangkok waiting for the order from exporters. In this process, the fish will be treated with medicine so that they can recover as the wild fish

are often injured from the capturing process. For this reason, several species with different origins are able to travel to the exporters at the same time. The exporter can save the cost from contacting different places for different species and it is convenient for them. If the wild caught fish are able to breed, it will help saving cost of transporting, however with more operating costs for certain species.

Marine fish is somewhat different. Wild caught fish are prohibited and could not be sent out of the country due to several law and regulations; only breeding livestock are allowed to export. Most of the marine fish farms are located in the eastern part of Thailand mainly in Chonburi, which is close to the sea or coastal line. The producers can use natural seawater to raise the fish and save the cost of production. Furthermore, it is easy to distribute their products to city or sub-urban area.

5.1.2.2 Technology Development

Technology development plays an important role in today's business. Especially in the ornamental fish industry where time is a very important factor since the fish should be delivered to the importer as fast as possible. As the world is developing, more technologies are introduced into the fields, both in good production, sales promotion, transporting process, and customer relation.

Internet is a technology that microcosmized the world. It has a lot of advantages for anyone who wants to do a business. People could sell their products online or use it as a gateway to promote and advertise their products, either by creating their own website or make an advertisement in related homepages. Website is a good way for companies to promote themselves and give basic information for customer. It is also an efficient way to make a direct contact at a low maintenance cost and the most powerful since customer from all over the world could reach them from anywhere. In the website, the exporters could contact the websites to Department of Fisheries or the Department of Export Promotion as to have their name in the exporter list to ensure the customer about the existence of the companies. Good photos of livestock will increase customer attention and a sales rate for it helps customers in making a decision after seeing the picture of the products they will receive.

Compared to the past, the Internet has become one of the important tools for exporters as it could be used to communicate with the customers directly. In the past, mail and telephone were the only means of distant communication. Telephone in the past also demands a high price and is not as good as today. Since Internet has taken place, emails are sent directly after the shipment is completed. Other communication programs such as msn messenger can help exporter in communicating a real time with importers from different countries. If a shipment has problems or the customers ask for any further information, they could be informed immediately. Online messenger program also helps the importers in keeping touch with the exporters even though they stay in different countries. This gives the exporters more convenience and makes the business more effective.

There are many technologies used in adding values to ornamental fish products such as improvement of genes and addition of extra colors. These techniques can be divided into three categories:

- a. Dyed fish – From the 1980's dying technique has been used with ornamental fish²⁴ such as glassfish (*Parambassis spp.*) and fish such as certain kinds of cichlids by injecting acrylic paints or dyes into the body cavities of fish using hypodermic needles. The fish that have been injected will come up with a bright color line that could be seen clearly on top of the body.
- b. Laser fish – This technique employs laser in drawing picture or writing word on the scale of the fish. It is suspected that this is done using Coumarine Dye (CD) lasers, which tore away scales and the epidermis down to the surface of tissue layer.
- c. GMO fish – This first started with a purpose to detect environmental pollutants in places such as contaminated waterway. It was first introduced to the

²⁴Clarke, M. 2006a. **Company offers custom fish tattoos with laser**. Practical Fishkeeping. [Online]. November 10, 2009. Available from : <http://www.practicalfishkeeping.co.uk/content.php?sid=829>

market in 2003. The genetically modified fish will be fluorescent at all the time because the natural fluorescent gene in the fish. It is founded that green color come from the gene of a fluorescent jellyfish (*Aequorea victoria*)²⁵ and red color from a corallimorphs in the genus *Discosoma*²⁶. This technique is usually used with two group of fish; *Danio spp.* and *Oryzias spp.*

Human makes these fish colorful with purpose of the bright color to attract more customers and of its ability to fetch a higher price under a new title. Bright color of dyed fish and laser fish will last for only a while will fade with time. But the color of the GMO fish will be permanent and they can produce offspring with the same color throughout its life. Initially, it is doubted whether these fish could be bred or not; but this is already proved by an aquarist in the UK that there is a fish spawn. The information is also confirmed by the producer²⁷. The fish was first available under the trade name of “Glofish” and “Fluorescent Zebra Danio” in many countries, but it is illegal to have them in UK as no Genetically Modified fish is authorized within the EU and the UK. In United Kingdom, it is going against the law which says that the importation into, or the acquisition, release or marketing of any genetically modified (GM) organisms within the UK is prohibited unless consent has been granted in accordance with Article 111 of the Environmental Protection Act 1990²⁸ which is listed that no one who has imported or acquired any genetically modified organisms (whether under a consent or not) shall continue to keep the organisms. Scientists are

²⁵Anonymous, 2009. **Painting life green: GFP**. Science in School. [Online]. November 10, 2009. Available from : <http://www.scienceinschool.org/2009/issue12/gfp>

²⁶C. Neal Stewart, Jr. 2006. **Go with the Glow: fluorescent proteins to light transgenic organisms**. Trends in Biotechnology 24 (4): 155-162

²⁷Anonymous, 2010. **GLOSFISH® FLUORESCENT FISH FAQ**. [Online]. November 10, 2009. Available from : <http://www.glofish.com/faq.asp>

²⁸Clarke, M. 2007f. **British aquarist bred illegal GM fish at home**. Practical Fishkeeping.[Online]. November 10, 2009. Available from : <http://www.practicalfishkeeping.co.uk/content.php?sid=1192>

afraid that GMO fish will be mutant and hybridized with native population if they are released into natural water. They may also cause many unknown effects to nature.

Dyed and laser fish are not yet ban in Europe, since they are products with no modified gene. But a group of hobbyist has been joining a program with the Practical fishkeeping magazine to launch a campaign promoting the ban of buying dyed fish in the UK for the reason that dyed fish will become weak and most of them are suffered from bacterial infection. It is estimated that about 80 out of 100 fish will die after being treated with dye,²⁹ for the reason that it is a kind of animal mutilation. Even though it is illegal to dye fish in some European countries such as the United Kingdom, there are loopholes in the law as demonstrated by the fact that dyed fish are imported from many Asian countries like Thailand and Taiwan without any problem. Innovations and Development of Technology are good that business people could use in improving the business, but it should be carefully used. The GMO fish are a good example in demonstrating how things need to be observed and made sure before action.

In ornamental fish business, technologies could be in a cultivation method, especially of the Marine ornamental. Marine fishes and animals are very delicate due to their specific needs. Cultivation of marine species is not successfully achieved due to limitation of knowledge and technology. But as time passes by, more information has been shared through various sources such as magazines and even available on the Internet. Technologies can help the breeders to go beyond their limitation in various ways such as the quality of water and the cultivation of live food to be available all the year.

5.1.2.3 Human Resource Management

²⁹Anonymous, 2008. **Dyed Fish**. The free freshwater and Saltwater Aquarium Encyclopedia. [Online]. November 10, 2009. Available from : http://theaquariumwiki.com/Dyed_Fish

Hiring of people is needed for this business to flourish. The Exporters need different people for different departments: Marketing & Sales, Management, and General Workers. Every step of the work is based on human resources. As ornamental fish are living goods, they need proper care to keep them healthy and survive until it reaches the customers. The fish should be observed and taken care daily by experienced workers. Fish that received a proper care will have fewer problems in exporting to the EU as they are disease-free and in a perfect condition. Training of workers is needed especially when they are introduced to the business. The training can be individual or in group led by experts. Basically the workers must know how to take care of live fish. Workers who have been working for a period of time will gain an experience that can be used in teaching new people. For general workers basic education is required, but skills and practice in fish caring are something especially needed.

Marketing and Sales Department should keep themselves up-to-date by following the news in the trade circle. They should be able to identify an opportunity in new goods or products, find the way to the source and reaching out to the clients. These people also need to be willing to work hard as sometimes the shipment is not always during daytime, but also late at night. The customers who stay in the different time zones also operate at a different time period. It is effective to contact clients using conversation program, but the workers should be ready to answer a call at anytime. Holidays depend on the clients' convenience and the shipment, not the normal standard holiday of the country.

5.1.2.4 Firm Infrastructure

The Firm Infrastructure is includes the Researchers, who have been conducting research projects aiming to breed and study certain kind of fish, which have a potential in becoming export products, also face a number of problems. Because most of the researches on Ornamental fish are by scientists and researchers working in national universities, bureaucratic process is therefore a problem. Research project has to be submitted in advance and needed to go through the process. The government

will be supporting in the promotion and sales abroad, with the regulations occur to make the product became competitive with others.

Results of the Value Chain Analysis

The study finds out that there should be an improvement in firm infrastructure, especially that dealing with the governmental affairs. Cooperation must be made between the government and the private sector to smoothen the exporting process. More promotion should be made worldwide, especially in the EU. Advertisement and Booth exhibition is needed in order to promote Thai exporters and demonstrate that Thailand has export potential comparable with countries with quality products. The government should supply exporters with space in trade fair or road show at a huge pet fair in Europe such as the Interzoo in Germany. Selected quality exporters should be given free attendance to workshops. Directory of Thai Ornamental fish exporters should be distributed to those interested through Government's agency or put the directory on the Department of Fisheries website.

As for researcher, once the project is approved, they still need to wait and see whether the requested budget is granted or not. The persons approving the project and granting the budget are from different departments and therefore make the system inefficient. As the budget is received as a whole through the university, the allocation often results in incomplete budget. This impedes quality as well as the progress of the project. If there were a continuous support for the project and studies on ornamental fish business, breeders and fish farmers will have new products as a boost to the business. Research and development should perform together in order to go further than other countries.

A link between the government and private sectors should be created by setting up a section under the department of fisheries to be a center to disseminate information and work as a one-stop-service for export of ornamental fish. This will also help when researchers are breeding or studying on a certain kind topic. The government and exporters need to work in cooperation to make a cycle complete; so that the researchers could focus directly on their work in developing a project and make it

suitable for breeder. The government could support by giving a separate fund for an interesting research project, while an exporter could support by making a survey on species needed from the importers and encourage the breeders to try or continue breeding them after the projects by researchers are done.

Exporters will not have to run back and forth to several places and slow down the process of documents. The government will be able to communicate with exporter directly and easy to gather trade statistics. Not only dealing with ornamental fish, the centre should include related products and services like fish food, water plants and other goods to support the industry chain. Exporter will then be able to export these products at the same time and increase their profits and overall export rate. This will make the trade more efficient and up-to-date as the centre makes a complete cycle that products are developed and marketed according to the need of the market.

New technology also helps saving human resources. For example, European exporters have a packing machine that could pack plastic bags that are filled with oxygen automatically. Within this process, time will be saved and the production will be faster than using workers' hands and rubber bands. Moreover, the quality of the packaging will also be of the same standard. It is effective for a big exporter that needs to pack a lot of fish or having many shipments per day. Quality of plastic bags used in export is different from those using in the domestic industry. The bags are thicker and some exporters choose to use a special kind of bags that wrap up the edge to prevent small fish from being stuck inside when put down the bag in the box.

Thai exporters are interested in using these new technologies such as packing machine and chemicals for treatment and examination before the fish are exported. Nevertheless, the costs are high. Packaging machine will be important in a huge exporting company that will be surely emerging in a coming future. The department of fisheries at Kasetsart University provides a laboratory for exporters to examine their ornamental fish product, but it is far from most of the export area. Some suggestion from exporters is to provide the same service in different areas to make it more convenient and effective.

5.2 SWOT Analysis

The SWOT Analysis aims to make Exporters realize the weakness and strength of the business. Opportunities and Threats are listed to point out to other competitors and to make correction.

5.2.1 Strengths

5.2.1.1 Wide variety of Product

Thailand has much strength in this business. First of all, Thais have a good resource of products. Wide variety of fish is obtained from breeders and gathered from the wild, of which many native species are popular among foreigners. Some exporters also do re-export fish from different countries such as India, Indonesia, and Myanmar. This is to provide more choices for importers as well as help saving their expense of ordering from many different countries through one shipment. Fish that travel from nearby countries will use less time in transportation, making the quality of the fish better as they do not require a lot of time to recover.

5.2.1.2 Real producer

Most of the fish being export is a fish breed or found in Thailand. The country only depends on a few re-export products. This make the cost of operation became lower as there were less expense on cost of transportation and tax.

5.2.1.3 Quality breeder

Breeders from Thailand are the leader of certain groups of fish. Thai breeders have a good knowledge on culturing ornamental fish. Many fish have been first developed and bred by Thai breeders. For example, Thailand is the best Betta breeder in the world; the Thai term 'Pla Kat' is used by retail shop in Germany and gradually becomes a common name replacing Betta in many European Countries. This imposes 'Thai brand' on these fish species. Thai exporters also provide choices for importers

as there are two grades of Betta for export: normal grade with low prices and A grade a more expensive tag price. Quality and quantity of Thai Betta are considered as the best in the world, as Thai Betta ranks first out of all ornamental fish exported from Thailand³⁰ and it is one of the major groups of fish imported to the EU.

5.2.1.4 Quality product

Ornamental fish product of Thailand has a good quality control on fish health. Most of the fish is healthy with well packaging. Fish usually arrive to the importer in a good shape with high survival rate. So far, Thailand has not had any problem on health issue. This means that Thailand has a strong system of screening and controlling of fish disease.

5.2.1.5 Low cost of production

Thailand is known for a long time as a good producer that supplies a quality ornamental fish to the world market. Good fish food is supplied in a low price and Low costs of labor also give Thai producers an advantage over Singapore and other countries.

5.2.1.6 Good location

Climate in Thailand is also suitable for all of the Tropical fishes to be breed and cultivated. Only in winter that Thailand will be somewhat struggle, but it does not last long. So this makes most of the fish species spawn all year round. There were also a lot of land and water bodies that can be use for cultivation.

5.2.1.7 Leader of Marine Ornamental Cultivation in Southeast Asia

³⁰Anonymous, 2005. "World of Ornamental Fish". **Thai Fisheries Gazette**, 58 (6): 491-503.

Exporters also have a strong point in that Thailand is the only country in Southeast Asia that has large Ornamental Marine Fish breeding farms that keep upgrading themselves with researches and studies. Philippines and Indonesia are main exporters of marine fishes, but their product is 100% from wild resources. The EU and the world are very concerned about environmental issues. One specific issue is the decrease number of world reef fish that were once abundant in nature as a result of the reef fish trade³¹. Now, Thailand can breed around 32 species of marine ornamental fish, of which at least 12 species are exported, while there are only 25 species of captive breed on commercial scale worldwide³². This keeps Thailand in focus.

5.2.2 Weaknesses

5.2.2.1 Weak Organization

Thai exporters are scattered, as they do not position themselves as a group. In 2003, an Aquatic Fauna and Flora Exporters Council of Thailand (AFFECT) were established with an aim to modernize the trade for the common benefits of the whole aquarium industry in Thailand with strong endorsement from relevant government agencies. It is regarded as a crucial and clear link between the government and the aquarium fish aquaculture and captures communities³³. Unfortunately, the organization has not been so useful to the traders. No significant information is provided on its website either to inform the exporters or the public. Certain exporters

³¹Scales H, Bamford A and A Manica. 2007. **Impacts of the live reef fish trade on populations of coral reef fish off northern Borneo**. Proc. R. Soc. B. (2007) 274, 989-994.

³²Bruckner, A. 2005. **The Importance of Marine Ornamental reef fish trade in the wider Caribbean**. Rev. biol. Trop 55 (1). [Online]. November 10, 2009. Available from : http://www.scielo.sa.cr/scielo.php?pid=S003477442005000300018&script=sci_arttext

³³Aquatic Fauna and Flora Exporters Council of Thailand (AFFECT). [Online]. November 10, 2009. Available from : <http://www.a-f-f-e-c-t.com/about.html>

and government officers also comment that there is no real cooperation and no real link between exporters and the government. There is no government's department that deals solely with ornamental fish.

5.2.2.2 Price-cutting strategy is being used by certain exporters

Producers and breeders also use a price-cutting strategy as there is little interaction among them. If there is a sense of group, they could make more profits. For example, they can make an agreement on creating a price floor; so that the products will not be compete with each other.

5.2.2.3 No size standard

Some importers comment that the quality of the size is not of standard. The size varies in each shipment. This causes a problem to the importers because they have to explain to their customers about the change of size and the price of the fish. They need fish with accurate size every time they order, but Thai exporters mostly overlook this problem or simply could not maintain standard.

5.2.2.4 Lack of experiment

Many breeders also avoid producing new kind of fish. They do not want to risk themselves because they are already satisfied with fish they can produce and already have a market for. This makes things under developing. Villagers and farm breeders lack knowledge and depend too much on traditional knowledge. Not using technology that could makes the process more effective with less time and supply the market with something new and in demand.

5.2.2.5 Lack of self promotion

Only big export companies that will have a chance to make a road show or trade fair in different countries, due to the high cost of operation and language barrier. From the previous trade fairs, "Aquarama" that held in Singapore; only two Thai

Ornamental Fish exporters showed up individually with a promotion booth of Thai Department of Fisheries. Small exporters lack a chance of promoting themselves and getting introduced to potential trade partners. Singapore itself exhibit 48 booths out of 150, which rates as high as 35%. Malaysia shows up with 16 exporters, Indonesia 12, Vietnam 1 and no Philippines³⁴.

5.2.2.6 No reputation of being the best exporter

Another problem is that Thailand only has a reputation of a good 'producer', but not a good 'exporter' when compared to Singapore as the later was claim to be a hub for world ornamental fish. Thai Ornamental fish exporters do not have their strong position in the world status as Singapore.

5.2.2.7 Logistic Problem

But the most important weakness of Thai Ornamental fish Industry is the logistic costs. When compared to Singapore and Malaysia, Thailand has more expensive airfreight. This is a major concern that steps up the price of the fish being exported to the EU even though the price of the fish itself is cheaper than that of Singapore and Malaysia; but when it is summed up in total with the logistic costs, the fish import from Thailand is more expensive. Lack of one stop service is another problem for Thai exporters. The exporting process should not take a day and should not be done and issued at different places.

5.2.3 Opportunities

5.2.3.1 Constant growth of Ornamental fish trade in European Union

³⁴Aquarama Magazine. May 2009. Issue 12. Printed in Singapore. 86 pp.

According to World Trade Organization, the world trade in ornamental fish is worth more than US\$4.5 billion with an annual growth rate of 8%³⁵ and Asian countries account for a significant 68% share. This is contributed to the constant growth of Ornamental fish trade in the European Union. This gives Thai importers more opportunities to export.

5.2.3.2 Government paid more attention

Thai department of fisheries begins to pay more interest in the export of Ornamental fish. This is shown in the seminar on exporting problems and potential, which is part of the Department of Fisheries year plan³⁶. The resulted RCA demonstrates the increasing reliance of Thailand on ornamental fish product. This will affect the policy that deals with ornamental fishes in the future.

5.2.3.3 More demand of Marine Ornamental fish

As there is a growth in Marine Aquarium hobby, there is a strong demand of breeding marine ornamental in European market. This creates opportunities to Thai breeders and exporters as other countries in this region have not cultivated ornamental fish at a farm scale for trade yet.

5.2.3.4 Opportunities in breeding new kind of fish

Not only for marines, but Thailand still has a chance to develop new strains of Freshwater tropical fish to supply the market with traditional knowledge and experience to lower the costs of production. Trends and market could be observed from magazines or the Internet.

³⁵www.wto.org

³⁶**Policies and Research Framework on Freshwater Fisheries in the year 2010-2013.** 2007. Inland Fisheries Research and Development Bureau. [Online]. November 10, 2009. Available from : http://www.fisheries.go.th/freshwater/news/circular_detail/scan%2011a.pdf

5.2.3.5 EU banned an import from certain country

Thai producers also have advantages over some other Asian producers. Some has been banned from exporting Cyprinids fish into the EU due to the contamination of certain disease such as the Koi Herpes Virus (KHV). Even though the fish Thailand also faces the same problem, the department of fisheries responses to the problem immediately and get in control of the situation. For this reason, the EU does not ban Cyprinidae products from Thailand. Malaysia, on the other hand, has been banned by the EU from exporting goldfish and carps in July 2008³⁷:

“The import of following consignments of fish belonging to Cyprinidae family, their eggs and gametes is forbidden: (a) consignments of live fish, intended for farming; (b) Consignments of live fish, of aquaculture origin intended for restocking of put and take fisheries; (c) consignments of ornamental fish for open waters and (d) in the case of consignments of ornamental fish for closed waters, only the species *Carassius auratus*, *Ctenopharyngodon idellus*, *Cyprinus carpio*, *Hypophthalmichthys molitrix*, *Aristichthys nobilis*, *Carassius carassius*, and *Tinca tinca* of the Cyprinidae family II-471b, (1252/2008/EC)”³⁸.

Result of the SWOT analysis

Results here could be use with the making of a strategy for Thai Ornamental fish exporters and related organization. In order found out that Thailand have a strong advantage in being a good producer of quality ornamental fish. When combine with several opportunities such as constant growth in the need of ornamental fish in European Union and banned of imports on certain fish from Southeast Asian Country;

³⁷Lee, R. 2010. **EU ban cuts revenue from aquarium fish**. New Straits times. [Online]. November 10, 2009. Available from : http://www.nst.com.my/Current_News/NST/articles/12mx/Article

³⁸Anonymous, 2009. **List Countries and Protective measures**. [Online]. November 10, 2009. Available from : http://www.bvet.admin.ch/ein_ausfuhr/01183/index.html?lang=en

Thai Ornamental Fish export rate will be able to raise up and compete with other countries. This disease problem in some countries increases a chance of Thai exporters to sell more and to gain the reputation of exporting quality disease-free fish to Singapore and EU. Malaysia has been having a hard time exporting fish such as carp and goldfish as everyone is wary about the possibility of diseases. Since supply chain is not isolated, Singaporean exporters, therefore, have to change their source of Goldfish and Koi to protect themselves from being contaminated. Singaporeans are worried about this issue for they might be banned if the disease is found³⁹. Their costs of operation will increase as the fish are to be imported from other countries instead. This is because Malaysia has a connected border with Singapore. Any country found with a diseased shipment will be recorded and shown on the list available on the Internet. This makes importers wary on the issues.

Threats also show that Thai government still need to improve in Law and regulations, which limits the number of species being produced and decreases the variety of livestock. Even though there was an opportunity in breeding new kind of fish to supply the European market, the government should change and improve certain law and regulation such as reduce the tax rate for breeders and certain law.

First of all, an export process requires time, while the order should be shipped as soon as possible. Thailand only has a good reputation of being a good breeder, while Singapore claims to be a hub for this business even though they import the fish from Thailand. If the European exporters know that they could get the same products they want from Singapore with better price and same or shorter period of time, they would definitely turn to Thailand. If Vietnam, Malaysia, Philippines, or any country could breed the fish better than Thailand, then the export chance will be lower as more choices are provided.

³⁹Clarke, M. 2006b. **Singapore Koi trade concerned about KHV**. Practical Fishkeeping. [Online]. 10 November 2009. Available from : <http://www.practicalfishkeeping.co.uk/content.php?sid=182>

Some of Thai laws are not up to date. Certain Ornamental fish that have high potential for export are listed as a protected species in the Wild Animal Preservation and Protection Act, B.E. 2535. Fish listed in this Act could be obtained, bred and traded by only those with permit. For example, Tiger Perch was once so abundant and said to be a good food fish, but it is decreasing in number and has become almost extinct. This fish is now protected by law and Department of fisheries listed it in the document that under the scientific name of *Datnoides microlepis*. But a recent study found out that the Tiger Perch found in Thailand, Vietnam, and Cambodia is another species (*D. pulcher*), while *D. microlepis* is a species that is founded in Indonesia. Because of this reason, Thailand could not import the fish and re-export it to other countries.

Another example is with Dwarf Chain Loach (*Botia sidthimunki*), a small fish found in the Central part of Thailand. Due to the habitat destruction and catches for ornamental fish trade, the fish is almost extinct in the wild and therefore is protected by the law. However, it is secretly bred by villager and illegally sold to ornamental fish market in the country for a long time. This shows that all of the fish that appeared in trade come from breeding program. The law should be revised to allow breeding. The revision will keep the law up to date and practical. Improvement of the documents and papers will lead to the way for export in the future.

5.2.4 Threats

5.2.4.1 Economic crisis

Since the production and trade of Thai Ornamental fish are linked with export rate, an effect can be felt if there is an economic crisis or a change in the world economic condition. Ornamental fish are particularly sensitive because they are not basic goods.

5.2.4.2 Law and Regulations

According to Thai law, the breeders who import breeders are subjected to 60% tax. Since breeders are often of a priced species that command high price, this creates a problem to those wanting to breed a new kind of fish for export.

5.2.5 Implication of SWOT analysis

5.2.4.3 Logistic Cost

Logistic cost is another issue that should be solved immediately. Thai Ornamental fish exporters will surely have a big problem if Vietnam has logistics and freight charge cheaper than Thailand as the export rate of Thai Ornamental fish is already lower than Singapore and Malaysia.

5.3 Revealed Comparative Advantage (RCA)

Revealed Comparative Advantage will be used to analyze the Ornamental fish trade of Thailand, Philippines, Singapore, Vietnam, Indonesia, and Malaysia toward the EU market. Export numbers from these five countries between the years 2007-2009 will be used.

In this study, the basic information is based on statistic records from Thai Department of Export Promotion, Ministry of Commerce under the Commodity Trade Code 030110 on Live Ornamental Fish. The information used begins with the year 2007 to keep the statistics constant because of the current number of European Union member states expanded to the current number of 27 in 2007 with the inclusion of Bulgaria and Romania.

In Figure 12, a chart shows the value of ornamental fish export to European Union each year. It could be seen that Singapore is the one who have a highest export number followed by Indonesia, Thailand, Malaysia, Philippines, and Vietnam. It can be seen that in 2007 and 2008, the numbers of Ornamental fish export value are increasing. Starting from 2007, Singapore ranks first in export value. Second is Indonesia, Thailand as the third and follow by the Philippines and Vietnam, which

have no significant change. But in 2009, values of export goods from every country (Figure 13.) decrease as a result from the world economic problem, except for Indonesia.

Indonesia has a good RCA number and it is growing significantly; for it is the world biggest exporter of Marine fish and also an important exporter of certain kind of freshwater ornamentals such as the Clown Loach and other native species. This creates more choice for customers. However, Indonesian breeders have been working on breeding programs of several other ornamental fish and their achievement begins to bear fruits. With the launch of new crustacean products such as ornamental shrimps and crabs from Sulawesi that has just been introduced into the market between the years 2008-2009, this creates a strong demand for European importers and made a good turning point for the business as Indonesia became in focus for freshwater as well as the marine species.

The RCA of Vietnam is more than 1 and it is increasing. It only decreases a bit between the years 2007 and 2008. However, Vietnam is still a new comer in the business started in 2001 and they could gain back the number to 1.87 in 2009. Even though it is not a significant change, the RCA is on the rise. This is due to the support from the Vietnamese government with a policy in improving ornamental fish business. The country boosts an industry by establishing ornamental fish farming village in the sub-urban district of Cu Chi⁴⁰ with the plan to give tax fee privilege to any fish import for breeding purpose and giving loans with low interests to support the Ornamental fish farms⁴¹.

⁴⁰Anonymous, 2007. **HCMC Ornamental Fish breeders make big bucks.** THANHNIEN NEWS. [Online]. November 10, 2009. Available from : <http://www.thefishsite.com/fishnews/4359/hcmc-ornamental-fish-breeders-make-big-bucks>

⁴¹Anonymous, 2008. **Ornamental Fish in 2008: Export expand 76.0% around 1,000 million baht.** [Online]. November 10, 2009. Available from : <http://www.positioningmag.com/prnews/PRNews.aspx?id=72729>

It is only Malaysia that the export number decreases in 2008 and drop in 2009 as well as the RCA number (Figure 14.). There are several reasons connected with the decreasing of the export numbers. According to the Ninth Malaysian Plan (2006-2010) Malaysia focuses on three groups of fish: Discus, Goldfish & Koi, and Asian Arowana (*Scleropages formosus*). Since the middle of 2008, Malaysia has been banned from sending of goldfish, koi, or any cyprinids fish, which considered one of the three important fish in the plan, to the EU due to the contamination of KHV disease. This is supplemented with the decline in popularity of Crossbreed Cichlid, which is originated in Malaysia. The fish is believed to be a lucky animal and was a trend for a period until the trend dies down. Other countries like Thailand could supply the same fish at a lower price. And the last one is Arowana. This fish need large space in order to thrive and it also ranks as the most expensive fish in the hobby. This is related to the economic problem. If the economy is not in a good shape, the sales of the fish will drop correspondingly. Dropping of sales rate in a particular type of fish also results in a significant change in export number as it commands a high price. Only Discus is still part of the plan, but it also competes with Discus exported from Thailand. For these reasons, Malaysia Ornamental fish export rate has been dropping.

Value in US \$ Million

Countries	2007	2008	2009
Thailand	6.8	7.3	6.8
Singapore	42.2	45	36.9
Malaysia	6.5	6.2	4
Vietnam	1	1.1	1.3
Philippines	2.1	2.4	2.2
Indonesia	9.9	11.3	11.5

Figure 12: Value of Ornamental Fish Export to the European Union from some Southeast Asian Countries between the years 2007-2009 (Source: World Trade Atlas)

Value in US \$ Million

Countries	2007	2008	2009
Thailand	22822	25617	19889
Singapore	25233	23651	19654
Malaysia	24718	25724	20377
Vietnam	10762	12594	10780
Philippines	7723	7915	5328

Figure 13: Export Value of Live Ornamental Fish Products to the European Union from some Southeast Asian Countries between the years 2007-2009; Commodity: 030110 (Source: World Trade Atlas)

Countries	2007	2008	2009
Thailand	4.56	4.41	5.23
Singapore	25.78	28.92	28.59
Malaysia	4.03	3.7	3.03
Vietnam	1.48	1.33	1.87
Philippines	4.19	4.73	6.24

Figure 14: Revealed Comparative Advantage of Commodity: 030110, Ornamental Fish, Live from Thai, Singapore, Malaysia, Vietnam, and Philippines to European Union between the years 2007-2009 (Source: Calculated by based on information from World Trade Atlas)

From the Reveal Comparative Advantage (RCA) of Thailand, Singapore, Malaysia, Philippines, and Vietnam, the studies find out that every country that the RCA result is greater than 1 means that they have an advantage in Ornamental fish product. Thailand has lower number of ornamental fish export value than Singapore and Malaysia and has lower RCA number than Singapore. This does not mean that Thailand lacks competitive advantage in Ornamental fish export to the EU market, as the RCA of Thailand decreases a little in 2008 and regains it in 2009. Upon comparing in terms of percentage, Thailand has more advantage as the result of RCA is going up by 20% in the later year. Philippines also has more RCA number than Thailand and it is increasing up each year as they are the second largest supplier of Marine Ornamental fish in the world market. This is due to the growth of Marine Ornamental trade around the world, especially the American and Europeans⁴². But Thailand still has more advantage over Malaysia and Vietnam since Thailand already has an advantage in breeding of the livestock, country location that is best for tropical fishes, reputation of being a good breeder, packing service, standard of the fish and increasing support from the government.

Comparing the five countries listed, Singapore has the highest RCA value. It could be seen that Singapore RCA is increasing each year. Even though there was a world economic problem in 2009, Singapore RCA only changes a little due to the high advantage in many categories. The country claims to be the world hub in ornamental fish with strong support from government. It is an important port of the region with good logistic services. Low freight charge to Europe makes them popular among European Ornamental fish Importers. Singapore is also a good middleman trusted by all of the European Ornamental fish Importer that they could provide quality products for them under the same standard. In conclusion, Singapore has strong advantages on Logistic Service and reputation as the hub of world ornamental fish.

⁴²Bruckner, A. 2005. **The Importance of Marine Ornamental reef fish trade in the wider Caribbean**. Rev. biol. Trop 55 (1). [Online]. November 10, 2009. Available from : http://www.scielo.sa.cr/scielo.php?pid=S0034-77442005000300018&script=sci_arttext

CHAPTER VI

CONCLUSION AND RECOMMENDATIONS

Conclusion

The previous chapters have stated and explained an export potential of Thai ornamental fish and analyzes using three economic tools: Value Chain, SWOT, and Revealed Comparative Advantage (RCA).

The Value Chain of Thai Ornamental Fish trade shows that Thai exporters work very well with the European importers. The strength of Thai exporters is the good source of supply as Thailand itself is the best producer of ornamental fishes in this region and probably in the world. This means that they can supply things the customers need with the best quality and does not need to pay for the logistic cost between countries. Various sales techniques are used to attract customers' attention and maintain the sales rate. New technologies play an important role in the development of new kind of ornamental fish. Modern methods such as through the Internet can also encourage the sales and keep in touch with the importers within a few second.

SWOT analysis indicates that Thailand has a strong advantage over other Southeast Asian exporters. Thailand has low cost of production; as there was good climate, cheap labor, operation cost, and knowledge on ornamental fish breeding which is passed on from generation to generation. Thai fish do have a good quarantine and strict quality control in term of diseases such that the country has never got banned from the trade or faced continuous problem about certain diseases. Thailand also has variety of products, which include captive breed marines. Weakness of Thai Ornamental fish Industry includes the ineffective grouping of exporters that lack unity, the reputation as a good breeder but not an exporter, lack of standard in size measuring, and the logistic costs that are a lot more expensive than a major exporter like Singapore. Third, Thailand also has many opportunities as this industry grows every year. Thai government also pays more interest to this business and has begun to give support. This will supplement the reputation of Thailand as a good breeder.

From the studies, it is shown that there are three major problems in Thai export potential to the EU market: Government, Unity in the Public Organization, and Logistic. For government, there are several points that need improvements: document, law, and the support. There should be an improvement in the process of export and document requirement. The process is rather slow due to the qualification of the government. Some laws are also out-of-date; they are not catching up with the current situation in the industry. Thai government supports people to breed ornamental fishes, but does not provide continuous support in finding a market for them. There should be an Ornamental fish trade fair that deals with Department of export promotion with an aim to launch new products and show the export potential that we have. Importers should be invited to attend an event. This is while Singapore always has a conference and trade fair that deal with this issue once every two years. With a trade fair in Thailand or opportunities for Thai exporters to attend trade fairs, Thai exporters can have more clients and create a connection to export. Unity in the organization set up for public advantage is another problem that Thailand has to face after complete setting up the middle link between government and the exporter in the form of an association. This may be difficult, but if the problem could be solved, it will be a great step forward.

It could be said that the future of Thai Ornamental Fish export Industry to the EU market depends on the situation on the costs of an airline. The biggest problem for all Thai ornamental fish exporter is the logistic costs. When compared to a perishable product like vegetables, the logistic costs of vegetables are cheaper while they need similar requirement such as the fix arrival date and cool storage. The government should come up with a strategy to help the exporter in this category as it is not a problem stemming from the product or the entrepreneur but a regulation made by the government itself. If the government improves all the qualifications listed and the organization becomes more united, but the logistic costs are still expensive as usual, this change will be no use. Customers will look for something cheaper if there were significant different in price.

Nevertheless, the analysis of Revealed Comparative Advantage shows that Thailand has an advantage in exporting Ornamental fish to the European Union as all of the results shown in the record is more than one. When compared with Singapore and

Indonesia that have higher RCA, Thailand should be seen as a place that could do much better if there is an improvement of the weakness listed. The results also find and explain that Thailand still has a lot of an export potential for Ornamental fishes in the European Market as other Southeast Asian Countries is not the direct competitors. Philippines and Indonesia is focusing on wild caught marine ornamentals, while Vietnam and Malaysia is producing something different from Thai main ornamental fish products. Even though these things were classified under the same category as 'ornamental fishes'; but the species of fish being produce in each country is varying according to the producer. Only Singapore could be seen as a competitor as they did act as middlemen who also buy the product from Thailand for export. Except from Philippines that focus only Marine fish, all of these Southeast Asian countries were both competitor and compliment since their product might be overlap for certain species but not everything was duplicated. Most people who keep fish will look for various fish that is originated from different area, so there was a chance for the sellers to sale more fish after the customer bought one. So the fish could be seen as a compliment to each other. Traders who want to trade with EU also need to keep them alert with by updating the new released documents all the time. If Thailand could keep itself with the current situation, it will be a great opportunity to a better achievement in the future.

Recommendations:

SWOT analysis indicates that Thailand has been known for decades as a leader of world ornamental fish breeder. However, Thai breeders focus on few groups of fish such as Goldfish, Bettas, and certain kind of Cichlids. Certain export fish species could not be bred by human yet. All of them are caught from the wild, for example the Glass Catfish (*Kryptopterus bichirrhis*), one favorite of all European importers. Each year, more than 600,000 individuals²⁰ are being exported out from Thailand mainly to the U.S. and the EU. All of the exporters rely on the number of fishes harvested from the wild. If the situation is continued without any attempt to breed the species, it will surely be a problem affecting the sales rate when unexpected event occurs such as flood or pollution that causes the fish population to decline. The

department of fisheries should see the importance of these species supporting the breeding program and encouraging the breeders to breed them so that the trade will not disturb the natural population.

The weakness also shows that the unity should be created in ornamental fish organizations to make a strong group of exporters to solve the problems together and decide or make an agreement with the price ceiling to decrease the chance of price-cutting strategy. This is the responsibility of all the traders to make an agreement with each other to make the business grow bigger and become more stable each year.

According to an interview, European importers think that the quality of fish bred and imported from Thailand is high in terms of health, packing, and product variety. However, quality checks should be done occasionally to make sure that the exporters will maintain this high standard. Most of the fish exported do fine, except for certain species like Guppies. Normally, Guppies are freshwater fish. But the problem occurs when the breeders find out that Guppies will be hardier and less capable of fighting with diseases if they are grown in brackish water. Once an exporter orders them from a breeder and sends them out to the importers in the EU, the fish will show certain symptoms of disease such as rotten fins and may die immediately due to the change in water quality. The fish could not acclimatize to freshwater and this makes the standard of the Thai fancy guppy not acceptable. All EU importers have noticed these problems and make a warning among themselves. The department of fisheries should take action in educating or giving knowledge to the breeders and ask them to breed in a more appropriate way such as breeding in pure freshwater and make a promotion after the situation is solved.

Interview results also find out that there are still a lot of fish and aquatic species that the European market needs and has high demand, especially Dwarf fish. This is due to the lack of space in modern households and the change of trend, contrasting with the past that everyone was looking for something different, beautiful or cheap. Breeding should be done to increase the number of the livestock available in the market as if there were more supplies, products will become cheaper and it will increase the sales.

rate. The following are the species recommended for cultivation that have high export potential.

Freshwaters:

1. Crustaceans

Crustaceans such as shrimp, lobsters, and crabs have long been engaging with ornamental fish industry. The popularity has been fluctuating over the years until a development of a new strain of shrimp by the Japanese a few years ago: Red B Shrimp is a small shrimp that could cost more than USD 1,000 depending on the stripe pattern on the body. Now, the shrimp has been bred with better quality by selecting good breeding pairs with strong color. The popularity of these crustaceans is also stimulated by the flood of new species of shrimps and crabs from Indonesia. They were first introduced to the world ornamental fish trade by an Indonesian Exporter a few years ago and caught everyone's attention right after it first appeared in the trade. Most of them came from Sulawesi Island and all of them are taken from the wild. These small creatures are new favorites to the European Aquarists. The popularity results in a magazine devoting to this little creature in Germany years ago. Most of the export product came from Japan and now Taiwan begins to start breeding these creatures.

These crustaceans are a good choice for breeders who are looking for a new product. They are able to breed in Thailand without many problems. These animals have short life span, making the selecting process shorter when compared to fishes. Some of the species commands a high price and reproduces easily. Dwarf shrimps need only a small space to live. This makes the shipment small and freight charge inexpensive. Certain species of shrimp requires lower temperature. They will do well in places with high elevation or mountainous area and could be used in supporting the project in the highland agriculture or farming. As Thai breeders have been successful in breeding new kinds of ornamental fish, crustacean should be a new product in the future. Hybrids and crossbreed might be done to increase the value of the product and make our products different from others.

2. Nano Fish

The word 'Nano' is used to describe something small. Nano fish therefore means 'Dwarf' fish that have overall length only a few centimeters. These fish is suitable for European lifestyle that less space is available and it demands less care, compared to a big tank. Most of the nano fish are originated in the Southeast Asia. Many species are Thai native species such as certain kinds of Rasboras, which include fish of genus *Microrasboras* and *Boraras*. Dwarf gobies such as the bumblebee goby and *Oryzias* sp. are also recommended by importers. These fish are easy to breed and demand less space and care. However, they do not command high prices as they are bread and butter fish, still a lot of demand in the market.

3. Freshwater Stingray

Freshwater Stingray is an exotic ornamental fish from South America. It is a new arrival in Thai pet trade, which could be traced back around ten years, but it already bred and exported from Thailand as one of the ornamental fish products. Thai breeders have an advantage over other countries as they could produce crossbred fish and make a good selection of a body pattern to develop a new strain.

Marines:

Information from an interviewees and results of SWOT analysis shows that Marine ornamental species still have a potential in becoming a good export product. According to the Strength that Thailand is the first one in the region that began to cultivate these products for export and opportunities in breeding new kind of fish. If Thailand could breed more marine species, this will make the picture of Thailand as a best world breeder stronger. There are around 1,400 species of reef fishes in the Global trade, but only 25 are captive breeds on the commercial scale²¹. If Thailand succeeds in providing more variety of captive breeds in world market, the market will turn attention to the country.

Marine fish are different in that they need time to acclimate before breeding. Indonesia would have more potential as they already succeed with breeding of Marine food fish, but so far they have not focused on this topic yet. Vietnam, Philippines and Malaysia do not focus on breeding these stocks; only wild caught

products from the wild are used for export. Singapore focuses on being an exporter and a middleman. To start a facility and get the product, it takes at least one year to make the mission successful. There are only nine commercial farms in the world that focus in breeding Marine ornamental and almost all of them are in United States and Australia. Only one operates in the U.K²². The nearest operation of the product to European Market is in U.K. However, the costs of operation in these countries are a lot higher than Thailand. The fish produced in the country will be able to compete in the market in term of price as Thai fish have lower costs of production. If Thai breeders turn more interest into this issue, Thailand will be ahead in becoming a leader in cultivating of marine ornamental in the region.

According to an interview, the EU has concern on environmental issues, marine fish could be used as a new brand or a green product from Thailand as a number of Marine ornamental sold in trade are from wild stock. Exporters can launch out a campaign and introduce the European importers the program to catch their attention. Certificates, logos or icon should be given to those selling marine ornamental from Thailand to give a statement that they concern about environment. This is similar to a green campaign of the EU using the logo EU flower, which guarantees the producer of this product commits to high environmental friendly production standard. Buying one fish does not mean only to support the idea, but also to help ten fish from not being caught from nature as the surviving rate of wild marine ornamental being caught is low. Only 1 out of the 10 can survive to the fish store, while fish from cultivation have much more tolerance and are easy to keep.

1. Clownfish

There are 29 species of clownfish in the world, but not every species are introduced to the cultivation. Every kind of clownfish could be bred in captivity and some commands high prices as much as USD 1000 per pair. Most clownfish species can adapt themselves to the weather in Thailand as they like tropical weather all year round and do not reproduce in winter. Marine fish breeders in Thailand are also familiar with rearing and cultivating clownfish, so they should move on to other species as they have been succeeded with 11 species of clownfish so far. As there are so many clownfish species, selection could be done to make a new variation of color

or stripe pattern. This will create demand to something special in the market. Breeders may select rare or uncommon species to breed such as Mcculloch Clownfish (*Amphiprion mccullochii*), Wideband Clownfish (*Amphiprion latezonatus*), or the Bluestripe Clownfish (*Amphiprion chrysopterus*) as they are in demand and command high price. Compared to the cost of operation of the common freshwater species, clownfish is worth breeding. Even though it has higher cost of production, it commands much higher prices.

2. Gobies

Gobies are one of the largest groups of marine fish in the world, whose sizes and colors vary. Some gobies have a high price tag as they are rare and beautiful. For example, a small goby like the Flaming Prawn Goby (*Discordipinna griessingeri*) from the Philippines that can obtain a maximum length of a few centimeters could be sold for a price higher than USD 100 in North American pet trade. The fry of these gobies has high survival rate and it is popular in the trade. Now there are only certain species of gobies that could be bred in Thailand, but in the world market there are still many more.

Recommendation for Further Study

1. Further Study could analyze mainly on trade competitiveness of ornamental marine fish to EU market.
2. Further research topic could be made on the Ornamental fish diseases found in European market and their use of regulation.

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APPENDIX

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APPENDIX A

List of an Interviewer

1. Barry Allday, partners of The Goldfish bowl from the United Kingdom, who has been involved in the business for more than thirty years. He's a wholesaler and retailer of Tropical fish that has been founded more than fifty years and said to be one of Europe's largest specialist in aquatic stores with imports from eleven countries around the globe.
2. Frank de Goey, Managing Director of Ruinemans Aquarium B.V. in Netherlands. He is also one of the Honorary Life Vice President of the OFI (Ornamental Fish International). Ruinemans Aquarium B.V. is one of the best and the largest wholesale of ornamental fish in Europe. It has continued its operation for more than 50 years. The company imports fish from at least eight countries and exports to a number of Western European countries.
3. Ir. Paul Bakuwel, Coordinator Purchasing & Quality Control of Ruinemans Aquarium B.V. in the Netherlands.
4. Managing Director from Thai Qian Hu Co., Ltd, one of the biggest companies that are jointed with Singapore
5. Nithiphat B., Thai exporter of Aqua Siamensis that deals mainly with the European Market.
6. Wuttidej Yuenyoung, the owner of Allfish Thailand, another exporter which specializes in small fish and aquatic plants.
7. Sajja Sujjaporamest has been working with breeding of Freshwater Stingray more than 8 years.

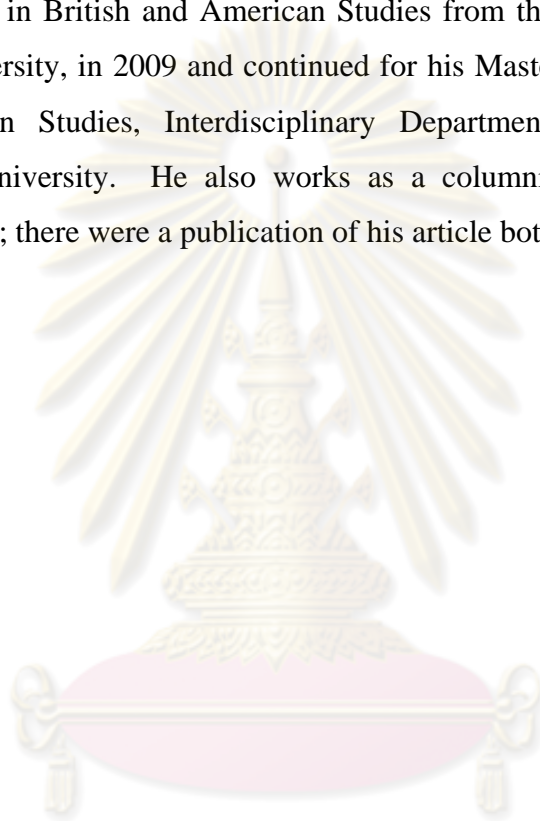
8. Mr. Pramote Sangsuksirikul, the owner of Nemo Farm, who has an experience in breeding marine fish for over 28 years and is one of the Clownfish Aquaculture Club. The farm starts its business for more than five years and now could breed over 8 species of clownfish.
9. Dr. Vorathep Muthuwan, Director of Institute of Marine Science, Burapha University, Chonburi. He founded and is still associated with the Marine Breeding Development program, whose aim is to give support to people interested in Marine Ornamental fish.
10. Dr. Somkiat Kanchanakhan, Fisheries Virologist at Aquatic Animal Health Research Institute, the Thai Department of Fisheries.



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BIOGRAPHY

Mr. Pavaphon Supanantananont was born in Bangkok on 18 August, 1986. After finishing his high school degree from Ekamai International School, he did his bachelor's degree in British and American Studies from the faculty of Liberal Arts, Thammasat University, in 2009 and continued for his Master's Degree in Masters of Arts in European Studies, Interdisciplinary Department of European Studies, Chulalongkorn University. He also works as a columnist and photographer for several magazines; there were a publication of his article both in Thailand and abroad.



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